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Conjunctive water management in North West China: A promising strategy to deal with uncertainty

Groundwater is a common pool resource for which good examples of collective management are rare. One reason is the high level of uncertainty associated with the resource's invisibility. First, users hardly know with whom they are sharing their groundwater. Second, it's hard to define how much ground water is available. Due to a lack of rules, uncontrolled pumping by a high number of individuals often leads to unsustainable use. It is argued that problems related to groundwater depletion can be solved by improving the coordination between surface water and groundwater use. In many places groundwater use for agriculture developed within canal irrigation districts (a practice known as conjunctive water use). Although surface water and groundwater are used side by side, the actors and institutions involved in resource management are usually separate and of a different nature. This is also the case for our study area in North West China. Traditionally surface water is managed and distributed by a state-led bureaucracy reaching from river basin to irrigation district level, while groundwater is pumped up and shared by small farm groups at sub-village level. Yet, based on the insight that groundwater and surface water are hydrologically linked, there have been various, recent attempts to bring surface water and groundwater management together. Conjunctive water management – whereby surface and groundwater are treated as one common pool resource – is expected to increase socio-ecological resilience and provide flexible solutions to cope with uncertainty caused by imperfect knowledge and climate variability. A concrete example would be to increase the use of groundwater in years of surface water scarcity and recharge groundwater aquifers in years of surface water abundance.

A challenge of conjunctive water management is the need for flexible institutional structures and good information flows amongst different authorities and water users. While conjunctive water management has become an important idea within water resources management, little research has looked at how these challenges are overcome in practice. In this study we compare the developments of conjunctive water use and management in three inland river basins in the Hexi Corridor, Gansu Province. In each of the three river basins the government has implemented measures to protect groundwater resources. However, responsible authorities are not necessarily those who manage the surface water, which might hinder coordination of management decisions. We use these three cases to examine whether the “promise” that conjunctive management increases socio-ecological resilience holds in practice. Based on stakeholder interviews and survey data collected in 2013 and 2014, we compare the river basins

on the following three aspects: 1) the constellation of surface water and groundwater management – to what extent are they integrated?; 2) information flows on rules and practices between authorities and water users – do the respective stakeholders respond to the information they get?; and 3) the conjunctive use behavior of farmers – to what extent is their choice between the two water resources flexible and able to respond to changes from year to year?

Keywords: Groundwater Depletion, Conjunctive Water Management, Uncertainty, Agriculture, China

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Correlates of food insecurity status of urban households in Ibadan Metropolis, Oyo State Nigeria

Food insecurity is a daily reality for hundreds of millions of people around the world. The urgent need to address this challenge led to its placement as one of the two targets of the first of the Millennium Development Goals, which is to halve the number of people who suffer from extreme hunger and whose income fall below \$1 per day by 2015. In spite of this, millions of people worldwide especially in sub-Saharan Africa still suffer from chronic hunger. This is an indication that very little progress has been made in reducing the food insecurity menace. In Nigeria, the situation is alarming given the efforts made by independent, successive governments to achieve food security in the country, through the setting up of a number of agricultural development institutions and special programmes and projects. This persistent food insecurity problem in Nigeria (especially in the rural areas) has been found to result from unacceptably high levels of poverty, low priority for nutrition on the agenda of government and resulting poor funding, the poor understanding by policymakers of the content of nutrition programs in relation to other sectors and the poor performance of Nigerian agricultural system. This implies the poor performance of the agricultural sector and invariably food shortages and accessibility problems and by extension immense challenges in the areas of vulnerability to food insecurity. The high rate of urbanization in Nigeria has exacerbated the problem of urban food insecurity as urban dwellers contribute to an increasingly important share of the food secure. This study, takes into account the probability of a decline in food access or consumption levels below minimum survival needs of urban households. The correlates of food insecurity of households in Ibadan Metropolis were examined using data collected from 150 representative households. Data obtained were analyzed employing descriptive statistics, food security index and the probit model. The estimated food security line was N1948.82. Based on this, 29.3 percent of the households were classified as food insecure while 70.7 percent were food secure. Econometric analysis revealed that tertiary educational status of household head; household size and employment status of the household head were the major determinants of household food insecurity in the study area. Efforts at improving urban food security should therefore take these factors into account. This could be through increased awareness on proper family planning activities and through formulation of relevant policies and implementation of targeted programmes at improving educational status of the affected households.

Keywords: Correlates, Food Insecurity, Urban Households, Nigeria

The effect of family planning on the multi-dimensional poverty status of rural households in Nigeria (POSTER)

The extent of multiple deprivations in Nigeria with respect to child health, infrastructure, employment, life expectancy and level of literacy indicates a low level of well being in the country. However, this low level of well being is more pronounced in the rural areas which are characterized by high fertility, low use of family planning methods and poor welfare. In spite of this situation, the role of family planning in managing population growth and as a poverty reduction initiative has received little attention especially in the developing world. This is evidenced in its outright omission in the Millennium Development Goals. Thus, empirical studies on the use of various methods of family planning and its effect on household wellbeing are important contemporary policy requirements. This study examined the effect of contraceptive use on the multidimensional poverty status of rural households in Nigeria using the 2008 Nigerian Demographic and Health Survey Data. The Logit regression model, Alkire and Foster measure of poverty and the Instrumental Variable Probit regression model were employed for analysis. Results revealed that factors such as household size, mass media exposure, contact with family planning agents, wealth index, age and educational status of women were the significant factors influencing the use of family planning methods among rural households in Nigeria. The poverty headcount of 0.475 and an adjusted head count poverty index of 0.311 for rural Nigeria is an indication of the prevalence of poverty and multiple deprivations in the rural areas. Further, deprivations in health contributed most to multidimensional poverty of the rural households in Nigeria, followed closely by deprivations in education. The negative association of the ever use of family planning methods with multidimensional poverty implies a decrease in the level of multidimensional poverty of rural households in Nigeria as a result of the use of family planning methods. Thus, policies or programs targeted at alleviating multidimensional poverty in the rural areas should incorporate family planning programmes to encourage the wide use of family planning methods.

Keywords: Family Planning, Multidimensional Poverty, Alkire and Foster, Rural households, Nigeria.

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Resilience of the Commons in the Midst Of Fragmentation and Titling of Natural Resources: African Pastoralists Adaption Strategies

Forty percent of sub-Saharan Africa is arid or semi-arid lands (ASALs). These rangelands are composed of grasslands, dry woodlands, and desert ecosystems and are home to an estimated 80 million rural pastoralists (Notenbaert et al. 2009). Pastoralism is a rational, adaptable, tried and tested production system uniquely suited to the ASALs. Pastoral livestock production is the dominant land use in the arid and semi-arid lands of Africa, providing a livelihood to millions of people. Pastoralist production contributes substantially to national economies, providing food and nutrition security and sustainable land use while maintaining landscape-level ecosystem services. According to a Policy Briefing No. 2 by AU/IBAR, twenty million people are estimated to have pastoralist livelihoods in the Horn and East Africa region. The livestock sector represents 20% to 25% of agricultural GDP across Africa (Mortimore et al., 2008). Significant portions of African livestock are found in pastoral areas. This indicates that

pastoralism provides a considerable amount of the red meat, milk and other livestock products in the region, as well as employing millions of people (Kirkbride and Grahn, 2008).

These contributions remain undervalued and insufficiently recognized. The true value of the economic contribution of pastoralism and its co-benefits to ecosystems, biodiversity, and other land users is not captured by the conventional methods or fully acknowledged (Barrow and Mogaka 2007, Davies 2008, Flintan et al. 2013, Notenbaert et al. 2012).

For centuries, pastoral communities have developed a sophisticated network of water resources— including rivers, rainwater and groundwater-fed permanent sources—and complex customary institutions through which to coordinate development and manage access. This system, including both its physical and its institutional components, critically ensures that the availability and exploitation of water resources does not jeopardize other resources, particularly by avoiding high concentrations of animals, which can threaten the health of the rangeland and livestock itself and lead to conflicts.

However, rapid change arising from multiple factors, including landscape fragmentation, sedentarization, and demographic drivers might affect the effectiveness of this pastoral coping strategy in times of drought. Diminishing natural resource availability, changing social values and governance systems, and new resource management institutions is challenging the capacity of communities for effective common pool resource management. The fragmentation of pastoral rangelands is occurring at an unprecedented rate as population growth and various public and private development projects spurs diversification and intensification of livelihoods. This situation is accentuated by the increasing number of politically connected, wealthy and powerful who are now gaining access to these lands for commercial use such as industrial (export-driven) agribusiness development, exclusive property markets development, or tourism development.

The subdivision of land into smaller, individualized parcels is both a symptom and catalyst of the threat posed by land use change (Davies 2008; Mwangi 2007, 2009). A primary driver of these dynamics is agricultural expansion into the ASALs. Anticipated effects of subdivided rangelands are increased sedentarization of mobile livestock-keeping populations, resource fragmentation, a declining resource base, and lower livestock and wildlife populations (Boone et al. 2005, Groom and Western 2013, Thornton et al. 2006).

Increasingly, pastoralists need new innovations to increase the productivity of their herds, while decreasing their vulnerability to environmental uncertainty. These adaptation strategies include herd splitting, range management, herding techniques (including social controls on range use), close monitoring of livestock and environmental conditions, and the use of wildlife as indicators—or for food in times of extreme need. Some pastoralists are diversifying their livelihood strategies into agriculture, business, and wage labor to reduce their dependency on livestock.

The unprecedented rate and scale of human-induced climate change in Africa is posing major problems to pastoral communities. (Kirkbride and Grahn, 2008: 11). As a result, pastoralists are employing a number of highly specialized risk spreading strategies to safeguard their herds in the face of unpredictable and sometimes extreme climatic events, disease outbreaks and social

unrest. These strategies ensure the rational use of the natural resource base on which the herds depend and also build strong social networks.

There's a need for increased representation and involvement of pastoralist groups at all levels. Governance is a key issue if the opportunities in pastoralism are to be fully realized, especially given its potential impact on conflict resolution. Reducing conflict through the recognition of rights could serve to open up huge regions which currently lie fallow as a result of insecurity, and also increase levels of participation in livestock markets.

Livestock markets should be developed to increase their bargaining power. Enabling services (credit and livestock insurance) are crucial to increase pastoralists' market participation and thereby release the full economic potential of the pastoralist system. Development of physical infrastructure will promote increased market access and reduce transaction costs with significant impact on livelihoods. Access to agricultural credit and agro-insurance products in the ASALs needs to be improved and adapted to the specific contexts. Pastoralists should easily buy private insurance to cover the loss of their herds to drought, and receive compensation in the event of animals dying during drought. Protecting their livestock assets through such innovative schemes reduce their risks of destitution. Non-livestock economic related ventures should be explored and effectively communicated.

Some pastoralists are fully harnessing the power of Information and Communication technologies (ICTs) to transform their pastoral lifestyles. ICTS are providing real-time market intelligence on livestock prices, weather patterns and have the potential for increasing the adaptive capacity to climate change through accessing data to early warning systems.

Overall, appropriate policies are required to fully unlock the economic potential of pastoralism and also support the transition of some pastoralists to alternative livelihoods in the face of emerging climate induced shocks and unprecedented land fragmentation.

Keywords: Natural Resources, Resource Fragmentation, Institutions, Policy, Africa

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Archaeological perspectives on collective water management strategies employed during prehistoric droughts in the North American Southwest

Theoretical models for how societies should manage common resources during climate change can be tested against the archaeological record. High resolution paleo-precipitation records from the North American Southwest show that prehistoric communities experienced droughts as severe as or worse than the contemporary drought afflicting the region. In the Jemez Mountains of New Mexico, prehistoric droughts are causally linked to the abandonment of large Ancestral Puebloan villages in the early 16th century. Yet not all villages within this region were abandoned, and some persisted until Spanish removal in the 17th century. Investigating the differences in how prehistoric villagers managed common pool resources, such as water stored in artificial features, may provide insights into the social processes driving the vulnerability or resilience of communities to climate change.

Keywords: Water, Drought, Archaeology, Common Pool Resources, Southwest

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How do real indigenous forest dwellers live? Neoliberal conservation in Oaxaca

As with most of Mexico, the southern state of Oaxaca has undergone a restructuring of its landscape intensifying conflicts over how resources and environmental rights are distributed. Although in the Mesoamerican context agriculture has been an integral part of Indigenous people's livelihoods, communities are unevenly disciplined to abandon such subsistence practice in order to maintain control of their forested lands. This paper examines how the recognition of indigeneity and customary land tenure has anchored a system for recognizing Indigenous peoples and holding lands that foster uneven development for Indigenous communities. While some peoples' lands have been liberalized, others have been re-regulated bringing with this a sweep of intercultural intricacies around what is characterized as customary land uses and who gets to be recognized as Indigenous. By looking at forest and agricultural dynamics, this paper shows how Indigenous peoples responds to unintended local consequences of land reform by articulating maize as central to the identity of Mesoamerican Indigenous peoples and a symbol of their ancient knowledge about their natural environments.

Keywords: Neoliberalism, Conservation, Indigeneity, Arboreal, Mexico

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The governance of co-management of Arapaima (Arapaima sp.) in the Middle Solimões, Amazonas, Brazil

Co-management of Arapaima can be considered as one of the successful cases of governance that contradicts Garret Hardin's Tragedy of the Commons. As a rebuttal to Hardin, Elinor Ostrom has analyzed various experiments involving the conservation of natural resources through collaborative management and concluded that many of them achieve positive results. In an attempt to identify the presence of governance in popular management initiatives and demonstrate that tragedy can be avoided, several studies have been pursued over the last 10 years. Few of these studies, however, address the implementation of mechanisms to achieve such governance. Thus, in order to contribute to the implementation of good governance in management systems in the Amazon, this study raises the key actions for the

sustainable management of the Arapaima and systematizes the main lessons learned in 15 years of activity, based on the principles of Ostrom. This study is qualitative / descriptive and uses the techniques of participant observation and document analysis to gather information on the management systems in the Middle Solimões region from 1999 to 2011. The results showed eight major steps to implementation of management: 1) planning; 2) zoning; 3) protection; 4) estimate; 5) fishing; 6) monitoring; 7) selling; and 8) evaluation. The main lessons learned through this study were: develop planning and monitoring activities; establish areas of use and protection of stocks based on traditional and scientific knowledge; implement effective ways to control fishing; ensure the reliability of scores (estimate inventories); promote the equitable sharing of financial benefits; fulfill commitments made in the negotiations; and evaluate the activities jointly, adapting the model as needed. Overall, it is concluded that the studied systems showed four key principles for good governance and conservation of arapaima such as: i) dialogue and mutual respect between local knowledge and scientific knowledge; ii) a solid grounding in technical and scientific methodology; iii) effective participation of users in the group stages of handling; and iv) constant adaptation of the management model from program monitoring and evaluation.

Keywords: Arapaima, Co-Management, Amazonia

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Collective action as a tool for water quality management in agriculture: the case of co-operative agreements in French drinking water catchments

Nonpoint source pollution from agriculture is a major threat to the quality of surface and ground waters in the European Union (EU) context. The EU Water Framework Directive (WFD), adopted in 2000, sets the objective of achieving good water status for all bodies of surface waters and groundwater by 2015. As part of the implementation process of the WFD in France, a national regulation requires the protection of water in 500 drinking water catchments identified as particularly threatened by non-point source pollution. In this frame, voluntary cooperation between drinking water suppliers and agricultural stakeholders is promoted for the definition and implementation of measures targeting diffuse pollution from agriculture.

This study aims at identifying the factors affecting collective action involving public/private water suppliers and agricultural actors for the control of nonpoint source pollution from agriculture in the French context.

Transaction cost economics are used to assess the benefits and costs of co-operative agreements for participating stakeholders. Transaction costs associated to collective action correspond to the information collection costs, bargaining and decision-making costs and the monitoring and enforcement costs of agreements (McCann, 2005). To identify the factors affecting the benefits and costs of collective action, we then use the SES (Social-Ecological System) framework (Ostrom, 2009; McGinnis and Ostrom, 2011).

The analysis relies on a two-step methodological approach. First, a literature review and interviews with 12 stakeholders of the water and agriculture policy fields at the national and river basin levels led to the identification of a first set of factors likely to affect collective action. In the second stage of the study, in-depth case studies of collective action in six drinking water catchments were realized, on the basis of 36 interviews with local stakeholders involved in co-operative agreements.

The in-depth analysis of collective action in the six study areas led to the identification of the factors affecting the achievement of cooperation between water suppliers and agricultural stakeholders: (i) the characteristics of the hydro-geological and agro-ecological systems in drinking water catchments, (ii) the characteristics of the stakeholders involved and (iii) the terms of co-operative agreements.

The nature of market incentives and the existence of public support at the water basin and national levels were identified as determining strongly the emergence and sustainability of cooperative agreements. The importance of these context conditions can be related to the public good nature of non-point source pollution control by farmers. In the presence of few direct economic incentives for water quality improvement, the success of collective action substantially depends on external economic incentives (e.g. the existence of a demand for “green” agricultural products) and public support.

Keywords: co-operative agreements; non-point source pollution; water drinking catchments; transaction costs; SES framework

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Persistence and Change in Social-Ecological Systems: Perspectives from Studies of Small-Scale Irrigation through the Lens of Coupled Infrastructure Systems

Social-Ecological Systems everywhere are already experiencing significant impacts from climate change. At the same time, globalization continues to generate rapid economic, technological, and social change. Caught in the middle of this coupled social and environmental change, pressed with changing patterns of freshwater availability on the one hand and changes in markets, technology, and social structure on the other are small-scale irrigated agricultural systems. These make up nearly 90% of all farming systems and generate 40% of agricultural output worldwide and thus constitute critical infrastructure at the global scale. This talk will explore the capacity of these systems to cope with changes they face through the analysis of individual cases and comparison across cases guided by the IAD and Coupled Infrastructure Systems frameworks. Using both quantitative and qualitative techniques I will demonstrate how institutional arrangements may at once help cope with specific, existing shocks but also generate vulnerabilities to novel shocks. I will discuss how such characterizations of robustness-vulnerability trade-offs in irrigation systems can be generalized to help inform policy options to improve the capacity of Coupled Infrastructure Systems to cope with variability and change.

Keywords: Coupled Infrastructure Systems, Robustness, Resilience, Vulnerability, Irrigated Agriculture

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The burden of conservation: who pays, who benefits, and why?

Salmon on the north coast of British Columbia are harvested in a series of complex multi-sector, multi-species fisheries. Commercial fishermen participate under a system of limited entry that was put in place in 1969. Recreational fishermen operate under two separate regimes, marine and freshwater. Indigenous communities harvest in both marine and freshwater systems under a protected Food, Social and Ceremonial (FSC) right. Since the mid 1990s, the official policy of Canada's Department of Fisheries and Oceans (DFO) has been that conservation is the first priority in salmon fisheries management, followed by FSC fisheries, and then recreational and commercial fishermen. This paper looks at the main participants in the salmon fisheries on the north coast, the commercial, recreational and indigenous fishermen, exploring their values around salmon and conservation as they have been articulated over the past 40 years. These values are then located within an evolving fisheries management system to see how these different groups have attempted over time to convince managers and policy makers that their version of what constitutes conservation should be the dominant one. In particular, the paper examines how the sports fishing lobby has succeeded in positioning itself as keen conservationists while the commercial fishing industry, which has a long history of supporting conservation, especially with respect to habitat, has come to be defined by an overfishing narrative. To complement the foregoing qualitative analysis, a suite of indicators is used to assess the effect of conservation trade-offs on the different sectors in the fishery over the time period of the study. A combination of archival and ethnographic data along with grey literature is used to build the analysis.

Keywords: Fisheries, Conservation, Trade-offs, Indicators, Salmon

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Exploring the meaning of 'Conservation' in Mexico's Lowland Maya Commons Malloni

This study addresses the meaning of Conservation in the Maya Zone of Quintana Roo, México. A set of interviews using semi-structured and open questions was undertaken from May to September 2014, involving two types of questionnaires: one exploring local terms for the word Conservation and a second one that used the local terms gathered during the first questionnaire to study local activities related to Conservation. Our results showed that, on asking the question "When you hear the word Conservation, what do you think this word is referring

to?”), the most frequent responses were: i) to look after the “monte” (a local word for rainforest) (44%); ii) to look after the rainforest, and do not slash it (8%); iii) stay out of rainforest areas (8%); and iv) a specific way to look after the rainforest (8%). All but one interviewees acknowledged that there were local Maya words similar to the word Conservation, namely “Kanan K’áax” (meaning “look after the rainforest”, since Kanan means ‘look after’ and K’áax means ‘rainforest’). However, 74% of interviewees stated that there were some differences between the words Conservation and Kanan K’áax. In particular they saw Conservation as involving: i) the government paying cash to look after the rainforest; ii) restrictions on pursuing certain productive activities, and prohibitions on taking resources from rainforest areas; iii) prohibition on slashing mature rainforest, which nonetheless resulted in having poor corn harvests; and iv) programs for reforestation. In contrast, the Maya term Kanan K’áax implies: i) no one paying cash to look after the rainforest; ii) no prohibition on taking resources from the rainforest; iii) [in the past] slashing mature rainforest, which nevertheless resulted in good corn harvests, and iv) no reforestation programs. Our results will be further examined in terms of federal and global policies addressed to the conservation of Mexico’s rainforest; specifically the benefits and the social costs of using and implementing programs of conservation at a local level.

Keywords: Conservation, Community-Based Conservation, Maya Zone, Mexico

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A cultural evolutionary explanation for the use of compulsory pooling in unconventional hydrocarbon production

This paper uses elements of the cultural multilevel selection (CMLS) framework to explain a problematic trend in the U.S. oil and gas industry. Unconventional hydrocarbon production, which extracts resources from underground shale formations and has experienced a major boom since the mid-2000s, is in many U.S. states subject to management under ill-fitting policy institutions developed for conventional production. Institutions which ostensibly minimized economic and environmental waste and maximized production efficiency of conventional mobile hydrocarbons do not perform similarly when applied to relatively immobile hydrocarbon trapped in shales. This institutional misfit advantages oil and gas producers but disadvantages individual landowners. This paper seeks to explain why the misfit emerged and persists.

The institution of compulsory pooling allows a state to force unwilling owners of mineral rights to participate in production when a threshold of proximate owners agree to collective production. In conventional production, pooling prevents hold-out owners from making “suckers” out of willing landowners, extracting mobile resources from underneath the latter’s property. Pooling also prevents a tragedy of the commons wherein would-be suckers realize their position and race to extract. However, in unconventional production, compulsory pooling is (initially) unnecessary because the immobility of the resource mean that an unwilling mineral rights owner cannot predate her neighbors by refusing to participate in production. Yet in many states where unconventional production is booming, pooling is still being used.

The CMLS framework can help explain this dynamic by focusing attention on group-level versus individual-level incentives and social learning. When policy and industry actors learned of the potential profits from unconventional production, they confronted two choices: (1) Craft new policy institutions to promote efficient, waste-minimizing production given immobile unconventional hydrocarbons, or (2) Extend the institution of compulsory pooling to unconventional production and use horizontal, explosive-reliant drilling technologies to make unconventional hydrocarbons locally mobile, thus legitimizing pooling's use. Changing drilling technologies to maximize resource exploitation given prevailing institutions is a self-interested, group-level response of industry actors seeking profit. This response involves within-group cooperation but is not socially cooperative. Changing prevailing institutions at the state level would have been a group-level response of policy actors seeking cooperative resource stewardship.

Compulsory pooling allows producers to reap benefits of economies of scale and reduces their liability for harm associated with drilling. While pooling previously benefitted both producers and individual mineral rights owners, the change in the nature of the resource reduced benefits to the latter. The benefits that accrue to individuals now only do so because of the change in drilling technology which itself was a choice of producers to create a biophysical situation which necessitated an otherwise ill-fitting policy institution. Self-interested producer behavior has largely out-competed the cooperative institutional solution in part because producers have publicly argued for compulsory pooling in unconventional production using claims rooted in the familiar, widely held understanding of mobile hydrocarbons. Insufficient understanding among individual mineral rights owners and policy actors of the implications of differences in hydrocarbon mobility prevents the social learning which could coalesce into collective pressure for institutional change.

Keywords: Fracking, Institutions, Institutional Fit, Incentives, Compulsory Pooling

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Aboriginal Capitalism and Alternatively *Living* Nuu-chah-nulth-aht

This paper examines the prospects of, and challenges to, living Nuu-chah-nulth-aht in contemporary times. At the heart of my examination is how Nuu-chah-nulth people struggle to maintain strong identities and livelihoods under the specific pressures of neoliberal economic development. Certainly, Nuu-chah-nulth people and territories have endured generations of colonial occupation and economic pressure, but of particular interest to me is the unique challenges presented by the present neoliberal development paradigm, which places specific pressures on Indigenous territories and identities. Isabel Altamirano-Jiménez describes this neoliberal-identity interaction as a descent into “market citizenship” (2004). Several scholars have proposed to Aboriginalize capitalism, such as “Capitalism with a Red face” (Newhouse, 2000), “Tribal capitalism” (Champagne, 2004), and “Reservation capitalism” (Miller, 2012). I seek to determine if this is possible in Nuu-chah-nulth territories, who have long deployed adaptive strategies, but the ongoing question is whether these strategies have successfully integrated new practices into Nuu-chah-nulth ways of being or whether these new practices have fundamentally transformed those Nuu-chah-nulth ways of being. This paper looks at

several examples of adaptive economic practices – including tribal-level initiatives as well as small scale, individual and family efforts - and discusses their potential cultural implications. As a means to evaluate these examples I access Nuu-chah-nulth traditions, but from a critical perspective to differentiate principles and practices. The purpose is not to get caught up in essentialist dogmatic practices, but instead learn lessons from traditional principles that can guide our actions through a diversity of contemporary problems and solutions.

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Clubs, common-pools and collective actions: discussing complex production systems in light of Sami reindeer pastoralism

In this paper, I argue that in analyzing over-investment problems in commons, it is useful to discern a specific type of over-investment problem: one where clubs are involved. I use the term 'over-investment problem of clubs' to denote such cases, and the term 'over-investment problem of individuals' to denote cases where no club exists (for example, as is the case in the classical 'tragedy of the commons'). The crucial difference between the two is the types of production factors involved. The 'over-investment problem of individuals' emerges when the system includes only private goods, in addition to the common pool. By contrast, the 'over-investment problem of clubs' emerges when the system includes not only private goods and the common pool, but also collective- or club goods. Building on existing literature on collective action and E. Ostrom's design principles, I demonstrate that under a set of certain conditions, the problem of clubs is easier to solve than the problem of individuals. The argument is discussed in the light of Sami pastoralism in Lapland: for Sami reindeer-owners, clubs known as *siidas* provide their members with capital security for their privately-owned investments, thus solving their supply- side collective action problem.

The existence of clubs not only crucially affects the outlook of the over-investment problem in the commons but also may affect the likelihood of its solution. The presence of clubs may bring about at least three mechanisms which increase the likelihood of solving the over-investment problem.

First, the existence of a club implies that cooperating individuals – members of the club – share locally a degree of social closure (i.e. trust as well as possibilities for communication and sanctioning). In some cases, the re-structuring of clubs may even extend this social closure beyond individual clubs, towards global social closure, as it is in the interest of individuals to maintain connections to members in other clubs. Second, when clubs have the authority to make commitments on behalf of their members, the over-investment problem is aggregated from the level of individuals to the level of clubs, potentially bringing about cooperative equilibria. Whereas the cooperative strategy of a single individual does not increase the likelihood of successful collective action, the cooperative strategy of a single club may very well do so. Third, the club is able to exclude users from the common-pool as they control access to a production factor. This is especially pertinent in cases where the optimal club size is relatively large in relation to the population of potential common-pool users.

In conclusion, analyzing complex production systems with both supply- and demand side collective action problems reveals various roles cooperation plays “in commons”. Sometimes it

is cooperation (such as club formation), which enables people to over invest in the first place. Previous cooperation, and institutions maintaining it, also heavily affects the outlook of the over investment problem. This paper takes important steps to analyze these connections.

Keywords: Clubs, Collective Action, Capital Security, Complex Production Systems, Sami Pastoralism

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Environmental change and property rights: The case of Nurri and Jubhoo lagoons in Indus delta, Pakistan

Coastal ecosystems play a vital role in supporting human well-being and conservation of unique biological resources. They are crucial for the protection of the coastline from extreme events like floods and providing diverse livelihood opportunities to people. Lagoons are an important part of the coastal ecosystem. However, coastal lagoons face a range of threats from multiple drivers at local, regional and global scales, and they are both anthropogenic and climatic in nature. A variety of concepts and methods have been used to analyse change in coastal lagoon social-ecological systems. Analysis of property rights to examine these changes has been a prominent approach used in various parts of the world involving diverse ecosystems. However, the use of this approach has been somewhat limited in the case of coastal lagoons especially in Pakistan. In this paper, I examine changes in the property rights regime in Nurri and Jubhoo lagoons in Pakistan to better understand its two-way linkages with processes of environmental change. Both these lagoons are Ramsar sites, located in the Indus delta of Pakistan, which is the world's fifth largest delta system. The entire region, which includes a number of important wetlands, has undergone serious degradation over the past three decades. This paper aims to examine the history of changes in property rights regime in relation to the process of environmental changes. The main focus is to understand the extent to which environmental changes and property rights influence each other in times of uncertainty, the management of which has changed from being a commons to a privately owned property, contractor system and back to commons again. Findings indicate that there is a two-way feedback between environmental changes in the two lagoons and the system of property rights that shifted from a commons arrangement (1977) to being privately owned and then to a contractor system (1980) before coming back to a commons arrangement (2008). However, loss in the key physical and environmental features of the lagoons raises fundamental questions about sustaining / reestablishing commons even though policies are in place. The paper concludes with suggestions on sustaining commons for the future.

Keywords: Socio-Ecological System, Environmental Changes, Nurri And Jubhoo Lagoon, Property Rights Regime, Coastal Lagoons, Commons

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A Dialogue with Commons Scholars on the Past, Present and Future of the Commons

The “commons” encompasses complex ideas and an array of terms with varying interpretations. For those new to the commons (e.g., early career researchers), this diversity of perspectives presents challenges when synthesizing key concepts and building a cohesive picture of the commons. In this paper, we outline the results of our collective engagement with eleven ‘commons scholars’ from a wide range of academic backgrounds and research contexts relating to natural resource management. Our initial motivation for this project was to clarify the various terms and concepts associated with commons scholarship. This project later evolved to help us understand what the commons means to different scholars. Our objectives were to: 1) understand the history and current status of the commons; 2) familiarize ourselves with the commons community; and 3) learn from scholars’ experience to gain a better understanding of the commons and to identify opportunities for future research. The content of our semi-structured interviews with the eleven individuals pertained to the background of each scholar; how their interest in the commons developed; their interpretation of how commons scholarship has changed over time; and what the future of commons scholarship may look like. From these interviews, our general findings were: 1) there is no “common” language for the commons; 2) the commons is evolving in a transdisciplinary world to incorporate new issues and methods; and 3) “new commons” are emerging and transcending the boundaries of traditional resource management. We hope that these findings will contribute to more effective transdisciplinary communication about the commons. While respecting academic efforts in commons scholarship, it is evident that we have not arrived at answers to all the pressing questions of the commons and that new avenues of research are emerging.

Keywords: Commons, Transdisciplinary

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Changing Ownership of Agricultural Land, Degradation of Commons and Food Security: New Perspectives

With only 42.9% land equipped with irrigation and more than 15% of population under nutrition, Prevalance of food inadequacy staring at more than 24%, poor spending more than 65% of their income for food related expenditure, importance of Coarse Cereals such as Pearl

millet, Fox tail millet, Finger Millet, Sorghum, Barley can not be understated in the semi arid track of India. But ground reality suggests the paradox,, at national level about 3,768,000 ha which was under cultivation of minor millets under semi arid region of India was converted to other uses in a decade from 2001 to 2011 and loss of commons such as irrigation tanks is one among the factor for such change.

On the other hand, it is quite common to find people from India and also in from South Asia, in far off places, from Americas to Africa, working in various positions from top echelons to lower rungs and also unique to them. One of the factors is a shift in land ownership back home. For, at the time of Independence, most of the land ownership was with one community (Brahmin), which was rent seeking in nature and found difficult to manage the farm. Hence, for service sector in growing urban India. Land ownership shifted to communities who were agricultural labour under the previous owners (such as Kamma, Kapu, Reddy). Enjoying absolute ownership rights, probably for the first time, these communities toiled very hard and ensured economic uplift and permitted second generation to pursue education, albeit with a minimal success rate. Successive generations increasingly took to not only to salaried employment but also to entrepreneurship and thus increased pace of their presence in sectors away from agriculture. Slowly same problems faced by the Brahmin community five decades earlier, came back. It would, perhaps, natural for land ownership to move to the present day agricultural labour communities. But ground realities are drastically different as they point two pathways, viz., a) shift from that of food grains to plantation crops due to increased income from sources other than agriculture and land as a investment rather than livelihood, b) increased lease farming with little or no concern for land quality. Each of one them have long term consequences on the food security of India (south Asia as well).

Taking the factor that the preference of food grains will shift from that to coarse grains to rice and wheat with growing incomes, for complete food security, promotion of coarse grains use by focussing on their benefits may become the part of the agenda for international agencies such ICRISAT and protection of commons to be made integral to food security measures of the government in India.

Keywords: Degradation of Commons, land use change, Land ownership changes, Coarse Grains, Food Security, India

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Analyzing Design Principles to diagnose Common Pool Resources: methodological challenges and possible solutions

Governing common pool resources in the face of new disturbances such as globalization and climate change is challenging. Success stories often become non-success stories when they are transplanted from one context, with a different set of conditions to another. Common-pool resources (CPR) have been at the center of attention in natural resource management research for more than half a century. CPR management regimes are being challenged by unprecedented changes due to globalization and climate change. Understanding what factors contribute to successful social and ecological outcomes in CPRs is of paramount importance for

understanding their adaptability. To grasp drivers of successful CPR we focus on the “soft human made infrastructure” part of CPRs: the design principles as proposed by Ostrom in her seminal work “Governing the Commons”. Design principles, albeit important, are interdependent with other types of infrastructures (i.e. hard human-made – canals, gear in fisheries, transportation etc. – and natural – water availability, reproduction rates, fires etc.). However, understanding the relative importance and co-occurrence of design principles is a first step to diagnose a CPR and try to intervene avoiding a one size fits all policy approach.

The analysis, however, is challenging. Secondary data analysis is often difficult, and documentation and data behind a specific case study analysis are often lacking. In this context, we need to make use of the right methods and, in case complement them with careful thought tools and cross-methods validation.

We will present an analysis of 69 cases on irrigation systems, fisheries, and forest to understand some the factors that underlie the long-term success of common pool resource management regimes in the face of change. For each case we assess the presence or absence of Ostrom’s design principle and look at co-occurrence patterns between design principles and successful outcomes. We first analyze co-occurrence of design principles using network theoretical tools and visualization, than we analyze configurations of design principles that are more likely to lead to successful outcomes using QCA. We complement the QCA analysis with a reliability metric devised to address uncertainty and missing values problems. The two methods are used for cross-validation. Our analysis suggests that the relative importance of design principles varies depending on the resource type (whether irrigation, fishery or forestry). It furthers highlights the importance of design principle co-occurrence and strongly suggest to avoid considering design principles in isolation or as a magic bullet. However, it also allows us to assess the potential “wellness” of a CPR.

Keywords: Methods, QCA, Networks, Design-Principles, Governance, Sustainability

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First Nations Perceptions of Wild Food Contamination in Alberta’s Oil Sands Region

Crees have a way of understanding pollution, unique to their cosmology and ritual practices, that is currently neglected in studies and policies regarding contamination in Alberta’s oil sands region. For example, they often consider large tracts of land to be polluted because of companies’ failure to show the land respect and lack of proper spiritual protocol in developing industrial projects. This contributes to people’s unease about harvesting wild foods, with negative effects for physical and spiritual well-being and potential breakdown of traditional family units that are formed around food harvesting, among other adverse impacts on Aboriginal communities. Various attempts are now being made to integrate TEK into risk and impact assessments with ineffective outcomes because the ethnoecological worldviews of people providing TEK and those who are writing assessments are conflicting. In the project approvals process, information that First Nations provide for the purpose of TEK integration

is reduced to biological data and the community's concerns about land degradation and contamination are being dismissed as insignificant. In this paper I will discuss how contamination is approached in traditional land use assessments and in the EIA process, and will compare it to my research on wild food contamination with Cree communities in northern Alberta.

Keywords: Cree, First Nations, Oil Sands, Contamination, Food Security

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Commons versus Commodities: Indigenous rights, water, and resource development in north-eastern BC

This paper explores the tensions and conflicts that arise when land-based resource development activities juxtapose distinct—and at times incommensurate—worldviews of water. On the one hand, indigenous governance often frames fresh water as a commons; on the other, resource development proponents often frame land-based resources (such as oil and gas) as commodities. This is of particular concern in the context of weak regulatory frameworks, which are characterized by regulatory capture, insufficient monitoring, and patchy enforcement. This is of particular concern given the rapid rate of resource sector development in Western and Northern Canada in recent years; particularly (although not only) in North-eastern BC, which is the focus of the empirical examples discussed in this paper.

The paper asks two questions. First: How might the “commons” provide a means of addressing some of the regulatory gaps outlined above, while enabling aspects of indigenous law to guide water governance? Second (and critically): to what degree is the concept of a “water commons” relevant to indigenous communities in Canada, given recent legal landmark decisions (e.g. the Supreme Court’s *Tsilhqot’in* decision)? In addressing these questions, the paper explores contrasting on “water commons” which arise from the co-authors’ shared experience of research on water governance in British Columbia. Further, we explore cognate legal concepts that might provide a means of advancing the concept of the commons within the Canadian context including: legal personhood for water (with reference to New Zealand); and the public trust doctrine (particularly with respect to the US’ *Winter’s* doctrine).

We conclude with some thoughts on the relevance of insights garnered in our research to broader debates over the commons—both as a practice of collective water management and as a selective strategy for indigenous activists when grappling with resource development.

Keywords: Indigenous Rights, Resource Development, Water

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Diagnosing large-scale marine protected areas: A comparative analysis of the social, ecological and institutional drivers of successful governance

Large-scale environmental governance systems are notably absent in the literature on common-pool resources and social-ecological systems, which focus overwhelmingly on small-scale systems. Environmental problems, however, emerge at multiple scales, and in the context of highly interconnected marine systems, tend to manifest themselves at large scales. Recent development of the social-ecological systems framework (Ostrom 2009) presents an ideal opportunity to apply and test knowledge developed in small-scale systems and move towards a better understanding of large-scale (>10,000km²) environmental governance. This presentation focuses on such questions in the context of large marine protected areas (MPAs), a formal method of governance in spatially bound areas in the ocean. Many large MPAs are being established, yet we know very little about what contributes to their ecological and social performance. We use the MPA global database (www.mpaglobal.org) to identify large MPAs (marine portion larger than 10,000km²) with governance arrangements in place for five or more years. Our sampling criteria identified 18 potential case studies. Sufficient secondary data appears to exist for 12–15 of these MPAs to enable reliable and accurate coding of these cases in the online Social-Ecological Systems Meta-analysis Database (<http://sesmad.dartmouth.edu/>). This database includes a comprehensive set of variables related to the ecological and social components of social-ecological systems, as well as the governance system that influence the ways in which people interact with the environment and each other. Comparative analysis of these cases will address critical research areas concerning: (1) the applicability of the design principles to large scale systems; (2) the extent to which success factors postulated in conservation biology and MPA design apply across cases; and (3) correspondence between resilience thinking and the design and performance of large-scale MPAs. By drawing upon multiple perspectives, our analysis will highlight key lessons for MPA success at large scales, while also suggesting important future research priorities for this field.

Keywords: Marine Protected Areas, Common Pool Resources, Large Governance Systems, Marine Conservation, Fisheries

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Combining qualitative and quantitative methods to strengthen CPR case-analysis: examining counterfactuals

Elinor Ostrom's design principles have been foundational to our understanding of the commons, and many studies have verified their importance for effective commons governance. The application of these principles, however, has been problematic where they have been applied as cure-all prescriptions, rather than diagnostic tools. Much like the over-prescription of antibiotics, the cure-all approach does not recognize the potential for other unaccounted causes or synergistic effects of combining factors. In this session, we will present current insights into diagnosing common-pool resource (CPR) systems. We will show that in order to provide a proper CPR diagnosis, we must first define what we mean by successful governance and establish what combinations of variables lead to such successful governance. Specifically, our team will present insights from multivariate analyses of CPR databases, which demonstrate how variables combine to ensure success, and what kinds of successes are ensured. We use these analyses to generate typologies of CPRs. Much like medical diagnostic tools, these typologies will allow scholars to pinpoint important biophysical contexts and interactions that differ between and within sectors and aid in the application of more targeted and CPR specific remedies. Finally, we share the insights of our experiences coding cases, attempting to reproduce pre-existing case-codings for the purpose of meta-analysis, and CPR database analysis. These insights demonstrate the importance of developing and sharing codebooks to ensure reproducibility across research teams, paying attention to the counter-narratives the case study outliers tell us, and developing innovative multivariate statistical techniques to analyze data with many missing data-points. Together, we suggest that these tools, strategies, and frameworks will advance the design principles by incorporating nuance, and by allowing these principles to adapt and evolve over time.

The localities of the globalized commons: Theory, concepts and methods for understanding risk, uncertainty, and collective action

Inshore fishermen in Southwest Nova Scotia (SWNS) could be characterized as members of a commons. But understanding their behavior requires a widening of our scale of analysis. For example, in 2012, a tsunami hit Japan, structurally weakening a nuclear power plant and causing a leakage of nuclear radiation into the oceans. With Japanese markets seeking alternative sources of fish, the price of squid as bait increased in SWNS making for tighter margins in an already precarious summer groundfishery. Fishermen hoped to supplement their incomes through the lobster fishery, where catches were at their highest, probably due to the collapse of the cod stocks and the loss of a major predator for juvenile lobster. However, they experienced a poor lobster season, fraught with a glut on the market, resulting low prices and fishermen's strikes. These low prices were, in turn, related to the weak American economy, crashes in the housing market in the Southwestern US, and complex banking instruments that nearly collapsed some of the world's largest banks. Meanwhile, fishermen sought political help from the state, in particular to curb the economic effects of foreign and local investors attempting to gain control over and consolidate the lobster sector. Legal loopholes were being used to

circumvent State policy in support of the “owner operator fleet”, but state bureaucrats claimed that they lack the financial and legal instruments to close these loopholes. Meanwhile the collective action of local fishing community is threatened when crewmembers and captains migrate to work in the Tar Sands of Alberta. These phenomena display the complex, multiscalar networks linking a traditional fish harvester and the resource to a variety of risks and disturbances.

This cosmopolitanization of the fishing commons presents a challenge to our theoretical and methodological tools, many of which were developed to understand equilibrium, modular common pool resource communities, and vertically hierarchical political systems. In Ulrich Beck’s theorization of a world risk society, he argues that we need to refine our tools for an increasingly cosmopolitan world. What are the implications of this recommendation for commons theory? How do we conceptualize self-governance, collective action, community, and the relevant scales of interactions? More challenging is the critique by Beck and Latour with respect to reductionist methods and dualist conceptions of modernity as the source of our increasingly complex and uncertain outcomes of risk management. In this paper, we open up discussion of several relevant synergies and contributions between concepts and theories from Ostrom, complex adaptive systems, actor networks, and risk society.

Keywords: Globalization, Actor Network Theory, Risk Society, Fisheries, Collective Action

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The windy roads of a micro-politician

This presentation aims to illustrate through a citizen's personal path (my own), how we, as individuals, can practice cosmo and micro-politics instead of a decayed cosmopolitanism or global citizenship while stopping the reinforcement of a fake notion of democracy. On how cosmos and "real lives" can be applied to politics making, how societal structures can be hacked with experimentation and the proliferation of its results. There is a fixture in the way we understand politics. It is made by and for humans only. We do not consider everything affected by our politics making. This is so, due to a deeper (mis)understanding of our surroundings and all living things (Cosmopolitique, Bruno Latour on Beck). It is known that mankind has always behaved as if nature was at their service. Although these days are over or at least should be - since nature itself has been over exploited and we face a definite environmental catastrophe - we continue to act as if nothing had changed. The scientific characterization of our epoch as Anthropocene as opposed to Holocene is an important benchmark in history, because it shows mankind acknowledges this shift. We function through codes and words and they are very important for the constitution of our understanding, which subjected to an established order amount to a misleading fabrication of ready-made realities (regimes of truths). The need of breaking this order and generating new centers of decisions, regarding the meaning of things (Las metáforas que nos piensan, Emmanuel Lizcano) and how to go about with the experimentation of basic concepts (Lignes de fuite, Felix Guattari) is an essential step to the assimilation of an era shift (Anthropocene). In order to avoid an academicism, which would speak to a reduced community and would therefore have restricted reach, I intend to present

my personal path as a self-management enthusiast, transition town supporter and above all a micro-politics practitioner.

Keywords: Micro-Politics, Cosmopolitics, Theory Put In Practice, Self-Management Research, Online Database, Pitch For Interactive Platform

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Commons in risk: livestock in Chinantla, Mexico

The paper shows research results in Chinantla region, Mexico, the third reainforest reserve in the country. In this region lives an indigenous population and in recent times livestock production is advancing through rainforest deforestation. This means a new threat against rainforest as a common that has been managed in a collective way for a long time. This does not mean that indigenous peasants' choice of introducing livestock can be explained as "the tragedy of commons", more likely they are compelled to seek their survival through a depredatory activity. This research aims to explain the reasons of this livestock expansion in indigenous people and analyze the possibility of a sustainable new way of managing rainforest as a common in the future

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What Makes Community Forestry Pro-poor: Lessons From Nepal

Community forestry (CF) is a form of devolution and policy reform where local people are involved in forest protection, management, utilization under certain agreements with the forest administration. Nepal is among the global leaders in CF and poverty reduction is a main policy theme of the Government of Nepal. The poverty reduction strategy relies on a targeted pro-poor program that helps improve the lives of the poorest households from the CF funds. Therefore, different strategies of reform have been proposed targeting the poor. One of the important provisions is to make a mandatory allocation of at least 35% of Community Forestry User Group (CFUG) income to pro-poor activities. Developing policy and institutions is a required condition but empirical evidences show that it is not sufficient to achieve the intended result. Though CFUGs have accumulated attractive amounts in their group fund, they have mostly invested in forest conservation and other community development activities without giving any special attention to the poor. As a consequence, the poor and socially excluded

groups get meager benefits from CFUG funds. Since the Nepalese society is highly heterogeneous in term of caste, class, gender and ethnicity, it is challenging to make the CFUG more accountable and responsive towards the poor and disadvantaged groups. In addition, forest size, resource conditions, institutional maturity, governance practice and CFUG funds also vary from group to group. These factors could have an influence in the pro-poor program.

The main objective of this study is to identify the major influencing factors that make the CF pro-poor in Nepal. The study was carried out in the Dhading district of Nepal using the data from 305 community forest user groups. This study uses Spatial Autoregressive model (SAR) to examines the relationship between the amount of fund allocated for the welfare of poor members of community forestry as a dependent variable and CF biophysical characters, size of CFUG fund, institutional capacity and governance practices as independent variables. This study shows that CF income, public hearing, and regular audit of CFUG funds are the significant variables affecting the pro-poor investment in CF. From the result, it can be concluded that governance activities have a crucial role to make the community forestry institutions more accountable and responsive towards the poor and disadvantaged groups.

Keywords: Community Forestry, Governance, Livelihoods, Nepal, Pro-Poor

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REDD+ Challenges for Local Community Rights and Participation – Experience from Nepal

Reducing Emissions from Deforestation and Forest Degradation in developing countries (REDD+) has been on the rise as the global large-scale mechanism to combat climate change, biodiversity loss and rural poverty through carbon trading. Treating carbon as a commodity has created new political interests and economic pressures on local livelihoods in competition with global conservation goals to increase carbon stocks. Nepal's long history of devolution toward community-based forest governance represents a prime example of working community forestry governance practice prior to the onset of carbon trade. Recently, the Nepalese government has formally entered into REDD+ policy preparations, but its emerging REDD+ framework is adding complexity to a delicate framework of rights and resources. It has yet to define clear legal provisions for key forest tenure rights such as carbon ownership, benefit sharing, and the nature and extent of political participation of local community forest user groups at the sub-national and local level – gaps which may jeopardize past successes of decentralized forest governance, undermine and weaken the multiple objectives of community forestry by shifting notions and priorities of traditional single-scale local commons to those of globalized multi-scale commons. The strong political momentum for REDD+ from the Global North has added considerable multi-scale governance challenges between global mitigation priorities and local livelihoods needs. This paper examines potential scenarios and impacts of

REDD+ and carbon ownership arrangements on Nepal's forest tenure security and community-based forest governance based on recent policy developments and outlook.

Keywords: Community Forestry, Commons, Livelihood, Forest Tenure, Nepal, REDD+

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Mapping Sectoral Impacts of Climate Change in the Terai, Hill and Mountain Commons of Nepal

Climate change has a multi-sectoral impact across ecological regions, socio-economic conditions, and gender and ethnic groups in Nepal. This impact varies to establish new social and economic order particularly in water and agriculture sectors. Drawing from people's perception across the three geographical regions of Nepal and their understanding to the changing environment, the paper summaries the key insights to understand the sectoral impacts of climate change on water and agriculture. The paper highlights the change in precipitation and draws lessons from the different research sites in adapting to the changing context of surface and groundwater availability. This illustrates how change in water availability affects land use, agriculture and the other development sectors. How are local institutions capable to inform climatic changes and respond in a participatory process? The answer illustrates the emerging conflicts and social hierarchies with the changing nature of common resources across caste, class, gender and ethnic groups to determine rights and access over common resources. To this, what level of community action has been undertaken to respond to environmental change. Therefore adaptation, through an equitable distribution of resources is essential both at community and policy level. The paper assesses the participatory strategies of Climate Policies in Nepal: a) National Adaptation Plan of Action (NAPA), b) Local Adaptation Plan of Action (LAPA) for an inclusive framework. This paper attempts to reflect on the convergence plan to address the sectoral impacts of climate change that require interdepartmental coordination.

Keywords: Agriculture, Climate Change, Community Participation, Institution, Water

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Understanding the efforts of Generation Challenge Programme (GCP) from commons Perspective

Generation Challenge Programme (GCP) is a knowledge production platform for agricultural research and development among CGIAR institutes, NARS, and other private institutes for the resource poor farmers in developing countries. The entire knowledge production and technology development approach of GCP is heavily influenced by the instrumentality approach of knowledge production. However, within the implementation process of GCP, certain non-instrumental trends have been emerging out that contradicts the basic tenets of instrumental approach of knowledge production. In this paper, we aim at understanding these contradictions as it can offer possibilities to reconstruct programmes such as GCP from a non-instrumental perspective. To do so, we take theoretical insights from the commons literature. Because of the fact that the concept of commons is a fuzzy one, in the first half of the paper, we systematically review different strands on commons concept to deduce four patterns. With these four patterns, we conducted an empirical investigation on the rice research network of the GCP in India. This paper argues that indeed there is a reasonable possibility to frame the knowledge production of GCP from commons perspective especially given the existence of this GCP rice research network at the non-state non-market level that thrives on sharing and creation of resources from diverse plural sources. Moreover, these practises are then further reinforced by the non-hierarchical, democratic, and inclusive organisational characteristics of this network that creates space for indigenous knowledge system.

Keyword: Commons, GCP, Knowledge Production, Rice, Research Network

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Uncovering ‘Spiteful Cooperators’ through combining experiments, a large-n survey, and interviews to analyze the impact of MPAs on fishing communities

Around the world marine protected areas (MPAs) have been the preferred policy tool to protect marine biodiversity. While their biological effects have received significant attention, understanding their societal effects remains more limited. Most of our current understanding of the effects of MPAs on local communities relies on studies using surveys or participant observation methods embedded in in--- depth case study accounts. The study presented here provides a complementary and novel view of the effects of MPAs by triangulating field experiments, a large-n survey, and informal interviews to key informants. We premise our study in the understanding that the ability of individuals to engage in collective action is fundamental for the well-functioning of civil society. Thus, our main research question is to determine how MPAs affects individuals' willingness to cooperate or harm each other, two behaviors potentially affecting the prospects of collective action. We conducted public goods and spite experiments with fishermen and other citizens (n=123) in two communities influenced by the presence of MPAs and two control communities in the Baja California Peninsula, Mexico. We found statistically higher levels of cooperation and spite in MPA communities than in non-MPA sites. In addition, a substantial proportion of subjects are 'spiteful cooperators', showing high levels of cooperation and spite when given the choice to do so in an anonymous environment. To determine any potential selection bias and the external validity of our findings we used a large-n survey to n=549 fishers and n=84 key informant interviews spanning all of the MPAs in the region. We argue that such extreme behaviors result from individuals' experiencing two different processes taking place in MPA societies. On the one hand, societies in MPA sites are exposed to norms of cooperation through environmentally-minded rhetoric encouraging individuals to protect their park as a shared resource, or, through government mandates establishing that fishers must form cooperatives as the only permitted way to obtain fishing licenses. Concurrently, in MPA sites conflict seems to be bubbling right below the surface as a result of the frustration that citizens and fishers experienced in the processes of formation and rule creation of MPAs. The creation of MPAs comes often associated with winners and losers in the process that drive explicit social comparisons in relative incomes and relative opportunities. The anonymous environment of the spite game provides a measure of the latent conflicts. These findings illustrate the complex social effects MPAs have in fishing communities and how measuring only cooperative preferences might circumvent social tensions that are potentially precursors for conflict. Measures of latent conflict might provide early warning signals that allow for conflict resolution to be implemented before it compromises collective action in the MPAs.

Keywords: Marine Protected Areas, Fishing Communities, Cooperation, Spite, Design, Implementations

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Evaluation of Daudkandi Model of Community Floodplain Fishery in Bangladesh using Case for Ostrom's Design Principles (POSTER)

Floodplain water-bodies are one of the most valuable and vulnerable common pool resources (CPR) of Bangladesh. In the last one and half decades the management of the floodplain fisheries along with other water-bodies fisheries has undergone various transformations in different parts of the country. Comilla district has been one of them. Daudkandi upazila (sub-district) of Comilla district is a low lying region and has been known as flood-prone area. In

1994 a group of local people started a fishery project by retaining the water brought in by rain within large low lying land through construction of embankment surrounding six villages of Daudkandi upazila. They were assisted by a local NGO, which devised a management system for the aquaculture. The aquaculture model was later gain popularity as Enterprise or Daudkandi model. The fishery has been later registered as a joint stock company in 1997 and named Pankowri Fisheries Ltd under the Company Act 1994. Landowners, small ditch and ponds owners whose property fell within the floodplain fishery have been monetarily compensated. Since then the fishery model has been subject of several studies: some of which tried to conduct economic analysis of the fishery using specific model (K. J. Chandra, D. Sarker, M. A. Khaleque¹ and D. R. Das 2010), some tried to compare this model with other floodplain aquaculture model (M. G. Mustafa and Alan C. Brooks 2009) and some tried to evaluate the model in terms of benefits and costs for the community (Toufique, K.A. and R. Gregory. 2008). Though the water body has been brought under a private management but its previous nature as CPR, and more importantly the fact that the management of the private company lays in the hand of the already existing users, i.e. community members, entail to examine the fisheries model in terms of existing CPR management model- an area of study which none of those studies focused. Thus the main thrust of the study was to find how the model's operational rules fit the seven design principles developed by Elinor Ostrom in her *Governing the Commons* (Ostrom, 1990) for management of CPRs. Data collected through interviews of the shareholders, directors, employees of the fishery, community members and field visits revealed that the seven principles of Ostrom can be found to be followed, albeit with some variations: for example the management of the fishery designed some measure of sanctions for rules breakers depending on the seriousness and context of the offense but these sanctions are not graduated in nature. Using Ostrom's design principles in evaluating the management practices of such erstwhile CPRs which later was turned into private aquaculture with users or community management helps us to find scopes of improvement in the management system so that these aquacultures can be more inclusive and socially beneficial.

Keywords: Common-Pool Resources, Ostrom's Design Principles, Daudkandi Model Of Floodplain Aquaculture

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Growing deep roots: How can Aboriginal communities find their way in forest governance?

In the 20th century, the model of industrial forestry has greatly marginalized the roles of Aboriginal peoples in decision-making related to forest governance. Yet many drivers have recently allowed the emergence of Aboriginal approaches of forest governance, notably evolution of Aboriginal rights, market requirements (i.e. certification) and national and provincial policies. Therefore, such context offers a unique opportunity to improve our knowledge on this topic.

Growing deep roots means using a culturally adapted model of forestry that is consistent with Aboriginal culture and values, which is therefore more likely to support long-term social change and economic growth. Thus, this research project addressed the following question: How can

Aboriginal communities in Canada influence forest governance? Between May 2012 and July 2013, I conducted a qualitative investigation (i.e. case study) in collaboration with the Essipit Innu First Nation. To ensure reliability and validity, this research employed four data gathering techniques: observation, documentation, interviews and focus groups. My intention was to understand the forest governance system on Essipit traditional territory, the process of decision-making, the actors involved and, more importantly, how Essipit influences forest governance.

The case study of Essipit (Quebec, Canada) provides new insight on how Aboriginal communities can innovate in forest governance. This presentation will shed light on a partnership between Essipit and the forest company Boisaco and on how this partnership is part of a “new mode of forest governance.” More specifically, I will explain how Essipit innovated in forest governance and gained authority over forest management decisions. This information is fundamental to improve the success of government forest policies.

Keywords: Aboriginal Peoples, Forestry, Governance, Canada

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Multi-level governance of small-scale fisheries under global market pressures: A comparative case study of Mexican sea cucumber fisheries

With seafood as one of the world’s most-traded food commodities and small-scale fisheries’ increasing contribution to seafood exports, important questions emerge regarding the role of multi-level institutional linkages in the governance of small-scale fisheries under market pressures. Multi-level governance gains salience in the context of market pressures for multiple reasons. First, local fishers’ engagement in global markets is by definition a multi-scale endeavor, regardless of the particular role of the State or non-governmental organizations. Second, a growing body of research has suggested that pressures from non-local markets may undermine and erode local governance arrangements. Relatedly, many have promoted the scaling-up of SSF governance as a viable approach to avoiding degradation driven by market demand. At the same time, research has also suggested that local-level institutions can mediate the effect of market pressures. While multi-level governance is likely a key tool to prevent degradation and fisheries collapse driven by market pressures, it is unclear what may be the most effective type of multi-level linkages or how governance rights and responsibilities should be distributed between local and non-local actors.

With the aim of contributing to a more nuanced understanding of the potentials and challenges of multi-level governance in SSF under market pressures, this paper presents a comparative case study of two small-scale fishing communities in Yucatan, Mexico that have recently linked to international markets for sea cucumber. Sea cucumber fisheries, like other benthic species with high international demand, present particularly tough governance challenges for SSF. Sea cucumber markets have reached almost every region of the world, expanding outward over time from the primary source of demand in Asia and exhibiting typical boom and bust cycles that have accelerated since the 1960s into recent decades. These markets often spread so rapidly that local institutions do not have time to respond and adapt. In Yucatan, some

communities have responded to markets by strengthening and adapting local institutions while in other communities demand pressure and related social conflict has rendered local governance arrangements impotent to control increased harvesting pressures. These divergent outcomes provide an opportunity to better understand the role that multi-level linkages play in the success or failure of governance responses to market pressures.

This study finds that while the linkages between local-level and State governance played an important role in influencing outcomes, the nature of these linkages was negotiated and often problematic. First, while the State provisions formal management institutions for sea cucumber fisheries, the ability of local communities to translate State regulations into contextually appropriate rules-in-use ultimately permitted local control over access and use of resources. Second, as conflict and violence escalated, controlling the incursion of outsiders became impossible without the presence of State enforcement authorities. However, given high rates of corruption and limited State capacity for enforcement, the creation of linkages between local monitoring and State enforcement institutions entailed a collective action problem for local actors. Recommendations for multi-level governance as a solution market pressures should thus take into account the importance of local institutions and power dynamics across levels.

Keywords: Multi-level Linkages, Small-scale Fisheries, Market Pressures, Local Institutions, The State

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Markets or incentives collective action? A comparative case analysis of payments for ecosystem services programs in the United States

Over the past several decades there has been an increasing focus placed on the development of market-based or market-like approaches to environmental conservation. Payments for ecosystem services (PES) has been promoted as one such approach and there are now billions of dollars invested annually in PES programs around the world. In concept, PES programs compensate land managers for practices that provide valuable ecosystem services to beneficiaries that fund PES programs. Although originally promoted as a market-like and economically efficient approach to environmental management, an alternative conceptualization of PES is emerging that recognizes the public good nature of many ecosystems services and contends that PES is better viewed as incentives for collective action. By examining eight PES programs in the United States, I show that these programs emerged under a variety of social and environmental conditions that are theoretically unfavorable to the development of efficient markets. As a result, this research demonstrates that the emerging view of PES as incentives for collective action improves upon the narrowly constrained market view of PES and can be greatly informed by the extensive collective action and “commons” literature. These findings imply a need to expand from a focus on the market logic of efficiency to an approach that also promotes social capital and the collaborative capacity of community groups in the implementation of PES programs. As a result, I argue that PES is better viewed through a broader “social-ecological systems” framing that integrates insights from both the market perspective, as well as other social, institutional, and biophysical considerations.

Keywords: Payments For Ecosystem Services, Ecosystem Services, Human Wellbeing, Markets, Collective Action

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Local Institutions & Household Delivery of Ecosystem Services under China's Conversion of Cropland to Forests Program

China's Conversion of Cropland to Forests Program (CCFP) is the world's largest afforestation-based Payments for Ecosystem Services (PES) program, having afforested over 27.55 million ha – 9.06 million ha of which is retired cropland – and involving 32 million rural households. Given the program's extent and size, and thus its potentially important effects on the rural economy, previous work on the CCFP has primarily explored its rural welfare impacts (in terms of household income effects, labor allocation and structure of production), general implementation (e.g. land targeting and program cost effectiveness), and potential impacts on grain output from reductions in crop area, a past concern of policymakers. Relatively few studies, however, have examined program-induced environmental improvements, and very few have examined these at the household level.

This paper utilizes 2010 cross-sectional survey data covering 2,656 rural households participating in the program from across China – the most representative survey data for the CCFP yet available – to explore one indicator of household delivery of program-targeted forest ecosystem services: the survival rates of trees planted on program-enrolled cropland. An interval regression model is used to explore the degree to which household characteristics, local conditions and institutions and local CCFP implementation regime are associated with survival rates. Of particular interest, the data set's wide diversity in local conditions is exploited to analyze the impacts of different institutional configurations and CCFP implementation regimes on outcomes. To better capture local de facto institutions, institutional variables are constructed from the multiple observations of households in the same village, an improvement over previous work which often controls for village institutional characteristics via the individual responses of village officials.

Model results find that while household characteristic, endowments and constraints are strongly associated with outcomes, local institutions and implementation regime also have important impacts. Households with more labor and forestry experience manage trees better, while higher opportunity costs for both land and labor have the opposite effect. This also applies to the village level, wherein households in labor-rich villages also generally have better survival rates, likely reflecting an abundant labor supply with which to manage trees. In terms of program implementation, prior consultation with participants and local communities, and

effective monitoring, both have a strong positive effect on reported survivorship. Results also suggest that subsidy support will be required into the near future to ensure program outcomes, since incentives to continue managing program-planted trees appear to fall off once subsidies are curtailed.

Keywords: Payments for Ecosystem Services; China; Afforestation; Rural Land Use; Institutions

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Positioning Equity in Social-Ecological Systems Frameworks and Common-Pool Resource Management

Some social-ecological system configurations can lead to ecological sustainability but might still be deemed inequitable by resource users or observers. It follows then that sustainability and equity considerations need to be addressed in an integrated fashion. In this paper, we unpack the concept of equity and examine how Ostrom's (2009) social-ecological system framework can be used to evaluate performance based on both sustainability and equity criteria. We then show how common-pool resource design principles (Ostrom, 1990, 1999; Cox, 2011) can be used to re-envision the governance of common pool resources. We posit that CPR design principles might be used to prescribe courses of action to produce more socially just and ecologically sustainable outcomes. To illustrate our points, we will discuss several case studies where indigenous groups are renegotiating equity and authority over natural resource management initiatives.

Keywords: equity, sustainability, common-pool resources, design principles, social-ecological systems framework, indigenous peoples

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Reducing demand of water in Canada's thirstiest city through agent based modeling

Kelowna, BC, has some of the highest water usage rates in all of Canada and also has some of the lowest fresh water availability in the country. These facts speak to the dichotomy of people's perception versus reality. Compounding these issues is Kelowna's importance in the food security of Canada through the production of the lion's share of Canada's pome fruits and the city's status as one of the fastest growing metropolitan areas in Canada. Although citizens largely seem unaware of the potential problems in Kelowna's water-future, city planners are more aware of these issues and are looking for a way to mitigate potential impacts in a warming climate.

I am creating an agent based model of how people use water, change the land-use of their property, and how these things can be affected by policy implementation. The agents within this model allow for more realistic representations of the effect of interventions in this socio-economical system that have not been explored previously. By informing the model with survey data I am able to populate the landscape with agents that hold a variety of realistic personality traits that effect how they make decisions within the model's landscape.

The model has been created in a spatially explicit manner using GIS data of the city of Kelowna. This allows users of the model to investigate the water use rates of a range of potential growth and policy scenarios in a realistic landscape. When complete, this will provide novel research results on how densification and urban sprawl will variably effect the water usage landscape and what policies, or combination of policies will likely have the strongest effect at reducing demand of water in the city. This project is being developed in collaboration with local stakeholders and will act as a policy support tool for informed governance once complete.

Within my presentation I will discuss how resource management problems are beginning to look at demand side management of resource use. Whereas traditional approaches focus on improving mechanical and technical efficiencies, by exploring ways to improve usage efficiencies through policy implementation we can help provide an important stopgap in supply issues until mechanical or technical implementation become realistic or affordable. I will further discuss the power of agent based models to assess effective means of reaching resource management objectives in a way that incorporates the human element in ways that were previously impossible.

Keywords: Agent-Based Modelling, Demand Side Management, Resource Management, Water, Socio-Economical System

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Bridging communities into conservation: an Indonesian case study

To help navigate the barriers and challenges of conserving coastal-marine commons, increasing emphasis is placed on connecting communities to actors at different levels and across institutional and organizational boundaries. Bridging organizations – i.e. independent entities that span the gaps between organizations (cf. Westley and Vredenburg 1991) – can foster these multi-level relations between actors. I examine bridging organizations involved in coastal-marine conservation efforts in two sites in Bali, Indonesia: the Nusa Penida Marine Protected Area and the East Buleleng Conservation Zone. Using a combination of semi-structured interviews (n=115) and quantitative social network analysis (SNA) (n=82), I explore how these organizations can better connect local- and regional-scale conservation actions, and how they may better integrate different systems of practices, knowledge and beliefs (by e.g., addressing trade-offs). This research illustrates patterns of collaboration and communication between bridging organizations and local resource users, customary institutions, private enterprises, governments and other actors. It shows bridging organizations engage communities in a number of ways – by facilitating horizontal/vertical linkages, building and strengthening local

associations, and serving as conduits of ideas and brokers of resources. In doing so, I argue that bridging organizations can contribute to greater multilevel, pluralistic conservation efforts; while at the same, ensuring locally-appropriate solutions.

Keywords: Bridging Organization, Conservation, Community, Multilevel Governance, Indonesia

Social dimensions of fit to advance the conservation of marine commons in the Coral Triangle

Ongoing coastal--marine ecosystem decline requires modes of environmental governance that intentionally fit conservation strategies to the social and ecological dimensions of marine commons. Yet, few analyses have explicitly dealt with social dimensions of fit and efforts to acclimate conservation strategies to social systems are underdeveloped. Bridging organizations – i.e. independent agencies that span the gaps between different organizations to facilitate multiparty collaboration (Brown 1993) – are a potentially powerful entity that can foster improved social fit. This study set out to critically explore how bridging organizations facilitate key governance attributes needed to better align or fit conservation efforts to complex social systems. Employing a mix of semi--structured interviews and surveys, I draw insights from three conservation case studies in Bali, Indonesia to exemplify different approaches to building social fit in marine commons. My focus on this region is important given the combination of diverse social, economic, and political pressures, which necessitate context sensitivity and multilevel coordinated approaches to achieve conservation goals. Research shows that bridging organizations can facilitate better social fit by building links between different actors, from seaweed farmers to governments; serving as a forum to integrate diverse practices and objectives, from biodiversityconservation to culture and livelihoods, and by scaling--up and empowering communities to engage in conservation decision--making. I argue that greater attention should be paid to these organizations as an entityto foster greater social fit in the face of complex conservation challenges.

Keywords: Social Fit, Bridging Organization, Conservation, Governance, Social Pluralism

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Institutions for Ecosystems Services: What Do We Know, What Do We Need to Know?

An ecosystem services perspective strives to identify, understand, and properly value the full range of benefits humans derive from ecosystems and include the production and flow of these services in agricultural management practices at the field and landscape scale. Whereas great strides have been made in identifying and measuring ecosystem services and their underlying biophysical properties, there has been insufficient understanding of the human institutional arrangements that affect ecosystem services. Yet this understanding is fundamental to develop appropriate policies and interventions that can enhance ecosystem service provision.

This paper presents a framework for assessing the interactions between people, agriculture and ecosystems, with particular attention to the institutional and governance dimensions. The framework is used to synthesize findings from a workshop on Institutions for Ecosystem Services sponsored by the CGIAR programs on Collective Action and Property Rights (CAPRI), Water Land and Ecosystems, and Forests, Trees and Agroforestry in October 2014.

A variety of arrangements influence smallholder decisions about the use of their land and resources. These include formal state institutions and markets, but also encompass local-level, customary, collective action, and informal institutions that regulate the use, access to, and distribution of benefits from the natural resources and ecosystems. Ecosystem services may introduce additional institutional requirements. Ecosystem services are particularly characterized by temporal lags between service produced and received, and spatial lags, or distance between producer and consumer. Temporal lags call for institutions that create tenure security, while spatial lags call for coordination institutions. Because of the multi-scalar and multi-actor characteristics of ecosystem service, they often require local actors to interface with environmental service markets at new scales, or encouraging the formation of new collective action institutions to manage ecosystem service producing resources, enforce rules, and distribute benefits. In addition, new institutional challenges are created by efforts to scale-up existing programs to cover larger landscapes. Addressing this requires attention to polycentric governance arrangements.

Without understanding existing institutions, including norms and intrinsic as well as extrinsic motivations of different actors, policies may inadvertently displace ecosystem service provision. The paper discusses the growing popularity of Payment for Ecosystem Services (PES) programs, noting that instead of considering these as strict payments or panaceas, PES should include attention to people, processes, power, and policies.

The paper concludes by identifying an agenda for engaged research, organized around the Institutional Analysis and Development (IAD) Framework, including diagnostic research on the measurement and valuation of ecosystem services; the role of institutions in delivering those benefits, and how different types of external interventions affect ecosystem service provision.

Keywords: Institutions, Ecosystems Services, Governance, Motivations, Benefits and Benefit Sharing

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A community-led approach for landscape planning

Fort McKay is an indigenous community located near the current centre of Canadian oil sands mine development. Community members have experienced economic benefits from industrial development, but have also seen their ways of life and environment altered by development. As industrial activities increase in their traditional territory, there is a need for the community to develop a clear understanding of the benefits and liabilities associated with land-use and to formulate an approach to set objectives for sustainable ecological and socioeconomic growth. This project provides the community with defensible, transparent and science-based information on the current and projected future states of the community's traditional territory and economy. This approach involves community-led selection of environmental, cultural and economic indicators, and application of land-use and ecological simulations to model these indicators in pre-development, current, and future conditions. Results from the land-use simulations were presented to the community where economic and environmental trade-offs were discussed. Community-led management and mitigation strategies were developed that better meet Fort McKay's landscape objectives. This approach is meant to: more effectively engage the community in understanding regional effects resulting from industrial land-use; support more informed and effective community engagement with industrial and governmental counterparts regarding environmental impacts to aboriginal traditional lands; and assist the community in effectively proposing strategies to address these effects. The findings of this project underscore the inadequate nature and structure of project-by-project environmental impact assessments and highlight the need for a more comprehensive approach to assessing both the benefits and liabilities of regional land use.

Keywords: Community-Led Approach, Oil Sands Mine Development, Simulation Modeling, Cumulative Land-Use Impacts, Traditional Knowledge

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Understanding the Relationship between Forests and Floods: Empirical Evidence from India

Of all environmental resources, forest resources are the most crucial links in the ecosystems. Apart from providing direct use values, forests provide numerous environmental services such as flood and watershed protection, nutrient cycling, pollution control, microclimatic regulation, carbon sequestration, etc. Several studies have shown that forests prevent avalanches, landslides and soil erosion and thus argued that degradation of these precious resources affects the economy and environment both globally and locally. Further, it is argued that the native forests do reduce the frequency and severity of floods as they trap water during heavy rainfall and release it slowly into streams, which lessens the severity of floods. However, the link between forests and flooding is still ambiguous and yet to be settled in academic literature. The objective of the study is to examine the relationship between flood damages and forests in India, where the frequency and severity of flood have risen over the years. The study uses secondary data on flood frequency and damages (loss of property and human lives) from across different states for the period 1998-2011. The study finds that forest cover is negatively correlated with the flood related mortality and direct damages caused due to flood events. And the amount of forest area loss is positively correlated with mortality and direct damages due to floods. The disaggregate level analysis suggests that several Indian states are found to be the most vulnerable to floods due to large scale deforestation and forest degradation, which have recorded a heavy death toll and more damages due to floods. The correlation results suggest that trend of forest cover in the country is a major determining factor of the flood dynamics. Hence, large scale investment in forest protection and regeneration is needed to prevent persistent flood occurrences and protect human lives and properties.

Keywords: Floods, Forest Cover, Forest Loss, Mortality Ratio, Relative Hazard Loss Ratio, Direct Damage

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Assessing the “Joint-ness” in Forest Management in the Kullu Valley, Himachal Pradesh

This study explores how forest management is currently being practiced and understood by forest users, the Forest Department and non-government organizations in two villages in the Kullu Valley of Northern India. In the early 90's the state of Himachal Pradesh started a program with international funding support called Joint Forest Management (JFM). The premise behind JFM was that while the government owned the forests it would share the responsibility of managing, protecting and making decisions about it with the local user groups (the rightholders).

The purpose of our study was to consider how the JFM approach to community-based forest management is currently being practiced and what people are learning in terms of sustainable forest management and protection through their involvement. We used a case study approach involving two mountain communities, Solang and Kakanhal. Three methods of data collection were employed, including participant observation, semi-structured interviews and transect walks.

We found that village committees (three in total) had been established in both villages as an approach to governance and that committee members worked to help decide what areas of the forest need protection and should be off limits to grazing, etc. and which need planting, among other tasks. Local people are keen to help protect forests because the villages are in avalanche and landslide prone areas and knowledge about the role of thick forest in mitigating natural hazards has been passed down through generations. Despite the presence of local forest management committees, forest users generally discussed their confusion as to who owns the forest and ultimately who has management responsibility. Our data show that women go to the forest most frequently and hold most of the harvesting and use responsibilities (i.e., collecting fodder, fuel wood, grass, hay, medicinal plants, mushrooms and grazing the cattle and horses), yet they are not represented, or not well represented on the village forest committees.

Much of the learning documented related to ensuring the forest is not overused and that “green trees” are not cut and lopped. In both Solang and Kakanhal we found a strong sense of caring for the forests among all participants, so that they can be “thick and healthy” into the future.

Keywords: Joint Forest Management, Northern India, Community- Based Forest Management, Collaboration, Social Learning

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Understanding what triggers, enables, and hinders cross-cultural collaboration in fisheries management

The fishery on Lake of the Woods is regulated by the Ontario government through the Ontario Ministry of Natural Resources (OMNR). Recreational fishing and commercial fishing are both regulated under the OMNR. Sport fishing licenses are issued to both Canadian and non-Canadian residents with restrictions on catch quantity per species, size requirements, and seasonal closures. Commercial fisheries located on Lake of the Woods are monitored and regulated under the local Kenora District OMNR. The Anishinaabeg of Kabapikotwangag Resource Council (AKRC) is a tribal council that was established out of a vision by the Chiefs of the seven First Nations surrounding Lake of the Woods to create and build capacity in areas such as education, health, forestry, water quality, and fisheries management. The research looks at gaining a better understanding of the relationship between AKRC and the Kenora District OMNR in working together to achieve sustainable fisheries management on Lake of the Woods. The purpose of this research is to determine what led to the collaborative cross-cultural learning between the two organizations in fisheries management by using an ethnographic research approach. Using this approach the research aims to document how cross-cultural collaboration and social learning occurs. A document review focused on three

projects where collaboration between the two organizations occurred. Key informants were then interviewed with a semi-structured approach. The research found that lack of trust and conflict resolution are major barriers that limit the amount of collaboration that occurs between the larger First Nation base and high levels of the OMNR. Locally however, learning was directly related to relationship building, and that as these relationships were built collaboration was able to occur. It was concluded that on a local level, AKRC and Kenora District OMNR were successful in collaboration of fisheries management projects on Lake of the Woods.

Keywords: Collaboration, Relationship Building, Fisheries, Learning, Cross-cultural

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Participation makes management planning "less worse": A case from Paraty, Brazil

While participatory governance arrangements for coastal resources have demonstrated some success, many design and management challenges remain. In the Paraty region of Brazil, the State has become more active in governance of coastal resources through the implementation and enforcement of various types of Protected Areas. Current policy in Brazil dictates a participatory process for developing or modifying environmental management plans, but most cases are consultative, not deliberative. For more than two hundred years, Trindade, a Caçara community in Paraty, self-governed its small-scale resource use for coastal fishing, agriculture, forestry, and shellfish harvesting. The Serra da Bocaina National Park (PNSB), encompassing five municipalities, has existed on paper since 1971, but enforcement actions by PNSB over Trindade only began in earnest in 2008. Since this time, these actions are increasingly hampering the use of major livelihood resources on which the community depends. A negotiation process with PNSB Authorities regarding the revision of the management plan relevant to the community of Trindade occurred from mid-2012 to late 2013. The community participation in this negotiation process was studied through observation of eleven meetings involving Park Authorities, Trindade representatives on the Park Management Council, and other key community leaders. In addition, interviews, focus groups, and small group meetings directly and indirectly exploring participation were carried out with 75 people. The Trindade community participants noted limited benefits of participation and did not perceive they substantially influenced the management negotiations. Only a small group of people represented a process with a major impact on the entire community. This limited participation can be attributed to various factors including ongoing misunderstanding about the negotiation process, lack of information or capacity to participate in this type of process, and inability to

attend the required meetings for various reasons. Participation was also hampered by lack of trust, by the approach taken by park authorities, by conflict within the community, and by the unmitigated power imbalances. A division in the community exists: those who accept the park and choose to negotiate with its authorities, versus those who reject the park and strive to keep the park entirely out of the community. The traditional livelihood and cultural activity of fishing is one of the most entrenched topics catalyzing community participation and organization. While community representatives recognize that their involvement made the management plan 'less worse' than the original plan, they want more ability to influence the plan. Capacity development efforts by our team with a Community-Based Organization in Trindade improved their ability to participate. Efforts to reach the whole community and government officials are needed. Policy must allow community participants to influence the final outcome. Meaningful participation requires a representative decision-making process. This paper is a critical analysis of the participation in the negotiation process in the case described, and provides insights to address the barriers to meaningful participation.

Keywords: Participation, Protected Area, Governance, Livelihoods, Brazil

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Inducing the bottom-up from the top-down? Conceptual considerations on state-funded cooperation and an empirical example from German agriculture

There is broad evidence that collective action and self-organization can help to overcome social dilemma situations. Equally, collaborative behaviour in different forms is seen as a necessary prerequisite to achieving socio-economic and development goals as well as innovative solutions, among others to environmental problems. Much research has been conducted on the conditions, under which collective action takes place and endures over a long time. But what do to, if such collective action does not emerge or sustain on its own? The role of external actors – be it the state, international organizations, NGOs or engaged individuals – deserves more attention. What can those actors do to successfully stimulate, strengthen and sustain collective action? And where are the limits of supporting 'self-organization' from the outside? The presented paper focusses on situations, where state actors aim to induce and support cooperative behaviour and problem-solving through the provision of funds. It lays out conceptual considerations, focussing especially on the interplay of the external incentives and individual motives. It then illustrates those considerations with an empirical example from state-induced practice-science cooperation in agriculture, aiming at finding practical solutions for climate-change adaption in North-Eastern Germany. Data is based on an analysis of documents and interviews, complemented by elements of participatory network mapping. The case illustrates possibilities and limitations of state-intervention aiming at inducing such cooperation.

Power and external intervention: an example from a state-funded collaborative project in German agriculture (POSTER)

Collective action and self-organization is known to enhance sustainable resource management and improved livelihoods in a variety of situations. With this in mind, states, international organization as well as NGOs and other actors try to support collective action by a number of

interventions, including regulations or funding opportunities. When engaging in local communities, such interventions necessarily impact already existing power relationships and structures. Evidence suggests, that the benefits of external intervention have a tendency to be ‘captured’ by the existing elites and that often marginalized groups are not able to take advantage of new opportunities provided to them by changed property rights and institutional change (Kashwan, 2011; Coleman, 2014). Under which conditions can we expect an external intervention aiming at supporting collective action or broader collaboration will manifest existing asymmetries and power structures or will in contrast help to overcome them? The presented paper aims at contributing to this discussion. After laying out some conceptual ideas, the paper presents the example of state-funded practice-science cooperation in agriculture in Germany. Data is based on documents and interviews and complemented by elements of participatory network-mapping. Results reflect on how different actors benefit from the cooperation, and on which actors the programme involves or excludes. In the presented case, all farmers participating in the project belong to the 6,4% of biggest farms in the region. This is in line with results from similar funding lines. Funders have to be aware of the side-effects on power-relations of their funding programmes.

Keywords: Power, State Intervention, State-Funded Programmes, Agriculture, Practice-Science-Cooperation

Practice-science-cooperation: three basic models from the literature on land use management and common-pool-resources (POSTER)

The use and usability of scientific results is becoming an increasingly important goal, both for practitioners and for scientists. What do we know from scientific literature on relevant factors for the use, usefulness and usability of scientific results for diverse group of practitioners? The presented paper is based on a literature review on practice-science cooperation, especially from the field of land-management and natural resource use. Three models can be distinguished, based on the intensity of practice-science-cooperation, and on the question of who is producing knowledge: scientists, practitioners, or both? More current models emphasise the importance of practice-science interaction throughout the process of knowledge production. At the same time, different models and ideas are in use in parallel, and each might fit to different situations.

The presented paper serves as an introduction for the workshop on practice-science cooperation. The models provide a basis for own reflections for how we see practice-science cooperation in the context of common-pool resources and collective action.

Keywords: Practice-Science-Cooperation, Literature Review, Land Use Management, Transdisciplinary Methods, Action Research

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Global Governance of in Genetic Resources and Associated Knowledge: A Commons Approach

The governance of genetic materials, sequence data, and associated traditional knowledge is a complex and challenging task. Accomplishing this task successfully has become even more important as the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization came into force in October 2014. At this time, all parties to the Convention on Biological Diversity are expected to create implementing legislation, and many nations in the Global South have already done so. However, some countries have tended towards restrictive legislation that erects barriers against all perceived risks and all potential users of genetic resources and associated data and knowledge. Given a colonial history of exploitation of biological resources, such protectionist regulations are not unreasonable responses, but neither are they necessarily productive ones. While a protectionist regulatory system might reduce unapproved uses of genetic resources, it simultaneously erects barriers to the development and sharing of knowledge about global biodiversity. Such systems limit partnerships for research technologies and other benefits, whether in-country or international. These may be addressed through governance mechanisms that appropriately address the interests and concerns of all stakeholders, with special protections and considerations given to the most vulnerable, especially indigenous peoples.

As genetic resources are often managed by groups with diverse interests and abilities to contribute to the resource, the commons framework is increasingly seen as an approach that can enrich and improve the governance of genetic resources and serve as a counterbalance to an overly proprietary approach. Researchers have extended Nobel Prize winning economist, Elinor Ostrom's seminal Institutional Analysis and Development (IAD) framework, based on her research of natural resource commons, to genetic resources and other knowledge commons. Indeed, the global exchange of genetic resources is supported by infrastructure of bio-repositories and databases that are an integral component of a research/knowledge commons. The IAD framework is applicable because it describes best practices for governance structures and management to achieve desired outcomes of broad-based participation, availability of data and materials for research, tempered against a return of benefits to contributing countries.

This panel brings together scholars and practitioners to discuss the governance of genetic resources and associated data and knowledge. Experiences and case studies will examine the governance of genetic resources in the often overlapping contexts of: the management of genetic material repositories (ownership, access and transfer of genetic materials); scientific data and information commons (large-scale public databases, open data repositories, Ex-situ collections, research consortia, public-private partnerships and other collaborative research initiatives); medical commons (platforms for sharing of medical knowledge and innovation between patients, governance of clinical trials); and traditional knowledge (protecting and sustaining access to local resources and traditional knowledge and practices). The goal is to reflect on current developments in this field as well as identify ways in which the study and practice of genetic resource governance can be further developed to improve the durability and effectiveness of genetic resource commons.

Keywords: Genetics resources, Genetics knowledge, Knowledge Commons, Scientific Commons, Global Governance

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Examining environmental conservation and sustainable development in Bhutan through the lens of cultural multilevel selection theory

Cultural Multilevel Selection (CMLS) has been proposed as an important theoretical framework that can help us understand the emergence and persistence of sustainable behavior, institutions, and policies. Processes at each of these scales, and the interactions between them, have long been recognized as being important for the management of common pool resources, but these dynamics have not been fully explored through the lens of evolutionary theory. Here, we use the CMLS framework to explore the emergence of national-level environmental conservation efforts in Bhutan that are linked to the development goal of maximizing Gross National Happiness. In discussing Bhutan's conservation and development history through the lens of CMLS, we have three goals. We seek to demonstrate the utility of using the CMLS framework for understanding social-ecological systems change and environmental dilemmas, to generate new hypotheses, and to pose new questions. Here, we present an abridged version of Bhutan's sustainable development history to illustrate the ways in which the CMLS framework provides a structured way of examining interrelated cultural, political and environmental dynamics operating across multiple scales. We focus on three particular processes, which include the emergence of within-group cooperation as a result of between-group competition, group-level social learning dynamics, and transitions between dominant levels of selection that may impact commons dilemmas at multiple scales. These three processes are captured in numerous historical and contemporary dynamics that we describe with this case study. First, we describe how threat external to Bhutan resulted in concerted efforts to forge a shared national identity among historically isolated and culturally and linguistically diverse communities. Second, we note how this distinct, Buddhist-based identity became intertwined with sustainable development efforts. Third, we demonstrate how group-level social learning processes contributed to the internal genesis of Bhutan's environmental policies. Fourth, we propose that the same social learning process may now be contributing to development goals and metrics that could contribute to global sustainability efforts. Finally, we discuss whether political decentralization and democratization may shift the dominant level of selection within Bhutan, potentially weakening bold national-level environmental policy. We conclude by re-emphasizing the ways in which CMLS theory can generate generalizable insights into understanding social-ecological systems change in ways that can improve our understanding of sustainable commons management.

Keywords: cultural evolution, Bhutan, sustainable development, environmental policy, multilevel

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Institutional context and climate change adaptation in the humid forest zone of Cameroon

Forests will face pressure from climate change over the next century disrupting the important ecological, economic, social, and aesthetic services that forests provide. The resilience of complex social-ecological systems, when faced with uncertainty and change stems from a variety of sources. Institutions for monitoring and responding to environmental and social changes, determine the tightness of feedbacks among social and ecological components, and ultimately affect their adaptability. Existing institutions have influenced the livelihoods and adaptation of rural communities in the past. They structure risk and sensitivity to climate hazards, and thereby facilitate or impede individual and collective responses, ultimately shaping the outcomes of such responses. Climate change is likely to have an adverse effect on rural livelihood strategies, primarily for those who live in poverty. Planning for climate change adaptation, therefore, needs to promote the capacity of local institutions and improve the relationships between local and national-level adaptation planning.

In Cameroon, the economy is predominantly agrarian and the exploitation of agricultural and other natural resources plays a central role in the country's economic development. The majority of the country's poor live in rural areas and work primarily in agriculture. In the humid forest zone, these primarily smallholder farmers, are also dependent on the forest for food, fuel wood, medicinal plants and other resources as part of their livelihood strategy. In the forest zone, recent studies have indicated that climate change is already having an adverse impact on the livelihood strategies of rural people. Drought, changing seasons, erratic rainfall patterns, heavy rainfall, and strong winds are among the main climate related disturbances perceived by local people.

Using a mix of both qualitative and quantitative research methodologies, the institutional context related to climate change was investigated at both the national and local level in Cameroon. Semi-structured interviews were conducted with representatives of national institutions with a connection to climate change, forests, agriculture or development. Quantitative surveys with 232 households in 13 villages in three provinces of Cameroon investigated the existence, types, and activities of local institutions. Interviews were also conducted with local public, and not-for-profit institutions. Household surveys showed a diversity of formal and informal institutions that relate to most aspects of rural life. While direct activities related to climate change adaptation were limited, the activities and density of membership in rural local institutions could increase a community's adaptive capacity. Local governmental institutions had not received any information from the national level and were limited in their knowledge of how to help communities respond to climate change. While limited in their direct action on climate change, local NGOs and international institutions act as bridging institutions with rural communities and could facilitate sharing of knowledge and innovation, thereby fostering resilience. Planning for climate change adaptation in Cameroon needs to promote the capacity of diverse local institutions and improve the relationships between local and national-level adaptation planning

Keywords: Climate Change, Institutions, Forests, Adaptation, Cameroon

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The acceptance of traditional authorities in the Okavango basin – An Experimental Study in Namibia and Botswana

Decision making in natural resource and land management depends on the design of institutions and the overall legal framework. There is an ongoing debate on the role of traditional authorities and customary law in African societies changing the model of governance. Traditional authorities as a form of social institution persisted through the colonial times. They control and administer access to land and natural resources and settle disputes. On the one hand, traditional authorities are considered as inherently undemocratic, autocratic and backward. On the other hand, they enjoy great acceptances and they provide important institutional services (Dipholo, Tshishonga & Mafema 2014). This discussion is very prominent in Namibia and Botswana, two countries with significantly different policies over the last decades with regard to traditional authorities.

We see two key explanations for the acceptance of traditional authorities: a) They are culturally accepted because of deep rooted social norms in the society; and b) They provide institutional services in a more affordable and accessible way than local governments. The main objective of this paper is to understand whether traditional authorities are primarily accepted due to social and cultural norms.

To assess the intrinsic norm dimension of the acceptance of traditional authorities we played an anonymous public good experiment in rural villages in Botswana and Namibia, where Individuals mostly rely on subsistence agriculture and natural resources. Thus, the experiment was framed according to local settings of land and resource use. We introduced a rule with a punishment mechanism to the game and labelled it for part of the group customary law and for the other part statutory law. The introduction of the rule allows us to analyze whether the different labelling of the same rule affects the compliance with the rule in the cooperation dilemma.

In Botswana and Namibia we observe notably high cooperation levels with average contributions of 61 percent and 55 percent, respectively, even without any treatment intervention. The introduction of the rule considerably increased the average contributions to the public good compared to the baseline and the control group. In Botswana and Namibia average contributions grew up to 93 percent and 86 percent, respectively, while 87 percent and

70 percent of the players complied with the rule of full contribution. We do not find a difference in the contributions and compliance between the statutory and customary law treatment.

Both, the baseline and the treatment contributions, give evidence of strong social norms within the village structures. The results raise the conclusion that people simultaneously accept traditional authority and the body of law, which is by many policy makers considered to be outdated and prone to misuse. Generally, people contemporaneously accept different forms of authority for different spheres of life and decision situation. The findings do not justify the conclusion that statutory law is equally effective as customary law. For making such a statement one must take into account that unlike statutory law the legitimacy of customary law is not based on democratic principles or the same mechanisms.

Keywords: Collective Action, Customary Law, Economic Experiments, Southern Africa, Governance

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Facilitating Self-governance: Questions and Challenges for Institutional Co-evolution

This paper explores opportunities to facilitate the development of self-governance within the context of concepts about feasible pathways for institutional change. Polycentric governance, network governance and related ideas provide a framework for thinking about the interaction of collective action at multiple scales. This goes beyond simple ideas of top-down and bottom-up to envision multiple directions and forms of interaction. Community involvement in water resources management offers examples of different approaches to encouraging greater self-governance, particularly efforts to encourage organization at community and basin scales. Within a design space, institutions occur in a variety of configurations. The idea of the “adjacent possible” offers one way of thinking about what alternative states may be reachable, and which counterfactuals might be or might have been. Possibilism emphasizes feasible reforms, in contrast to aiming for more remote ideals. Path dependence highlights how earlier institutional changes shape what trajectories may come afterwards. Conceptual frameworks for institutional analysis and development (IAD) and socio-ecological systems (SES) offer tools for mapping institutions and their dynamics, which can be applied to analyzing what may be possible. Civic studies emphasizes how citizens take part in co-creating institutions, highlighting the space for initiative and agency within wider patterns of social co-evolution. Social imaginaries, including concepts such as “commons,” often frame the ways in which issues and aspirations are defined and discussed within epistemic communities. Visionary concepts can emphasize valued goals and processes that help define and guide the growth of good institutions, including related ideas such as flourishing, renewal, “life,” positive deviance, and creative destruction. The organization of governance processes may be influenced through a variety of means, including information, research, advocacy, policy change, community organizers, and participatory techniques, including multi-stakeholder processes. While interventions are often planned and assessed in structural terms of “establishing” organizations, it may be useful to pay more attention to indicators of collective action in problem-solving and provision of services, and ways of facilitating change in such processes. Based on a review of relevant concepts concerning feasible and desirable possibilities and pathways for institutional

change, the paper points out promising opportunities for understanding and supporting changes in self-governance.

Keywords: self-governance, participation, polycentricity, institutional analysis and development, collective action

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Public Trust and Indigenous Trust traditions: Emerging opportunities for securing land rights in Guyana, Suriname and Belize

The potential for growth in forest-based environmental service (ES), and high transaction costs for demonstrating that a service (such as carbon sequestration) really is being provided, have stimulated a re-centralization of government administration over public forests. This trend is evident in non-Annex 1 countries, including the circum-Caribbean countries of Guyana, Suriname and Belize where those publicly owned lands overlay Indigenous and Traditional homelands. The stimulus to re-centralization counters a gradual trend towards subsidiarity in favor of local community-based resource management.

The paper presents the results of fieldwork in Guyana and Suriname and traces some of the evolution in thinking about securing rights for hinterland communities based on colonial-era and current Public Trust policies and statutes and contemporary inter-governmental commitments. External threats to Indigenous and customary lands include State-sponsored logging and mining of natural tropical rainforest, exclusion from customary forests to enable carbon-trading by the State, exclusion from traditional hunting grounds to satisfy Northern ideas of 'pristine' forest, drilling for petroleum, poaching of wildlife and fisheries for illegal exports and uncontrolled cattle grazing. These issues are complex but can benefit from analysis of similar situations historically and in the present.

Formal settlement processes to confirm customary usufruct rights and/or Native Title can provide Indigenous and forest-dependent peoples with the legal basis for asserting their rights to access and benefit sharing (ABS) in relation to the provision of environmental service (ES). In the current context of expanding natural resource extractive activities and environmental degradation, this paper explores strategies that can support the territorial claims of Indigenous and Traditional Peoples of the circum-Caribbean region who continue to fulfill the fiduciary role inherent in Indigenous Trust traditions.

Keywords: Circum-Caribbean, Public Trust, Indigenous Trust, Settlement Processes, Payment For Environmental Services

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Towards a new national network for community forestry in Canada

Due to increasing interest in community involvement in forest governance in Canada some practitioners, policy makers and lay people feel that a national community forestry network could be useful for coordinating actions and inquiries aimed at improving community forestry implementation. Current experiences from regional organizations in the provinces of British Columbia, Ontario, Nova Scotia as well as experiences with the Canadian Model Forest Network will be discussed to illustrate some of the positive results and pitfalls of using a networked approach. In particular, the potential for a new national research network to support policy change as well as information and resource exchanges will be presented. Focus will be placed on identifying current opportunities and needs given existing partner resources, relationships and priorities. This presentation will conclude by reflecting on how community-based research in cross-cultural settings has informed the state of knowledge and practice on community forestry in Canada and a small set of applied research needs will be identified.

Keywords: Network, Collaboration, Community Forestry, Canada

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Practical Innovations for Protecting Common Lands and Resources: Grassroots Legal Empowerment Strategies

Across Africa, Asia and Latin America, governments, investors, and other elites are capturing vast areas of land for agro-industrial enterprises and resource extraction. In many cases, these land grabs dispossess rural communities of the lands and natural resources vital to their livelihoods. Common lands and forests are often especially at risk due to weak legal protections for community-level rights to lands and natural resources. Better legal recognition and protections for customary community land and resources are urgently needed, at national and local levels.¹

Mapping and documentation of common lands and resources is not enough. Community land and resource protection requires strong local governance. Providing a poorly governed, disempowered community with documentation for its land rights without ensuring intra-community mechanisms for good governance may, in some instances, make land dealings more unjust and quicken the pace of the communities losing their land.² Documentation and mapping need to be paired with processes that support local communities to define and establish: governance systems for lands and natural resources; accountability measures for leaders; and intra-community mechanisms to protect the rights of all owners including women and other vulnerable groups.

Namati and its partner organizations in Liberia, Uganda, Mozambique, Kenya, and Nepal are pioneering innovative approaches to empowering local communities to protect their common lands and resources through legal documentation and strengthening community governance systems. With our networks of grassroots legal advocates and community-based paralegals,³ we are translating policy into actual protection for common lands and resources at the local level.

Long-term, sustainable, and equitable community land protection cannot be achieved with a single, simple intervention. Over the past five years, Namati and our partners have been developing an integrated yet multi-faceted model of community land protection. We are continuously experimenting with different tools and techniques, rigorously evaluating our impacts and effectiveness, and learning from successes and failures. This presentation will showcase some of the successful grassroots legal empowerment mechanisms that Namati and our partners use to strengthen protection of common lands and resources, such as:

- Namati's four part approach to community land protection;
- Developing and supporting a network of community-based paralegals for land protection;
- Resolving local land conflicts and building community unity;
- Facilitating community processes to draft and enforce local by-laws and management plans; and
- Tools to prepare communities for negotiations with potential investors.

The presentation will also explain how Namati and partners leverage the community land protection process to support community-driven improvements in intra-community governance, gender equity, and natural resource management. Namati will share practical experiences, strategies, challenges, and opportunities with the goal of encouraging wider adoption of grassroots legal empowerment approaches in efforts to protect common lands and resources.

Keywords: Land Rights, Customary, Governance, Legal Empowerment, Grassroots

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Collaborating with power: Resource industry participation in multi-actor water governance

Collaboration is increasingly being used by traditional states to support and enable governance of environmental 'commons' at regional and watershed scales. Collaborative governance is predicated upon equitable deliberation and debate amongst state, private and civil actors pooling their time, resources and knowledge to achieve common goals. However, practical incidences of collaboration are fraught with issues of power. While relatively easy to identify at the operational level, differences in reach and influence amongst actors at nested administrative and constitutional levels can create hidden power structures that shape that ability of collaborative processes to generate improved governance and environmental conditions. These imbalances are particularly apparent in situations where large, publicly traded resource industries participate in collaborative processes. Influential economic actors can not only mobilize more resources, but also benefit from hegemonic privilege stemming from global capitalist economic models that are reproduced at multiple scales. This influence has been increasing with neoliberal trends toward decentralization that increase state dependence on economic actors.

This study examined the roles of both the state and industry in incidences of collaboration for water governance where natural resource industries are present as actors. Theories on relational, structural and discursive aspects of power were used to construct a framework for revealing visible and hidden expressions of power in collaboration, and their potential impacts on the achievement of collaborative process goals. This framework was empirically applied through comparative case study methods to two instances of collaboration: the Athabasca River Watershed in Alberta, Canada, and the Thames-Sydenham Source Protection Region in Ontario, Canada. Each case contained two distinct levels of analysis: the operational watershed level and the administrative provincial level. This nested approach facilitated the examination of issues of scale.

Research revealed that, at the state level, cultural path dependency and structural dependence on industry prevented governments from devolving influence over policy decisions to collaborative groups in a meaningful way. From the perspective of publically traded resource industries, collaboration continues to be viewed as an optional exercise, useful to build social license, educate society and gather information. Overall, economically important policy decisions continue to be made through elite-level access, lobbying and regulatory relationships, almost always outside of collaborative processes and out of the public eye.

The ability of collaboration to achieve better, more implementable environmental policies in situations where resource industry actors are able to exert significant influence at multiple scales is limited. However, collaboration can generate benefits with respect to the development of social capital and civic empowerment. As such, those considering collaboration should consider whether processes are being proposed to achieve tangible environmental outcomes, or if social benefits are sufficient. It is important to recognize that collaboration without the perceived power to make real change has led to civic disempowerment, but also, conversely, that social benefits may lead to improved environmental conditions in the much longer term.

Keywords: Collaboration, Water Governance, Power, Resource Industries, Influence

C

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How long does a groundwater collective action last? Duration analysis of small-scale farmer collectives in the Irrigation District of Costa de Hermosillo, Mexico

The increase in the number of farmers leaving the collective in the Irrigation District “Costa de Hermosillo”, Mexico in the past decade presents an opportunity to analyse the factors that affect a collective’s sustainability. There may be several reasons why farmers decide to exit from the collective. In this respect, this research is focused on identifying how the collective action endures through several external and internal stresses. I use a semi-parametric model of

'duration to exit' to estimate the effects of explanatory variables over the small-scale farmers' conditional

probability to leave the collective. The empirical results highlight a significant role of different measures of capital (social, human, physical, financial and natural), as well as of diverse farmers' attitudes and perceptions in influencing their exit timings. Factors such as performance of the collective, conflicts over the decision-making process, and the perception of corruption in the government are found to play a key role in determining exit duration. Natural resource scarcity, especially those concerning groundwater depletion and the subsequent risks of saline intrusion also play a role. Policy implications of such findings are derived. Future work will use the derived results in a dynamic model of farmer decision making within the collective.

Keywords: Collective Sustainability, Semi-Parametric Model, Conditional Probability, Farmer's Attitudes and Perceptions, Groundwater Depletion

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The challenge of crafting institutions for the commons: the case of community forestry support programs in Mexico 2003-2008

Mexico forest tenure structure is known worldwide for its progressive approach of giving local communities full property rights to set a robust support to sustainable livelihoods in forested areas. Most forest areas in Mexico are owned by local communities either through the ejido, agrarian indigenous community or groups of small owners' schemes. We refer to all these arrangements as "forest communities".

In the last 30 years many forest communities explored forest production at a commercial scale, creating their own communal forestry business and concurring to the national markets with their timber and nontimber products. The social and economical impacts of this approach was tremendous, steadily improving the living standards of communities with their own forestry business. This success prompted rural organizations to ask the Mexican Government to launch programs to expand the "community forestry" model as much as possible. The Government launched with international assistance from the World Bank and other agencies three different programs to foster forest commons: the Forest Conservation and Management Program (PROCYMAF for its acronym in Spanish), the Indigenous, Communities and Biodiversity Project (COINBIO for its acronym in Spanish) and the Mexican part of the MesoAmerican Biological Corridor (CBM for its acronym in Spanish).

The social and economical impact of these programs has been documented in their respective evaluations, but the question about their environmental impact or even about their environmental sustainability and therefore their validity as National policies, has been scantily explored and practically not debated. To contribute to answer these questions, the author made an extensive analysis of their impact over forest cover during the 2003-2008 period, which was the core time of execution of these three programs, and correlated them with institutional development variables, following Elinor Ostrom Institutional and Development Analysis Framework.

The paper to be presented at the 2015 IASC Congress will present the results obtained by the author after revising 2,070 cases of community forests covering 9 million hectares in South Mexico.

Keywords: Community forestry, Forest policy, Mexico, Mesoamerica, Institutional Analysis

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Hybrid youth knowledge in environmental governance in Northern Canada

Several Indigenous and post-colonial scholars recognize that an important characteristic of the Aboriginal experience is that of simultaneously existing in two worlds. Aboriginal youth in the Northwest Territories (NWT) of Canada, educated within a formal curriculum but also experientially gaining knowledge through on the land practices, have a unique, albeit implicit, understanding of how, when, and under what conditions to make such epistemological negotiations between Western and Indigenous ways of knowing. Aboriginal youth knowledge consists of the lively complex of ways of learning and teachings by elders, family, 'land' and broader community sources, and the knowledge gained within the formal institutional education system.

Problematizing local resource co-management institutions, I discuss the development of hybridity in environmental knowledge by which indigenous youth employ socio-cultural ecological knowledge in the context of land governance in the Canadian North. Here, Aboriginal youth are not only navigating a multi-educational environment, they also represent a new generation of land managers in Aboriginal self-government in Canada in which they are expected to provide traditional and instrumental knowledge towards solutions for complex social-ecological problems.

As a way towards understanding social change, this paper and presentation explores how northern Aboriginal youth within the formal education system understand, express and apply their unique knowledge that is simultaneously derived from Dene knowledge and school-based knowledge, in the context of co-management-based natural resource management (NRM) under not only Aboriginal land claim agreements but most recently, Aboriginal self-government. As such, I examine how Aboriginal youth cognitively navigate the discursive terrain within which they are educated but also consider how hybrid knowledge incorporates these voices and valuable novel understanding in ways that enhance environmental governance in the context of local natural resource management.

Keywords: Aboriginal, Youth, Natural Resources, Governance, Northern Canada

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Socio-ecological interactions in Fisheries from the perspective of Ethnoecology Comprehensive: Itaipu Beach, Niterói / Rio de Janeiro (POSTER)

This research adopts a socio-ecological perspective in order to identify and understand the answers found by fishermen to maintain their lifestyle in the face of changes in social and natural environment in which they operate. The interdisciplinary theoretical framework is situated within the Comprehensive Ethnoecology. The identification of the elements, strategies and conditions that foster or impede the potential for self-organization and evolution of socio-ecological system of artisanal fishing was performed by studying the trajectory of informal rules in the existing artisanal fishing of Itaipu beach (neighborhood in the city of Niterói, Rio de Janeiro state) over the past 35 years. The Itaipu beach proved to be the locus for the study due to initiatives to implement a Marine Extractive Reserve. Diverse procedures (free depositions, mapping fishing spots, photographic record, amongst others) were used to subsidize the analysis, which were focused on the local ecological knowledge of different fishing arts, fishing areas used, disputes over natural resources, identification and understanding of informal rules, and the imbricated network of meanings in the dynamics of institutions that underlie this activity of collective use and direct their management practices. The data show that the maintenance of this secular activity on the fringes of Niterói metropolitan area is due to the refined local ecological knowledge and the observation of informal rules on the part of fishermen, factors which adapt to social and ecological transformations and should be considered in any management initiative in the area.

Keywords: Ethnoecology, Artisanal Fishing, Customary Law, Extractive Reserves

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Governance of Marine Fisheries and Biodiversity Conservation

The classic interaction between the use of Nature and the protection of Nature has a very long history. This paper explores such an interaction, specifically in regard to fisheries and marine biodiversity conservation. Decision-making over fisheries and over biodiversity may be seen as constituting two potential 'streams' of governance, flowing through global governance, including United Nations fora, through nations of the world (e.g. interactions of environmental and fisheries agencies), and in thousands of coastal communities. Coming from common roots, the governance 'streams' have evolved over the years, producing legislation, policy and management plans, affecting economies, ecosystems and societies, and generating passions and conflicts. There has been an increasing intensity of interactions, and similarities that have grown through externally driven convergence and interactive coevolution. This paper examines the dynamics of these changes, and possible limits to integration related to risk tolerances and core beliefs, by exploring impacts of the governance streams on the commons, at multiple scales from local to global. Case studies are drawn from a new book on the governance of marine fisheries and biodiversity conservation, which examines the interaction of the governance streams across multiple fishery types, geographical regions, governmental levels and disciplinary perspectives. The cases include small-scale fisheries, small island developing states, regional management bodies, and global institutions. From these cases, it is clear that the more differentiated the processes of decision-making about fisheries and about biodiversity, the freer

the streams are to follow different pathways to different places, but the more interrelated the problems those streams try to address, the more opportunities for conflict arise if the streams are following different pathways to different places. Ultimately, it is concluded that while total overlap of the two governance streams may be unlikely, and even undesirable, avenues to productive integration in the future may be of benefit to many commons globally.

Keywords: Governance, Environmental Conservation, Protection, Sustainable Use, Marine Biodiversity

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Participatory practices in the public sphere: A case study of the Site C Clean Energy Project in British Columbia

In the public sphere, the debate and deliberation of energy development and energy alternatives reveal the meanings, skills and materials that members of civil society draw upon when considering natural resource development. Examining these elements of social practice as contested ideas and frames of reference are being negotiated in politicized public debate accesses processes of both mediation and public opinion formation. Contemporary forms of digitized media, such as Twitter and news post comment systems that allow for the circulation of user-generated content by a broad public, provide a site for the sociological analysis of how changing media-related practices may have an increased capacity to influence political decision-making through a more extensive and interactive public sphere. New understandings of representation, publicity, governance, democracy, and what it might mean to deliberate and participate in pluralistic public spheres emerge when Habermasian ideals of procedural structure, rational bias and unmediated forms of dialogue that are traditionally associated with deliberative institutionalized decision-making processes are set aside. This research asks how the online media-related practices of members of civil society serve to (re)structure public deliberation and mediation, public opinion-formation, and the mechanisms of transfer of public opinion to the political arena as actors engage in deliberation on complex energy choices within the landscape.

This study involves an empirical examination of the social practices of individuals and organizations engaging in public debate surrounding BC Hydro's Site C Clean Energy Project. A mixed-methods case study approach was applied to explore the relationships between political debate in the public sphere and the media-related practices of actors in a digitized and interactive media-space as controversy over the proposed development of this large-scale hydro dam on the Peace River near Fort St. John, BC erupted in the media. The first stage of online data mining and analysis provided an inventory of online media used by actors, identified the actors most engaged, and described the characteristics of the media-space associated with the Site C project as actors presented arguments in favour of or against the project. The second phase of research focused on qualitative semi-structured interviews to analyze more deeply the media-related practices of the participants identified in the first stage of research as they attempted to influence public opinion. The findings of this study open up new avenues of research into the mobilization of the public sphere and the potential for new sites of agentic action in democratic decision-making related to the commons and controversial energy development.

Keywords: Social Practice, Public Sphere, Mediation, Interactive Media, Energy Futures

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Relating Commons Analyses to Public Sector Management: Experiences from Zambia's Educational Sector

The concept of a 'commons' applies to many human situations given the potential convergence of interests of people operating in shared environments that maybe organizational, virtual, physical, political, social, cultural, or economic. Analyses of commons offer unique insights into an important human trait, a natural instinct to seek to collaborate with others for mutual gain. Revealing the mechanics of collective action, analyses of commons show how key features of human association such as rules, leadership, authority, interpersonal relations, trust, interests, incentives, and consequences work to achieve mutual gain. Whereas the impetus for commons analyses has been driven by considerations of productivity, efficiency and sustainable governance of natural resources, this paper broadens its use to include running of public institutions. This idea, to treat public institutions as commons, is inspired by the author's doctoral research that sought to understand why some local community groups, given similar incentives, were successful in executing small social public infrastructural projects while others failed. The research concluded that socio-political compromise largely secured success in collectively executing the social projects. This compromise, or 'political capital', bolsters creation and sustenance of informal rules that facilitate operational governance in managing collective interests and producing public goods. Applying this logic, this paper deeply describes experiences from programmatic efforts implemented over a seven-year period to encourage performance improvements among five of Zambia's ten provincial education management units. Analyzing this experience, this paper discusses essential elements of working with polities in overturning constraints to performance. Substantively, this paper describes efforts in persuading and influencing change in public institutions by building interpersonal relations, leveraging authority and closing information gaps that undermine collective convictions on performance challenges. As commons, public institutions are usually afflicted with deleterious aspects including inertia, incompetence, shirking, loafing, and negligence that undercut service delivery functions. Contesting one-track responses to poor public sector performance, this paper asserts that reforms aimed at improving accountability must work at catalyzing associational traits in public institutions rather than merely focus on demand creation and imposing a multiplicity of technical fixes. In public institutions, informal rules ensure that interactions among group members transcend but also may enhance formal relationships. Because public institutions are socio-political arenas, understanding nuances regarding interpersonal relations and influence of information and power asymmetries on institutional politics is vital for reform success. This paper discusses how this dynamic has significant implications for public sector reform initiatives, including decentralization, and development theorizing more broadly.

Keywords: Commons, Political Capital, Information and Power Asymmetries, Collective Action, Governance Reform

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Tragedy of the Privatization of the Commons

In the governance of common pool resources, there are two types of error. For one, the type 1 error is concerned with the case where unrestricted use of common pool resources leads to over-utilization and depletion of the resources. This is the well-known problem of the tragedy of the commons. We refer to this as a type 1 error, because a tragedy of the commons happens if a community mistakenly claims a certain resource as commons when, in fact, the resource would be better utilized as private property.

For another, a type 2 error refers to the case where the erroneous privatization of common pool resources results in inefficient resource allocation or “race to the bottom” situation. Therefore, this problem can be termed as the tragedy of the privatization. In this case, an optimal governance strategy may be to use the resource as a common property resource rather than a private property such that it may be governed either by the state or a self-governing community. In the real world, there are numerous cases where type 2 errors occur when common pool resources are governed.

This study addresses the issue of the tragedy of privatization, which happens if the consent of a community is not well defined when in fact it should have been for the optimal use of the resource. In a sense, the tragedy of the privatization is the opposite case of the tragedy of anti-commons where the consent of a community is defined to excessively result in the under-utilization of the resource. We can find diverse ways to avoid the tragedy of the privatization. For example, we can interpret a firm as an organization in which employees voluntarily yield their private efforts to the employer preventing the potential tragedy of privatization by restraining their own use of work hours. Another example is a local government which quite often uses a mandate to restrict the way its constituents utilize their properties to prevent the tragedy of privatization.

Specifically, we will do three things: first, we will explore several cases of the tragedy of the privatization of the commons in a historical context. Second, we will attempt to classify these cases based on the current status of governance. Finally, we will identify the determinants of the governance types. An effort of this nature would enable us to further expand the horizons of our understanding of the issue of common pool resource governance.

Keywords: Tragedy of the Commons, Tragedy of Privatization, Tragedy of Anti-commons, Firm, Government, Governance Types

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Community based Landscape-linked land tenure: A case study of Nagaland, India

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Community-based land governance through customary law, with unknown titling and informal mapping (Alcorn, 2011), is followed largely in the abodes of indigenous people (IP), comprising about one fifth of the world's territory (United Nations, 2009). Their self-organized and evolved community institutions promote disciplined and dynamic tenure systems with continuum of rights linked to landscapes, mostly under collective control of community. Such systems have demonstrated their resilience and effectiveness in governing remaining the global biodiversity hotspots through sustainable natural resources management with often, net ecological handprints, in the context of climate change.

This paper highlight the inherent elements of this alternate land governance system and its interconnected landscape management, in the context of state of Nagaland in India and discuss its implications on landscape ecology, food security and sustainability.

Nagaland located in northeastern India, has ninety two percent geographical area under community ownership. It has a population of about two millions, comprising of 16 recognized tribes, each occupying a distinct area, having, in many cases has own unique land tenure systems. Usually, a major proportion of land is held as common village land, which is either jhum land or community forestland, Apart from this, the village landscape in Nagaland consists of Palm/Bamboo Blocks and Homesteads with different forms of tenure. The jhum lands (including cultivated and fallow-forest blocks) are governed through temporary individual tenures to meet the need of food, fuel, housing and other biomass-consumption needs and also to ensure soil fertility and resilience. Forest reserves are governed under community control to meet the requirements of forest products including timber and also to ensure sustained ecosystem services especially water-flow and biodiversity conservation through delineated conservation areas. Palm or bamboo blocks primarily are maintained to meet housing needs. Homesteads and gardens, with long-term individual tenures, are put under perennial economic tree (including fruits, agar etc.) and other horticulture production systems for meeting food and income needs.

The customary laws are un-codified, yet very effectively applied and interpreted by the Village Councils, and other traditional institutions for land allocation and dispute resolution. In most community land, all members have a right to use but with prior consent of the custodians, the Village Council. There are restrictions on land uses as per landscape limitations, to maintain soil fertility and ecosystem services.

Four key elements of this customary-law based land tenure system are community control, landscape-based land-governance, continuum of rights within particular landscapes and cyclic natural resources management. This system through a maintenance of dynamic mosaics of landscape, have ensure sustenance of substantial forest density with rich biodiversity, diverse foodscapes to meet needs of cultural food and nutrition, soil fertility and resilience, ecosystem services, flow for biomass to meet other consumption needs and economy. This land governance system also aligns well with triple bottom lines of sustainability through meeting ecological resilience and economic prosperity with a robust decentralized community-based institutional mechanism.

Keywords: Land Governance, Shifting Cultivation, Indigenous People, Sustainability, Ecology

Commons Foodscapes for a Local Food Security: Juxtaposing Biodiversity, Culture, Nutrition and Indigenous Community in Indian Forest-Foodscapes

Global and local food security discourses have largely remained around production, access and absorption traditionally and around food sovereignty and food miles of late. In these debates the focus of food has been limited to agriculture landscape, productions mainly through cultivation and access has primarily been through market or public distribution system. Such biasedness continues, in spite of growing globally accumulated evidences as well as traditional age old practices around sourcing of food and nutrition from non- agriculture/privatized commons landscapes, through non-cultivated methods of collection and access and distribution through sharing and caring by community-based decentralized institutions and customary norms.

These common-foods, primarily sourced from common landscapes viz. forest, wetlands, grasslands and including seasonal commons, have traditionally been biodiverse, nutritious and culturally preferable, apart from being produced locally naturally as per the local agroclimate. Most importantly they continue to be the significant food-source for the common man, the poor, women and socially backward communities. In the land of indigenous communities, where a major portion of landscape is under community control and de-facto commons, such foodscapes have always been wider, with a low share attributed to cultivated landscapes. Ensuring of tribal food security, culturally, nutritionally and temporally is incumbent upon maintenance of their local and cultural food basket, which comprise of largely commons foodscapes in forests and wetlands.

This paper, taking example of forest as a source of food, particularly in the context of India, argue for expanding foodscapes beyond these artificial boundaries. Drawing upon emerging secondary literature on this dimension globally and locally, and based on author's own experience of working in forest-fringe regions in different states of India, this paper seeks to reinforce the argument with evidences around (1) share of forest-food in food and nutrition basket, (2) their rich biodiversity and nutritional potential (3) embedded local ecological knowledge around forest-food-species conservation and use as well as (4) the cultural connections they have in different agroecologies and community abodes. The forest-food connections with the culture of indigenous communities is being now celebrated and reiterated through organization of forest food festivals, examples of which, will be dwelt upon to juxtapose the indigenous livelihoods, culture, cuisine and biodiversity with forest food. Gender has a inherent link to forest food, as the women not only collects the food from forests, they also manipulate the biodiversity and manage the regeneration, through their selective and seasonality of harvesting. While, highlighting this angle, this paper goes on to present a case study in the state of Odisha, where women collectives have now been entrusted with a pioneering task of regenerating non-tree forest foods in a bilateral forestry- project, with author's initiative. Briefly, the paper also discusses traditional community institutions and norms which influence the access, collection and distribution of forest-food.

Keywords: Forest-food, Gender, Local Ecological Knowledge, Food basket, Food Sovereignty

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Small-scale fisheries in ecologically sensitive areas: opportunities and challenges for sustainability in diverse institutional arrangements in Latin America

Many Latin American small-scale fisheries (SSFs) operate within ecologically sensitive areas. Reconciling conservation with resource use is socially and politically challenging and often conflictive, due to the large number of people involved and the significance of fishing for their livelihoods. Diverse institutional arrangements have been independently designed and implemented in several Latin-American countries to accommodate SSFs and conservation. Examples include Reservas Extrativistas Marinhas (RESEXs) in Brazil; various forms of multiple use marine protected areas in Mexico, Ecuador, Colombia, Chile and Argentina; combinations of TURFs (Territorial Use Rights in Fisheries) and Marine Reserves in Chile, among others. In all these settings, the need to attend to conservation has created opportunities, but also presents challenges for SSFs management. On the positive side, attention to SSFs management has generally increased, bringing into focus the need to regulate access and the damaging ecological side-effects of some fishing gear, promoting the establishment of participatory bodies and enhanced institutions, increasing incentives for fishers to organize, improving monitoring and enforcement, and creating opportunities for the diversification of livelihoods. Added challenges include conflicts in objectives, overlapping mandates of intervening government agencies leading to dilution of responsibility and inaction, interagency conflicts, social costs due to exclusion, and unresolved conflicts among users. We compare and discuss various institutional arrangements for the management of SSFs operating in ecologically sensitive areas, which differ in origin, objectives, design and implementation. This approach, we hope, may inform the quest for solutions that accommodate priorities in social-ecological systems.

Keywords: Small-Scale Fisheries, Protected Areas, Complex Commons, Social-Ecological Systems, Latin America

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Polar bears, complexity, and cautionary lessons for managing a dynamic commons.

Over the past decade polar bears have become potent symbols in the global struggle to combat climate change, based on the well-promoted and simple narrative of “less ice means fewer bears”. Policy responses and international publicity campaigns have largely ignored greenhouse gas emissions but led to increasing burdens on Arctic aboriginal peoples, typically through restricting harvest and/or trade. These outcomes deepened intercultural divides and, in Canada, sowed conflict within an otherwise functional co-management system.

The state of scientific understanding has advanced though, now showing that the causal relationships between melting sea ice and declining polar bear populations aren't as simple or linear as was once thought, and that impacts of a warming climate on polar bears are highly dependent on local biophysical context. These findings are strong vindication of local and traditional ecological knowledge, specifically in the Chukchi Sea and western Hudson Bay. They have been largely ignored by media however, which continues to amplify oversimplified dualistic narratives.

Institutional capacity for making rational, feasible, and justifiable management decisions about polar bears and their habitat has been significantly eroded by this chain of events. Polar bear management is no longer a resilient or successful system, despite a legacy of past successes. Prospects for collective action in the common interest are slight, though progress is being made and social capital rebuilt in the relatively de-politicized arena of managing polar bear-human conflicts. Given the now-apparent potential for abrupt non-linear Arctic sea ice loss, which would pose a novel challenge for conservation institutions at all scales from local to international, there is urgent need and significant scope for improving the performance of governance for polar bears and the Arctic as a whole.

Keywords: Climate Change, Governance, Inuit, Polar Bear, Symbol

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Enclosing the oceans: Values embedded in fisheries research, practice and policy

The world's oceans are the latest frontier in the enclosure of the commons. Recent decades have seen major shifts towards limiting access to marine resources through sovereignty, regulation and privatization. Although property rights are now at the core of dominant policy solutions for fisheries, conflicts over privatization and enclosure reflect a diversity of values and desired outcomes in efforts to govern the commons. Questions of who benefits (and who should benefit) from the existence and use of the commons are embedded in the metrics used to evaluate policy outcomes. Contemporary disciplines engaged in fisheries management research hold a diverse range of normative positions on the ultimate purpose of resource use, conservation, and management institutions. This study investigates how these broader normative positions are expressed in divergent evaluative criteria and management goals for property rights in the fisheries literature.

We illustrate the practical relevance of these questions through a comparative analysis of reform processes in three red sea urchin fisheries in Baja California, Mexico; California, U.S.; and British Columbia, Canada. Though all three fisheries emerged in response to the same market forces and continue to use similar gear and harvest methods, they have developed dramatically different institutions of rights and access. British Columbia's red sea urchin fisheries are managed under Individual Transferable Quotas, Baja California uses territorial rights allocated to companies and cooperatives, while California has basic limited entry licensing and is currently undergoing changes to the rights conferred by permits. Our analysis will show how the emergence of different rights regimes reflects the evaluative criteria used in problem diagnosis and the management goals used in identifying and selecting new policies. By comparing approaches in fisheries research, practice and policy, this analysis reveals how explicit attention to the social purpose of commons use and management can help to better understand the emergence of diverse rights regimes and inform ongoing efforts to develop successful fisheries management institutions.

Keywords: Fisheries, Property Rights, Institutions, Policy Evaluation, Enclosure

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Multi-Commons and Meta-Commons in the New Data-Sharing Universe

The application of Ostrom's Institutional Analysis and Development (IAD) framework and other existing tools of institutional analysis to information commons has yielded valuable insights regarding the nature, design and operation of pooled information resources. Yet recent trends in the aggregation of large bodies of information, particularly scientific data, defy current modes of analysis.

Both the IAD framework and much of commons theory assume the existence of a single pooled resource, which we refer to as a "centralized" commons. Different models are required to analyze the independent but linked data pools increasingly found in scientific data sharing environments today. We refer to these distributed structures, in which two or more independent data pools are linked together, as "decentralized" commons.

Decentralized commons take two principal forms:

- Multi-commons, in which independent data pools are integrated so that a user may access any of their data components via a single access point or portal, and
- Meta-commons, in which independent data pools are not integrated, but share a common legal and policy framework that authorizes users to access individual nodes on uniform terms and conditions or "rules in use"

Assuming that linkage and interconnections are adequate, and legal obstacles are contractually addressed, the end user of a decentralized commons should obtain the benefits of all of the affiliated data sets as though they belonged to a single, centralized pool or commons.

We propose a set of minimum conditions necessary to establish decentralized commons and then assess current multinational scientific data sharing efforts in terms of our framework. Our hope is that this new distributed commons framework will enable policy makers and researchers to assess existing and proposed modalities for trans-border data sharing to maximize usage, interoperability, and public benefit.

Keywords: Transnational, Data Sharing, Metacommons, Multicommons, Scientific Data

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Uncovering Resident Perceptions of a New Forest Livelihood: Timber Extraction within the Chico Mendes Extractive Reserve, Acre, Brazil (POSTER)

Acre, located in the western Brazilian Amazon, appeared on the global conservation radar during the 1980s when local activist Chico Mendes organized the rubber tapper movement to protect forests and forest livelihoods. This social movement inspired creation of the first extractive reserves, including the Chico Mendes Extractive Reserve (CMER). Extractive reserves are forest areas inhabited by extractive populations (extractivists) granted long term usufruct rights to sustainably harvest and manage the resources within their forests (Allegretti 1989). Historically, rubber (*Hevea brasiliensis*) and Brazil nut (*Bertholletia excelsa*) have been the primary non-timber forest products (NTFPs) to generate income (SEMA 2010) within the reserve, while commercial timber was not approved for harvest (Vadjunec & Rocheleau 2009). For the first time since the Chico Mendes Extractive Reserve's (CMER) inception, timber will be integrated into the array of legally extracted forest products within the reserve. Despite minimal investment required of resident stakeholders and relatively high returns on that investment, many households have rejected participation in the logging project.

The objective of my research is to identify and analyze CMER residents' perceptions about the upcoming logging endeavor and why they decided to enlist in the project or not. Do residents accept timber as a viable forest livelihood? Why or why not? Reduced impact logging (RIL), when managed carefully, can generate economic benefits for forest users while minimizing ecological damage on forest cover, carbon stocks and biodiversity levels (Putz et al. 2012). Therefore, logging in the unique social-ecological extractive reserve system is arguably an appropriate supplemental livelihood in an increasingly dynamic local economy. Despite potential benefits, however, timber harvesting within the CMER has produced skepticism among some reserve residents (Duchelle et al. 2011). The proposal to fell trees in Acre has been a difficult sell after the historic violent struggle of the rubber tapper social movement organized to prevent encroaching deforestation in the 1980s (Azevedo & Freitas 2003; Kainer et al. 2003). Also, the threat of reinvestment of timber profits into cattle enterprises (thereby causing deforestation) is a major concern of multiple stakeholders (community members, NGOs, government agents, and the forestry industry) in Acre (Duchelle et al. 2011). My research attempts to capture resident perceptions about the upcoming logging project within

the CMER. Structured interviews (Bernard 2011) were the primary form of data collection and were conducted from June to August 2014. I will integrate quantitative and qualitative data analysis; specifically, I will run logistic regressions to test whether CMER resident decisions to log may be explained by select demographic, economic and cultural variables. I will also compare responses by gender. Qualitative data collected will inform an in-depth analysis of the reasons why CMER residents will participate in the project or not, and to understand more holistically the complex issues related to logging within CMER boundaries. The outcome of integrating this novel livelihood has the potential to increase the resilience of the extractive reserve protected area as a conservation strategy, or it could further destabilize the current coupled human-natural system.

Keywords: Rubber Tapper Social Movement, Values, Environmental Behavior, Protected

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Exploring fishing dynamics in the Dominican fishing village of Buen Hombre

Like many small-scale fishing communities around the world, the coastal community of Buen Hombre in the Dominican Republic is dealing with a set of challenges to reconcile its fishing activities with the ecology on which it depends. The current community of about 800 people relies extensively on a network of reef, sea grass, and offshore marine ecosystems. As the community has exerted increasing pressure on their marine resource over the past several decades, the resource has become increasingly depleted, resulting in significant reductions in fish stock as well as localized reef crashes throughout the resource area. Several attempts to shift resource use towards sustainability have failed and high fishing pressures continue to further deplete the resource. These dynamics lead us to ask what features of the case are continuing to lead to resource degradation, and whether any factors are starting to mitigate these processes.

In this presentation we discuss the methods and results of a project geared towards answering these questions using a statistical analysis of fishermen survey data. Building on an earlier project that focused on collecting and analyzing ecological transect data to explore the health of the local reef ecosystem, we collected a near-exhaustive sample of the roughly 90 Buen Hombre fishermen over two field seasons to explore the motivations for their fishing behaviors and their opinions regarding the status of the ecosystem on which they depend. Following this, we conducted a statistical analysis of the survey data in order to explore the relationship among a set of interrelated factors including (1) membership in the local fishing association, (2) main sources of livelihood, (3) gear choice, (4) fishing site choice, and (5) fishing intensity. In our analysis we find that a mix of factors, notably changes in gear and fishing sites used, the number of fishermen and their livelihood diversity, as well as an

increased connectivity between Buen Hombre and its external environment, have contributed to the decline of the condition of Buen Hombre coral reef fishery. We conclude with a discussion of what may lie ahead for this particular case and others like it.

Keywords: Small-scale Fisheries; Dominican Republic; Surveys; Resilience; Common-pool Resources

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Brazilian Indigenous People Kamaiurá and the Sustainable Development

This study aims to analyze the importance of the recognition of legal pluralism for the promotion of cultural and environmental sustainability. Through the Legal Anthropology discipline, we intend to present some of the standards of the Brazilian indigenous people Kamaiurá, concerning about the land use and the use of natural resources.

The people Kamaiurá live in the southern part of the Xingu Indigenous Park, in the Brazilian state of Mato Grosso and have a population of approximately 523 people. They are inserted into the Tupi linguistic brunch and speak the indigenous language Kamaiurá. Considering the contact with the non-indigenous people, most of the population also speaks portuguese. Despite the presence of some Western values, such as consumer goods - clothes, motorcycles, stereos etc., Kamaiurá people keep their social organization and their own way of relating to the natural environment.

To understand a little of Kamaiurá universe, it is necessary to understand the importance of myths to this indigenous people. They not only permeate the collective imagination, but define rules and establish the way of life in the village. The respect they have for natural resources is interconnected to this mythological universe. The preservation of these resources comes from a very close relationship they establish with nature, which is defined not only by aspects of addiction, but mostly by the primary meaning of myths and beliefs Kamaiurá. Many plants and animals, for example, have spirits and they act directly on the social environment. In this sense, is intrinsic in the indigenous nature use natural resources sustainably, as these support them physically and culturally. It is common in some Kamaiurá's myths reporting marriages between indians and animals, showing that these and humans are treated as equals.

The Kamaiurá territory is collective. Although the Brazilian Federal Constitution does not recognize the indigenous property rights over their land, but only the right of possession, internally, there is no such distinction. Each village place is historically linked to its inhabitants. The territory identifies the indigenous people because it is the memory of ancestors and the natural resources necessary for the maintenance of their socio-cultural survival.

Among the Kamaiurá standards, is to care for the individual goods, as a fruit tree, and collective goods such as rivers, lakes and forests. Prioritizing the well-being of the community, the indigenous people Kamaiurá follow adjusting their rules and operating regardless of the state figure. Considering the traditional way of life of indigenous peoples, recognition and

respect their own standards are closely related to sustainable development, both for the environment is preserved, as for the richness of cultural diversity is perpetuated.

Keywords: Indigenous Peoples; Kamaiurã; Law; Cultural Sustainability; Brazilian Indigenous Rights; Legal Pluralism

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Governing research for developing countries: from foreign aid to global challenges

Research-for-development (R4D) concerns scientific investigation directed towards the benefit of developing countries. R4D is at a critical juncture: closing as donors squeeze public expenditure and narrow both geographic and thematic coverage of foreign aid, and opening with an expanding set of global challenges that affect all people. This paper contrasts the logics of 'foreign aid' and 'global challenges', and applies institutional design principles derived from scholarship on the commons to governing international research collaboration. Commons require a negotiated, cooperative use of a limited resource, such as forests or fisheries, in a manner that avoids shared public 'ills', such as overexploitation or environmental collapse. Similarly, R4D involves the use of scarce research funding and talent to generate knowledge and solutions to address social problems including poverty, hunger, and disease. Research collaboration consists of ad-hoc, time-limited institutional arrangements for governing this common 'good' (funding and talent) and common 'bad' (shared public problem). Design principles from common scholarship offer unique insights for crafting such international research collaborations, including how diverse actors negotiate their roles and responsibilities. Such arrangements occur at the level of funding agencies which partner on joint calls-for-proposals, and at the level of individual research centres which collaborate on projects to share funding and assign tasks. Given that funders and researchers are rooted in different national policy contexts, this limits their ability to buy into a shared program design. Research governance in different countries emphasizes varying notions of 'success' ranging from peer-reviewed publications and prototype technologies, to real-world impact on policy and practice. Meanwhile as more countries join the ranks of middle income and emerging economies, they exercise greater power and authority over the design of international research collaboration. Thus R4D is both evolving and returning to its roots as science diplomacy predicated on mutual benefit.

Keywords: Institutional Design, Foreign Aid, Innovation, Research Collaboration, Developing Countries

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FPIC, REDD and Green Economy and their influence in sustainable commons management in Peru

Peru enacted a FPIC law in 2011 and started implementing it in 2013. This process is particularly relevant in the drafting of the regulations of the forestry law and the legal and institutional architecture for ecosystem services and REDD schemes. The law and its regulations introduce the principle of interculturality, traditional knowledge among others to respect indigenous people's rights. REDD schemes require land security, combating illegal change of use of land, conservation activities and sustainable forest management in order to achieve its goals. Peru is one of 8 countries leading the implementation of SFM and REDD schemes. Peru's protected area service is scheduled to review its communal reserves regime in 2015 in consultation with indigenous peoples and other rural populations. This process will occur under the influence of the FPIC law and the experience of the drafting of the regulations of the forestry law. Since 2010 the Amazonian Regional Governments Fisheries Managers have been drafting a proposal for a new version of the Amazonian Fisheries Regulations. Their proposal includes management plans, conservation agreements, locally run fisheries committees to oversee regulation compliance and enforcement, among other innovative proposals, already implemented at international level. The Ministry of Production, responsible for public policies on fisheries has been boycotting this process and proposal. Recent developments since 1990, and the four processes considered can shed light on the experience and lessons learned in Peru's legal and institutional architecture for communal resource management. The paper will present the experience and lay out the challenges ahead for the consolidation of communal resource management in Peru in the year ahead.

Keywords: Indigenous peoples, FPIC, REDD, SFM, Peru

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Urban Food Security and Land Use: Defining the Connections; Identifying the Vulnerabilities, and Source of Transformation

Among the most significant threats to social wellbeing today is the lack of resilience of our global agri-food systems, understood as the geographic, social and ecological processes defining food production, distribution and consumption. This lack of resilience has direct implications for food security: access to sufficient, safe and nutritious food to maintain personal wellbeing (FOA 1996). While higher food prices affect everyone, vulnerability varies tremendously. The urban poor, with limited ability to adjust to price rises or produce their own food, face particularly high risk of food insecurity (Viljoen and Wiskerke 2012). Attention is often directed toward the Global South, yet many poor urban households in middle-and high-income countries have limited access to sufficient food quantity as well. Food security is under pressure from multiple drivers, including climate change, environmental degradation of agrarian lands, and corporate concentration, among other things. As urbanization continues to progress, moreover, expanding pockets of urban poverty amounts to growing numbers in cities facing vulnerability to food insecurity. Structural transitions in our global agri-food system that enhance food security and maintain ecological wellbeing are thus crucial. Changes in urban and

peri-urban land uses can have mixed effects on urban resilience as well as food security, with urban sprawl covering valuable farmland on the one hand, and the expansion of urban agricultural activities and other alternative food initiatives on the other. These new landscape and social processes describe an increasingly dynamic socio-ecological terrain. The question whether innovations in urban land uses could induce resilience in our cities and agrifood systems alike, furthermore, resonates with enduring academic questions regarding the sustainability of socio-ecological systems.

Keywords: Food And Agriculture; Urban Studies; Food Security; Urban Ecolog

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Investigating the Psychological and Contextual Determinants of Effective Community-Based Participatory Decision Making

Ostrom's (1990, 2010) design principles for community-based governance outline social-ecological factors and governance structures that may improve community stewardship of common-pool resources. Participatory decision making, in which community stakeholders work together to make important governance decisions, is one of Ostrom's most prominent principles. However, as a general guideline, the design principle of participation does not consider specific aspects of the social-ecological context (Agrawal and Ribot 2013) or explain the processes that unfold during the course of participation (DeCaro and Stokes 2008). Participation is not always necessary or effective (Ostrom 2009), and it is difficult to determine why participation is effective in some situations, but not others. It is also difficult to promote community-based governance. Without further insight into the underlying mechanisms of participatory decision making, in different social-ecological contexts, we cannot anticipate the types of participation that may be needed to empower communities. The purpose of the current paper is to describe the psychological processes that underlie effective participatory decision making and outline rigorous scientific methods to study the dynamics that unfold in different social-ecological and governance contexts (DeCaro and Stokes 2013). Using this knowledge, we may identify the most appropriate forms of participation for specific social-ecological contexts based on culture, biophysical system, socioeconomic characteristics, and other factors. We may also study the dynamics that emerge during participation in terms of their underlying social and psychological processes (e.g., perceptions of procedural fairness, self-determination, and acceptance). Such analysis allows us to determine how governance structure, context, and process interact to influence important intermediate outcomes (e.g., trust, cooperation, and commitment), and ultimately contribute to the success or failure of community-based governance.

Keywords: Ostrom Design Principles, Community-Based Governance, Participatory Decision Making, Psychological Science, Social-Ecological Context

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Farming knowledge building between migrant and local peasants in the Eastern Amazon

Local knowledge is emphasized in the commons literature as a key element for resilience as it incorporates context-based information for adaptation to socioenvironmental changes. Mainly treated as ‘customary’ information systems underlying traditional populations’ practices, local knowledge is often contrasted with non-local knowledge driving unsustainability and vulnerability. In this paper we argue that the distinction between local and non-local knowledge may mask more nuanced processes of knowledge hybridization mediated by social interactions and learning transfer.

We focus on the emergence of an agroforestry system in the Eastern Amazon designed by middle-scale migrant Japanese farmers since the 1980-90s based on local and non-local sources of information: 1) customary ecological knowledge on environmental suitability of local crops from traditional practices carried out by local peasants; 2) scientific/technical knowledge on new seed varieties, soil quality, and new intercropping systems developed by researchers associated with the farmers’ organizations; 3) technocratic knowledge on institutional arrangement, social organization and commercial farming strategies found among migrant Japanese farmers.

The experience accumulated by the Japanese farmers has led to one of the most successful cases of sustainable farming systems in the Amazon region. Their agroforestry system combines both environmental protection and regeneration with highly profitable multiple crop production. The dual goal of sustainability and profitability has been achieved not only due to highly elaborated knowledge on the farming system but also on their commercial, political, organizational and administrative skills. Today, they are recognized by the scientific community (academic publications), by financial organizations (social technology by the National Bank), by the national and international media (frequently approached for interviews and documentaries), and by corporations (partnership in green market and CSR initiatives).

The analysis will be centered in three stages of the knowledge building process. Firstly, the application of local peasant’s knowledge on subsistence farming techniques and suitable species by migrant Japanese farmers on commercial, middle scale farming system. Secondly, the enhancement of the agroforestry system through knowledge exchange with scientists, private companies, and funding agencies on farming innovations and technocratic procedures. Finally, knowledge building and transfer processes in two productive contexts: 1) design of an innovative oil palm cultivation within the agroforestry system in partnership with a cosmetic company and researchers; and 2) transfer of the Japanese agroforestry knowledge to local peasants.

The preliminary conclusions lead to different direction of the literature on local knowledge and agroforestry. First, local knowledge has been a highly dynamic hybridization process of

information built and shared through the encounter of two different cultural backgrounds (Japanese farmers and Amazonian peasants). Second, the economic profitability of the agroforestry system has been considered by Japanese (or local) farmers as the key driving force of the implementation of this farming system, while environmental conservation is regarded as a side-effect. Therefore, the analysis of the social processes mediating knowledge hybridization and the transformative outcomes thereof has rendered a detailed understanding of local knowledge building and sharing for sustainable farming systems in the region.

Keywords: Local knowledge, Agroforestry, Sustainable farming, Amazon

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All we are is dust in the wind? Overcoming the constant threat of sand drifts

Sand drifts are the most common environmental challenge in sandy heathland regions. In these fragile ecosystems, uncontrolled drifts of sand can rapidly destroy the vulnerable zones of intensively cultivated arable land usually situated in close proximity to village centres. European heathlands usually originated from degeneration of formerly wooded areas, mostly before the 12th Century AD. From the Middle Ages to the 19th century, many of the European heathlands were subject to some form of common resource management. Throughout their existence, most of these common pool regimes witnessed periods of ‘environmental crisis’. Overexploitation and mismanagement, could easily push this fragile ecosystem over the limit, with sand drifts as a devastating result. From the 15th century onwards, it has been acknowledged that common heathlands were severely degraded by mismanagement by the common pool resource institutions and the ever increasing population pressure. Especially the failure in monitoring the commons and fining trespassers have been considered defining causes.

Nothing is what it seems however. Thanks to new dating techniques such as OSL (Optically Stimulated Luminescence) it has become clear that sand drifts were certainly no medieval phenomenon and occurred sporadically between 3000 BC well into the nineteenth century throughout Europe. Certain key periods showed an increased activity of sand drifts, but they were not as uniform as they are often portrayed. This paper aims to focus on the reasons behind the occurrence of sand drifts and particularly why some regions could avert a disaster and limit the effect of sand drifts to natural events, while others suffered the full blow. By comparing different sand drift fazes between the early middle ages and the nineteenth century, in distinct regions within the European cover sand belt, I will argue that sand drifts were not directly linked to climatological effects, nor pure demographic fluctuations, but were rather connected to the social order of particular societies, and are due to a lack of preparedness or failure to properly react to threatening hazards of certain landscapes of risk. Most important are the property structures, power balances, commercial strategies and institutional arrangements.

Keywords: Disaster, Sand Drift, Commons, Property Relations, Distribution of Power

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Natural protected areas in urban spaces and collective action: A comparative study of two cities

The conservation of natural protected areas located near cities is relevant to the provision of various ecosystem services, mainly the hydrological. The maintenance of these ecosystems depends on complex decision-making processes in which several key social and political actors are involved. Through a comparative study in two metropolitan areas of Mexico we analyze from the polycentric perspective (multiscale and multilevel) several expressions of collective action to achieve conservation of those places.

Keywords: Conservation, Natural Protected Areas, Metropolitan Areas, Collective Action, Polycentric Systems

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Beyond the basin: rethinking the boundaries and players involved in multiscale water governance

Water governance is a complex, multiscale commons problem domain. It involves multiple actors, several levels of organisation, numerous policy goals and interests, and multiple drivers of change. In this context, river basins and watersheds (or catchments) have become the de facto “ideal” unit for defining and managing water problems in most countries around the world. Proponents have successfully argued that basins and watersheds provide an appropriate frame for integrating social, political, economic and environmental considerations. Hence, numerous examples exist around the world of catchment- or watershed-based management. In transboundary contexts, basins are especially important because they define the scope and jurisdiction of many treaties, agreements and other institutions of shared governance.

Unfortunately, the record of success of addressing water challenges using boundaries defined by basin and watersheds is decidedly mixed. Reflecting this reality, there is growing recognition within the water literature that governance based on hydrologic boundaries is problematic. Critics have pointed to issues relating to boundary selection, accountability, participation and empowerment; hydrologic units, they note, also can be a poor fit with “policysheds” and “problemsheds” (which are generated by the intersection of policies and problems with ecological boundaries). From a diagnostic perspective, these kinds of concerns speak to a much larger problem facing water governance, which the water community has been slow to recognize: actors, institutions and drivers typically viewed as external to water governance strongly influence the achievement of desired outcomes. Actors can include not only those from other policy sectors, but also a wide range of private actors with significant but sometimes obscure interests in water (e.g., agribusiness, mining and the power sector, as well as wider financial institutions insurance companies, and trade-related actors). Increasingly actors

such as these, and the concerns of their sectors, are shaping water governance in significant ways that are not widely recognised and understood.

In this paper, we explore how water governance can better address these external considerations from a more systemic perspective, by situating it within larger social and ecological systems. We apply the lens of Ostrom's social-ecological systems framework and specifically focus on two particular aspects of the framework that deserve greater attention: choices about the ways in which water governance action situations are bounded, and the role of external factors in multilevel water governance situations. Our diagnostic approach pays particular attention to critical external considerations that shape water governance outcomes across scales, including the emergence of new actors, and key drivers such as changes in demand for food and energy, population shifts, and climate change. Empirical examples drawn from Canadian transboundary settings (domestic and international) ground our analysis. Drawing on cases from western and central Canada, we use a systemic diagnostic approach to reveal the extent to which long-term governance failures are linked to external factors. We show that these issues cannot be resolved through a traditional water governance perspective, and argue that promising avenues for improvement exist in critically engaging with external actors and institutions. Findings have strong relevance to a range of other complex, multiscale commons problem domains that face similar challenges, including biodiversity conservation, forests and livelihoods, and climate change adaptation.

Keywords: Water Governance, River Basins And Watersheds, Diagnostic Framework For SES Research, Canada

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The Common Rules Project: Towards a common language to analyze and interpret commons' regulation in historical Europe

Our present-day society is highly regulated and institutionalized. In order to avoid inertia of the institution, adequate actions to reduce complexity and increase complementarity of the rules are

needed. This project aims at understanding how bodies of rules can be effective –in avoiding freeriding- and how efficient –with the least possible effort- regulation can be developed, in order to achieve efficient and well-functioning institutions. We hereby focus on commons, the common being an institution for collective action (Ostrom 1990) that has existed at the European countryside for centuries, and that was set-up to regulate the collective use of natural resources (grassland, woodland, water) for large parts of the rural population. We go back to the regulation of commons in Western and Southern Europe, looking at the internal structure and changes of rules of various commons, in relationship with a number of independent variables such as population growth, surface of arable and waste land, climate, et cetera.

Over the past three years a team of scholars at Utrecht University, the Public University of Navarra (Pamplona), and Lancaster University have been working on the digitization and analysis of the regulation of in total twenty-five commons across Europe. We have in total collected data on regulation for 25 commons: 9 of them were located in the eastern part of the Low Countries, 8 Spanish commons located in the northern area of Navarra, and 8 English commons, all located in Cumbria. For all commons, written regulation has been preserved; all cases complied with the selection criteria of having a lifespan of over 200 years, while also having changed their regulation at least once over these two centuries.

In this document we offer a first analysis of the large database that is now available for other researchers to consult. This online tool is intended to allow commons-researchers to use a structured and historically embedded environment to deal with the very interesting but often hard to analyse material the historical commons have left behind. In this paper we describe the content of this database and offer some basic results of the comparative analysis so far.

Keywords: Commons, Rules, Institutional Change, Long-term, Europe

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Role of Indigenous Knowledge in Community Based Coastal Fishery Management: Case of Beach-seine & “Stilt-fishing” in Southern Sri Lanka

Coastal fisheries play an indispensable role in shaping the socio-economic status and livelihood of Sri Lankans by way of household income generation, employment, food and nutrition security (e.g. provision of 65% of animal protein for its populace), and foreign exchange earnings. Successive failures associated with “exclusively government-managed fisheries” have steered the authorities in charge of which to recognise ‘community-based management’ (CBM), which is traditionally in place in coastal fisheries in Sri Lanka, as an effective alternative for fisheries management. Albeit, the traditional fishers partake in CBM use “indigenous knowledge” (IK) for fisheries systematic investigations into this subject arena are sparse in Sri

Lanka. In this context, eight ‘beach-seine’ and three ‘stilt-fishing’ fishing communities in Southern Sri Lanka were studied to ascertain extent to which such communities utilize IK, and its degree of accuracy, in fishing activities. To elicit the utility of IK, a number of Participatory Rural Appraisal (PRA) techniques, including semi-directive interviews, focus group discussions, and key-informant surveys were employed, and on-site inspections of the ‘catch composition’ were carried out for beach-seine (n=87) and stilt-fishing (n=47) operations. Fishers’ response on catch composition recorded “before” (ex-ante) and “after” (ex-post) the fishing operation (in biomass, kg) were coded separately on a scale of 1 to 5 and was, in turn, log-transformed and ordinated using Principal Component Analysis (PCA). The PCA scores of first component of each ordination were correlated subsequently to ascertain the accuracy of fishers’ predictions. Results revealed that both beach-seine and stilt-fisher communities manage their commons. Traditional fishers use IK effectively to predict the catch composition through specific signs arising from the behaviour of fish schools and sea terns arriving to/over the fishing territory.

The methods used by fishers customarily in this respect are termed as “Rathe dameema”, “Rathe narugama”, “Diyagate dameema”, “Polawa bideema”, “Lihiniya wadeema”, “Pusba gaseema” and “Tele dameema”. Fishers tend to modify their fishing gear depending on the target, i.e. hook colour of the stilt-fishing rod and mesh size of the cod end of beach-seine, to secure a higher catch and to protect the gear. Further, the results reveal that there exists a significant positive correlation ($r = 0.975$; $p < 0.001$) between ‘predictive power’ of catch composition and the actual catch composition of traditional fishers. Overall, the results imply that the information generated through IK of fishers is valid and reliable. Thus, the use of IK minimizes transaction costs (i.e. cost of search, negotiation and verification) associated with sustainable resource management, especially for common pool resources like coastal fisheries.

Keywords: Coastal Fisheries in Sri Lanka, Community Based Management, Indigenous Knowledge

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Grabbing the Commons

In the last 5 years there has been a growing body of literature addressing the complex and expanding global phenomenon of international land deals and large scale land acquisitions. This recent trend, popularized as “land grabbing” has been object of academic discussion and matter of policy and political debate. One of the observed features of land grabbing is that it is generally associated with a transformation of tenure and local institutional arrangements. Scholars point out that land grabbing is operated by neglecting or by eradicating traditional, local, customary, indigenous and common property regimes. However, what is missing in the literature is a systematic review of this relationship.

The purpose of this paper is to provide the results of a meta-analysis of the entire body of literature on land grabbing with a particular attention between the dynamics of acquisition, its political-economic drivers and the institutional transformations of land access, property and ownership institutions that result. We review over 200 cases of land grabbing, prevalently illustrated in peer reviewed journals and systematize the relationship between the different features of the land deals such as sector of investment, country, type of contract, reported institutional arrangement, main drivers and the outcomes in terms of common and traditional property regimes transformations.

With this paper we provide a systematic analysis that supports analytically the assumption, that land grabbing is impacting and happening at the expenses of the commons worldwide. Moreover, based on this meta analysis we explore the hypothesis that the dissolution of traditional and communal property land regimes resulting from land grabbing, inevitably produces the double phenomenon of land commodification and loss of local environmental stewardship. Finally the results of this study are discussed within a theoretical framework that combines perspectives from political ecology, political economy (in particular Ostromian institutional analysis) and commons theory.

Keywords: Global Land Grabbing, Commons Grabbing, Common Property Regimes, Dispossession, Commodification

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“Who Decides? Investigating Decision---making Dynamics of Community Water Projects on Mount Kenya.”

There has been a considerable amount of research conducted on the institutional dynamics in irrigation systems, with emphasis on the rules governing water management. A complementary line of research has developed experimental economics approaches to understanding individual-level decision-making in the context of collective action problems. Despite this work there is arguably uncharted territory in the social psychology and group decision-making inherent in community level water management. In order to assess cross-scale resilience of households and communities reliant on irrigated agriculture, we have developed a multi-method approach for characterizing institutional dynamics as a platform for cross-site analysis of human-water governance by combining household surveys, institutional analysis and social psychology dynamics in group decision-making.

Much work has demonstrated that informal rules often outweigh what would be dictated by formal rules (i.e. constitutions, by-laws). But we have found it is critical to articulate the role of internal dynamics within management committees in order to understand the nature of how individual preferences and decisions evolve and manifest in group decision-making processes. We examine a set of Community Water Projects (CWPs) among four different river basin Water Resource User Associations in Kenya where management committees play a central role in water allocation and management. The experiment involved 95 community water project managers from 20 different CWPs management committees and investigated the internal dynamics of group decision making that are effectively in place. Specifically our research studied what is the level of coherence between individual decision preferences and group decision and what are the factors that influence the final decision as a result of a small group decision making internal dynamics.

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Research Paper Presentation: Primary and Secondary Impacts on First Nations Traditional Land and Resource Use in Alberta's Southern Oil Sands Region

In Alberta EIAs too often only acknowledge and recognize direct physical disturbance as an impact to First Nations Traditional Land and Resource Use. This has resulted in a number of invisible impacts that are unaccounted for in EIAs. This presentation outlines a full range of primary impacts to Traditional Land and Resource Use in the community of Chipewyan Prairie Dene First Nation and suggests a pathway leading to secondary impacts on individual and community health and wellbeing.

Keywords: First Nations, Traditional Land Use, Oil Sands, Impacts, Alberta

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Participatory monitoring of small-scale fisheries in Brazil and the Southern Cone: a literature review

Participatory monitoring approaches for natural resources management are increasingly being proposed by researchers, NGOs and even some governments. On such proposals, different levels of participation and incorporation of local/traditional knowledge (hereon ‘fishers’ knowledge’) may be observed: from resource users simply collecting data for managers to the active inclusion of fishers’ knowledge in designing data collection and analyzing data through direct collaboration. Fishers’ knowledge relevant for natural resources management pertains to all the spheres of a social-ecological system, including the environmental, operational (fishing practices and logistics), institutional, social and economic spheres, among others. In this sense, several sorts of fishers’ knowledge may be considered for monitoring: from fishers’ ecological knowledge about the target resources and the environment to logistics for fieldwork and social and cultural norms. Studies on participatory monitoring are emerging in Brazil and the Southern Cone - a geographic region encompassing Argentina, Chile and Uruguay. Some of these cases show encouraging results and have been gaining attention in small-scale fisheries management in recent years. In this paper, we review English, Portuguese and Spanish literature on the use of fishers’ knowledge in artisanal fisheries monitoring programs in Brazil and the Southern Cone. We explore what types of information is being monitored (e.g. resource abundance, catch and effort, socioeconomic indicators), what sources of knowledge are being used (local/traditional or scientific) and how (which stages of management they inform), the level of fisher participation in these monitoring programs and the institutional arrangements in which participation and fishers’ knowledge use occurs. Our review is primarily based on articles found on database platforms available on the internet (e.g. Web of Sciences, Scopus and Google Scholars). We explore Portuguese and Spanish literature due to its importance to local managers and users, and to incorporate literature rarely accessible to the international scientific community. We discuss achievements and challenges of participatory monitoring initiatives in small-scale fisheries management in the study region.

Keywords: Co-Management; Local Knowledge; Participatory Monitoring; Small-Scale fisheries; South America

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Negotiating knowledge, shifting access: Building legitimacy for Indigenous institutions resource management institutions in the Pacific Northwest

Despite an increasing interest among land managers in collaborative management and learning from place-based Indigenous knowledge systems, natural resource management negotiations between Indigenous communities and government agencies are still characterized by distrust, conflict, and a history of excluding Indigenous peoples from decision-making. In addition, many scholars are skeptical of Indigenous communities attempting to achieve self-determination through bureaucratic and scientific systems, which can be seen as potential mechanisms for co-opting Indigenous community values (e.g. Nadasdy 2003).

This presentation considers how Indigenous communities and state agencies are building legitimacy for new natural resource governance institutions within the Pacific Northwest. Taking a community-engaged scholarship approach, the work addresses two exemplar case studies of Indigenous resource management negotiations involving forest management with the Karuk Tribe in California (U.S.) and the Xáxli’p Indigenous community in British Columbia

(Canada). These cases explore the ways and degree to which Indigenous peoples are advancing their self-determination interests, as well as environmental and cultural restoration goals, through resource management negotiations with state agencies—despite the ongoing barriers of uneven power relations and territorial disputes.

Through these case studies, I examined how Indigenous resource management negotiations affect knowledge sharing, distribution of decision-making authority, and longstanding political struggles over land and resource access. My analysis shows that both communities are strategically linking disparate sets of ideas, including Traditional Ecological Knowledge (TEK) and Western scientific knowledge, in order to shape specific natural resource governance outcomes. This work also demonstrates that both communities are shifting access to land and resources by identifying “pivot points”: existing government policies that provide a starting point for Indigenous communities to negotiate self-determination through both resisting and engaging with government standards.

This work emphasizes the importance of viewing the world from the standpoint of individuals who are typically excluded from decision-making (Harding 1995, 1998). Pursuing natural resource management with Indigenous peoples is one way for state agencies to gain innovative perspectives that often extend beyond standard resource management approaches, and consider longstanding relationships between people and the environment in a place-based context. Yet the assumption that tribal managers would export Indigenous knowledge to agency “professionals” or other external groups, supposedly acting on behalf of Indigenous peoples, reflects a problematic lack of awareness about Indigenous perspectives on sovereignty and self-determination—central goals for Indigenous communities that choose to engage in natural resource management negotiations with state agencies.

Keywords: Indigenous resource management, eco-cultural restoration, Indigenous knowledge, forest policy, self-determination

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Community forestry in the Indian green economy: Taking stock of the Van Panchayats

Governance of the world’s forest is under transition as there is a growing appreciation of the role they play in carbon sequestration, biodiversity conservation, and hydrological security. New modalities of governance are being developed internationally which aim to offer financial incentives to secure these various ecological services. However, forests are also recognized as being essential in rural livelihoods, and the idea of local participation and community forestry are key components to this debate. In Uttarakhand we find the only legally recognized forest councils in India, the van panchayats, often described as more autonomous and democratic than the joint forest management arrangement found in other areas. Although they have a long history they are now undergoing a process of reform in order to capitalize on this changing focus, and to bring the benefits of a ‘green economy’ down to the level of the village. At this juncture it is beneficial to take stock of the extensive

knowledge we already have on the van panchayats, and to see this in relation to the new developments in the state and internationally. Therefore, in this paper we offer both an extensive literature review, as well as an update on the present situation of the van panchayats based on recent field research.

Keywords: Van Panchayats, Joint Forest Management, Green India Mission, Green Economy

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Explaining project failure paradox in post-Soviet Central Asia: The case of Uzbekistan

In agricultural context, the problem of innovation diffusion is particularly pronounced. For the Central Asian countries, many technologies have been produced to improve land and water use efficiency and agricultural sustainability. Yet, the efforts to implant such new technologies fail for reasons that are puzzling. A general understanding is that the rigid institutional structures inherent from Soviet economy impede the adaptation of technologies that are dynamic in nature. Therefore, the objective of this study is to explore these reasons and to offer institutional insights on how the success of innovation adoption can be improved.

We use Veblenian concepts of the institutional dichotomy between the ceremonial and instrumental behavior patterns as the theoretical framework for explaining the paradox of the apparently unavoidable failure of development projects in the context of a transition economy. We investigate ways to adopt these concepts for the study related to the success of development projects and innovation diffusion in agriculture. For this, we use examples of two distinct innovation projects in Uzbekistan. The first case presents a Soviet project on the mechanization of cotton harvesting. The second case is a recent 10-year development research project aimed at enhancing agricultural efficiency through testing and transferring agricultural innovations to Uzbek farmers.

We conduct an in-depth study of the implementation processes of each selected project, by giving a specific focus to the second example. For the second project, based on the literature review and interviews with the project members, we reconstruct the chronicle of project events and the roles and functions that various stakeholders (local administration, central planner, researcher, and farmer manager) took at different phases of project implementation. To understand the implications of adopted technologies to different stakeholders, the analysis is

supplemented by the review of social, environmental, economic and political characteristics of the selected technologies, namely conservation agriculture, water saving technologies, and afforestation practices, with respect to each stakeholder. Finally, we look at external processes such as droughts and non-linear agricultural restructuring policy that accompanied the project and affected its implementation.

The institutionalist dichotomy approach brings us to the concluding paradox that the efforts of local government to display interest in new technologies are ceremonial, in such a way that the technological efforts of western donors merely serve to impart legitimacy on local governments. It is argued that despite the economic feasibility of such projects, their successful scientific testing and the willingness of stakeholders (e.g. donors and recipients) to realize the innovation transfer, the projects can end in a ceremonially prescribed outcome. Hence, while selecting and testing a new technology, the development programs should anticipate the institutional changes that would be required to enable its accommodation.

Keywords: Development Project, Innovation Adoption, Institutional Dichotomy, Veblen, Transition Economy

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Collective action within the household: Insights from natural resource management

Households face a collective action problem: members must work together to produce livelihoods and allocate goods. Yet the models of household behavior generally treat the household as a single entity, or as separate individuals bargaining to achieve their own best interest. Neither examines how and when household members will cooperate for mutual benefit. But there is an emerging literature on the importance of “jointness” of assets and decision-making within households. The commons literature and the Institutional Analysis and Development (IAD) framework provide important insights on factors that encourage and inhibit such jointness and collective action. This paper draws these two literatures together and provides insights into how to understand collective action problems within the household. We also ask what insights or directions the collective action literature might gain from the household and intrahousehold literatures. By using the collective action framework to explore household decision-making, we enrich both bodies of knowledge, raise new questions and point to directions for future research. This could have direct policy implications, helping us to think through what types of policy interventions can support cooperation within the household as well as the community.

Keywords: Gender, Collective Action, Natural Resource Management, Intrahousehold, Household

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Amended but still Unconstitutional: The Trials and Tribulations of Ontario's Mining Act

After a series of high profile disputes pitting statutory mining rights against constitutionally protected Aboriginal rights, Ontario finally amended its Mining Act, with the first set of amendments coming into effect in 2009 and the most recent in 2013. Prior to 2009, Ontario's Mining Act, like most mining regimes across Canada, provided for a free entry system, which treated Crown lands available for staking as a kind of provisional commons. Anyone who complied with the minimal technical requirements was entitled to stake a claim and have that claim recorded, with the Crown retaining no discretion to refuse to record the claim. As such, the Mining Act prevented the Crown from fulfilling its constitutional duty to consult and accommodate the rights of Aboriginal peoples. The purpose of the recent amendments was to remedy this defect.

This paper argues that the amendments failed to achieve their desired goal. The amended Mining Act violates both Canada's constitutional law and the customary law of the Anishinabek nation in at least three ways. First, recent jurisprudence illustrates that recording a mining claim triggers the duty to consult those who have Aboriginal title claims, but the amended Mining Act does not require consultation prior to the recording stage. Second, the early exploration activities permitted by the Mining Act violate Anishinabek laws about land use and thus adversely impact the treaty right to implement Anishinabek laws, again with no obligation to engage in prior consultation. This paper's discussion of Anishinabek land use laws will challenge the assumption that Indigenous communities manage lands and resources as a commons, at least in the case of the Anishinabek nation. Third, the new regulations run afoul of both Anishinabek law and Canadian law by failing to allow sufficient time for Anishinabek decision-making processes. For these reasons, the amended Mining Act is still unconstitutional and another round of amendments is required.

Keywords: Aboriginal Rights, Mining, Indigenous Customary Law, Duty To Consult And Accommodate, Free-Entry

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Ontario conservation tax incentives programs: An investigation of cross-scale interactions among state and non-state ecosystem service provisioning

In south-central Ontario, various terrestrial biomes are meeting which makes this region one of the most biodiverse in Canada. However, land conversion that started with the arrival of European settlers has transformed the region from one dominated by forests and wetlands into one dominated by agriculture and urbanized areas. These land cover and use transformations have led to extensive reductions in various ecosystem services, including decreased habitat provision for many plant and animal species, thus reducing biodiversity. Different from more northern parts of the province, land in south-central Ontario is primarily in private ownership. The Conservation Lands Tax Incentive Program and Managed Forests Tax Incentive Program are two voluntary programs with the goal of encouraging environmental best management practices on private lands. Private landowners can enrol in these conservation tax-incentive programs if their land fulfills certain requirements for environmental values and area size, and if they agree to follow best management practices. In exchange for adherence to these practices,

private landowners enjoy a reduction in property tax for their property. Continuing land cover and use transformations, financial costs and benefits from land preservation, and non-financial benefits from ecosystem service provisioning, create a network of cross-scale interactions between state and non-state actors including: different levels of state actors - primarily provincial and municipal governments - differ in their political and financial interests regarding conservation tax-incentive programs; financial benefits that private landowners receive through program participation, may lead to increased property tax costs for non-participating residents; and a varied types and levels of ecosystem services are enjoyed by residents at the local, regional and provincial level. These interactions are largely structured by explicit rules in the form of Ontario land tax law, tax-incentive program procedures and financial inter-governmental compensation agreements. However, much variation exists in external biophysical and socio-political factors that affect whether individual private landowners utilize these rules for their own financial advantage. Additionally, much uncertainty exists about: the actual levels of increased ecosystem service provisioning at local and regional levels that result from private landowner program participation; and rule breaking behaviour by private landowners that is enabled by lack of enforcement and may be geographically structured by variation in local culture. The goals of this presentation are: to unpack this network of interactions between rules and non-state actors using the tools provided by the Institutional Analysis and Development framework; and to increase our knowledge of ecosystem service provisioning for this action situation structured by conservation tax incentive programs.

Keywords: Participation, Private land, Rule breaking, Scale, Variability

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An alternative view of land-use planning: introducing Akhee design

Ontario's Far North land use strategy is currently being developed by the Ontario Ministry of Natural Resources. This broader strategy covers 42% of Ontario in a portion of the province that is considered ecologically sensitive and valuable. The Far North is home to 31 Anishinaabe/Cree communities. The current proposal suggests the strategy will address cultural and heritage values, environmental values and concerns, protected area design, infrastructure, and potential economic development opportunities. These areas in turn will be used to develop policies on a) land use designations; b) categorizing protected areas; and c) processes and rules for amending community based land use plans. In the end, community-based land use planning will be supported and possibly directed by this strategy. Far North development is being guided under the principles of sustainable development, in particular the balance of ecological, economic and social dimensions of sustainability. Therefore, the land use strategy and community-based land use planning should also take into account these principles. But, do these principles and our historic discourse of sustainable development fit with the Anishinaabe and Cree holistic concepts of land and development? Through an examination of the structural and functional components of the human/land relationship, I propose a tweaking of the sustainable development model and refocusing our goals of resource development to human development. With this alternative view, land use planning changes from an exercise of land categorization to one of understanding how the significant relationships that people have with the land provide them the capabilities to be active in their communities' social, economic,

cultural, spiritual and political realms. I will introduce the concept of Akhee design (holistic land design) as a method for communities to engage in land use planning that goes beyond the idea of fulfilling technical or administrative functions in our system. Akhee design focuses on the way a community sees and uses its territory to sustain, enhance or re-create the functioning of their culture and community learning. It is based on the idea that a significant place in the territory connects an individual to various Akhee relationships where sharing and learning occur. If these Ahkee relationships are acknowledged and respected, then Anishinaabe/Cree people in the Far North will be more effectively engaged in decision making about development strategies in their territories.

Keywords: Land Use Planning, Sustainability, Human Development, Capability Approach, Akhee Design

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Addressing water concerns in southern Ontario: Insights from local First Nation contexts

Water is a prominent concern for First Nations in Canada. Research addressing water on First Nation reserves has focused in particular on securing access to safe drinking water given ongoing regulatory gaps, jurisdictional fragmentation, and the assertion of indigenous rights. In this paper I use institutions as a lens to examine how three First Nation communities in Southern Ontario, Canada are responding to water quality and quantity issues. Institutions are defined here as human constructs that shape and are shaped by human behaviour and are often described as forms of rules that can be nested structurally, spatially, and temporally within cultural, social and economic, and political contexts. A multiple case study approach was used to gather experiences from each case site community. Data from multiple methods (key informant interviews, secondary and archival data gathering, participant observation) were used to triangulate prominent themes according to institutional strategies, analytic deliberation, institutional variety and nesting, for improving how actors respond to complex challenges. Key findings from the research highlight eight institutional characteristics that enable First Nations to achieve their goals and improve water management, including support for balance between traditional and western arrangements, support for relationships on-reserve to align perceptions of authority and legitimacy, and support of community engagement especially with youth.

Keywords: Institutions, Water, First Nations, Ontario

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Social learning for collaborative forest management in a community-based organization: Lessons from Uganda

Governments around the world decentralized forest management and in so doing opened up spaces for non-state actors through provisions in national forest policies. Non-state actors include community-based organizations, non-governmental organizations, research organizations, and businesses. In developing countries, influential non-state actors are usually non-governmental organizations that have the financial and technical resources to engage in collaborative forest management. Collaborative forest management is seen as a promising approach to sustainable forestry in developing countries like Uganda. Collaborative forest management is also participatory providing forest-adjacent communities opportunities to not only access resources from gazetted forests but also providing the opportunity for them to contribute to the management of forests. Collaborative management also provides opportunities for social learning.

Social learning has been reported to contribute to the management of common pool resources like forests and water. However, we still don't know who influences learning and how social learning to forest governance and conservation in developing country settings. The Uganda National Forest Authority provided collaborative forest management agreements as a mechanism for involving forest-adjacent communities in forest management and protection. A major component of the agreement is working together with local communities to diversify livelihoods sources. Local communities are also required to form community-based organizations which then work with the government agency in charge of forestry to manage central forest reserves. The use of local community-based organizations to jointly manage forestry resources is a recent institutional innovation in Uganda.

This presentation describes the results of a study that investigated the contribution of social learning to forest management and conservation at Budongo Forest Reserve in Uganda. Data was collected in 2013 through personal semi-structured interviews with local CBO members (31), focus group meetings (5), key personal interviews (6) and forest walks (3). The study results show that CBO members are contributing to the management of Budongo Forest. They started off with limited knowledge about collaborative forest management and forest conservation, however, over time they learned through participating in forest management activities. Whereas the CBO started with numerous learning opportunities, the focus and number of activities has changed mostly as a result of external circumstances – most of the CBO's activities is externally funded by national or international non-government organizations. We found that what the CBO is learning as well as contributing to forest protection and conservation is strongly influenced by external actors.

Keywords: Budongo Forest Reserve, Collaborative Forest Management, Community- Based Organizations, Conservation, Non-Governmental Organizations, Social Learning, Sustainable Forest Management, Uganda

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A common pool resource framework for comparing community renewable energy projects

I develop a framework for the analysis of institutional evolution of the diverse development and business models of renewable energy generation with a focus at "community renewable energy". Community renewables projects can share attributes of commons and common pool resources, as they can draw on local resources and infrastructure and can impact on local environments, such as landscape in the case of wind energy, while local or larger-scale communities can benefit from the energy generated. However, community renewable energy continues to be an ill-defined concept, despite a long tradition in certain regions such as in Denmark and Northern Germany and great expectations in countries such as Germany, the UK and Italy. Increased social acceptance, mitigation of environmental conflicts and improved development of local communities are usually seen as the main benefits of such arrangements, when they encourage local ownership. Property rights and governance arrangements are decisive for qualifying as a community energy project. However, differences to "non-community" projects are not entirely clear, as other models also offer benefits to "local communities", while ownership may be shared between large institutional investors, local residents, absentee owners and municipalities for example. These questions can be decisive for governments and banks wishing to support community renewables. More generally, the de facto organisational set-ups can theoretically direct investments in renewable energy infrastructure and determine who benefits from increased deployment. This way they would influence the future of energy provision.

The guiding research questions are how community renewable energy generation projects emerge, how they are organised and how they change over time. This implies a need to categorise community renewables projects and identify quantitative and qualitative change. I approach the questions of emergence from entrepreneurship perspectives (private, social and public) and the questions of organisation and change from institutional and evolutionary economic perspectives, with a particular focus on common pool resource theory. The analytical framework I develop is used in a systematic content analysis of published research on community renewables.

There is very limited research into the conditions for emergence of novel organisational models of community renewables, their evolution and implications for further deployment and governance of respective sectors. For example, external professional development and management companies can be involved in such projects, while some community renewables projects are merging and run subsidiaries, for example managing local grids. Other community projects fail and are bought by community and "non-community" companies. There are thus similarities to large utilities to which community renewables are often compared to as more sustainable decentralised alternatives. Several criteria are identified, which determine the degree to which these renewable energy projects can be seen as commons and community enterprises. The criteria can also be used to track institutional evolution and compare projects in different localities in terms of ownership, conflict mitigation and policy dependency.

Keywords: Renewable Energy, Community, Framework, Common Pool Resource, Conflict

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Firewood and forest commons: exploring the contributions of collective action and institutional fit to forest conditions

Why do some groups succeed while others fail to resolve environmental problems? This simple question has attracted substantial theoretical interest for many years. Whereas earlier research highlighted the need for external agents to take action and resolve social dilemmas for resource users by changing the incentives they face (Gordon 1954; Hardin 1968); more recent research clearly demonstrate that groups of resource users can and have successfully resolved environmental problems to sustainably govern the use of common-pool resources (CPRs) over a number of years (McKean 1982; Berkes 1977; Acheson 2003; Ostrom 1990; Tang 1991). However, there are important differences with regards to the ways in which scholars account for the performance of common property governance systems. For some sustainable CPR governance is primarily the result of the investments that resource users make, and levels of cooperation they achieve to govern the use of their resources (Ostrom 1990); while for others the explanation lies in the choice of operational rules that fit the core features of the problems they are meant to address (Young 2002; Acheson and Wilson 1996). Today the collective action and fit hypothesis stand as the two leading general theories for successful and sustainable governance of CPRs; though few, if any, studies seek to explicitly explore and test their contributions to social or environmental outcomes. This paper, therefore seeks to evaluate the contributions of collective action and institutional fit to biophysical forest outcomes. It does so by drawing upon a database of forest commons where fuelwood resources are used, and then evaluating the contributions of local rulemaking, monitoring, and operational rules to the annual change in forest condition. Preliminary results suggest that both local rulemaking and rules that prohibit individual harvesting have a positive effect on forest conditions, but that the choice of an individual harvesting rule has a considerably greater effect. This indicates that scholars interested in the sustainability of social-ecological systems should consider not only the collective-choice rules that determine the distribution of rights and responsibilities for environmental governance, but also the operational rules that are chosen and enforced.

Keywords: Collective action; Institutional fit; Forest commons; Sustainability

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The social practice of commoning as core determinant for commons

For the management and mitigation of climate change it can be expected that a wide range and large quantity of restructuring measures will need to be put in place. For these processes, public acceptance is of crucial importance. The attitudes of individuals and communities that are directly affected by the measures strongly contribute to the degree of success of the respective measures.

The proclaimed inevitability of changes, related to climate change mitigation, often fuels emotions like suspiciousness and anxiety among stakeholders. People who are confronted with

“necessary” alterations in their close environment expect right away – often with good reason – to not have a say in the planning and implementation processes. They easily feel powerless, frustrated and treated unfairly which is not the best starting point for a restructuring process. In most cases, a rather minimalistic participation process is implemented. Often enough, this is rather aggravating the situation than contributing to a solid and long-lasting solution. Accordingly, conflicts seem to be almost inevitable and, as a response, implemented measures are challenged by means of protest or resistance. This can only be prevented if people have good reasons for accepting the decisions being taken. Real acceptance can only be achieved by putting into practice a procedure that allows the stakeholders to find a common solution. Trust, transparency and processes that are perceived to be fair are the expected basis to gain public acceptance. Necessary for this is the availability of the relevant information as well as decision-making processes that allow all affected people to actually have a say – at best to be on equal par.

The social practice of commoning has exactly those principles as a foundation. To be successful, it requires solutions that are acceptable for the social environment. Solutions can be expected to be of better quality the better the involved people are informed. Trust in the chosen decision-making procedures plays a crucial role. Commoning describes a specific form of livelihood production. Derived from empirical findings from the field of commons as well as deductive process of theoretical reflection, a preliminary ideal-typical definition for the term commoning is self-organized co-(re)production and mediation of peers who aim at satisfying their needs. Commoning could be, that is the core of the argumentation, a social form that allows for an adequate, transparent and inclusive process of decision-making. The solutions found in commoning processes can be expected to be widely accepted. Accordingly, commoning principles may give advice to measures and strategies that aim at finding ways to organize accepted solutions for the challenges occurring in climate change induced restructuring processes.

Keywords: Commoning, Co-Production, Urban Commons, Digital Commons, Self-Organization

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Sustainable cities and the commons: comparative inquiry of citizen re-appropriation processes in Paris and Berlin (POSTER)

The convergence of the ecological, the social and the economic crisis now urges societies to reflect on a new paradigm toward the sustainable management of their resources. Beyond the traditional dichotomy between “public” and “private”, the concept of the “commons” is receiving growing attention in the political, legal and academic spheres. Likewise, citizen initiatives for the re-appropriation of the commons – i.e. the co-production, defense and claim of the commons – are multiplying all over the world, especially in cities and on the web. The present project addresses the way actors experience the commons, define and (re)claim them in urban areas. It follows two main goals. At the empirical level, our research will reflect on the validity and modalities of a sustainable urban transition through the commons, highlighting both the unity and the diversity of their re-appropriation (articulation between the commons, the market and the state; social, environmental and democratic dimensions of the

process). At the theoretical level, it will clarify the existing theoretical corpus on the commons as well as related initiatives (e.g. social and solidarity economy, collective/ shared economy). Suggestions will be drawn toward more consistency between the theory and the reality of the object as it is thought, produced and wanted by the actors on the ground.

To this end, our analysis will draw on in-depth investigation of the various arenas involved in the production, debate and reflection around the commons. It will combine first and second-order literature review, semi-directed interviews and ethnographic observation. The investigation will be targeted to the sites where academic and militant research is being formalized (e.g. case studies, international conferences, dedicated web platforms, various journals and publications), as well as to the political, legal and institutional arenas (transcription in the political sphere, representation by organizations, production of formal and informal law by jurists or in administrative reports). In addition, inquiry will be conducted on three concrete sites where the re-appropriation of the commons is taking place in urban areas: the urban agriculture sector (community gardens), the energy sector (community energy cooperatives) and the waste management sector (community re-use schemes). While taking into account the international dimension of the movement, the study will mainly draw on a comparative analysis of the discursive and practical activities taking place in two European metropolis: Paris and Berlin. Our research will follow a pragmatist and relational approach, putting emphasis on the experience of the actors on the ground as well as on the cultural and time dimensions of networking activities. This theoretical (and epistemological) perspective is notably inspired by the work of J. Dewey. The re-appropriation of the commons will be understood in a relatively extensive and contextualized manner as proceeding from complex interactions – reciprocal and potentially asymmetrical – between various self-organized publics on the one hand, and between these publics and their environment on the other. Particular attention will be drawn to the plurality of possible perspectives, discrepancies arising from languages, terminologies, categorizations and conceptualizations, traditions and disciplinary usages, especially regarding the distinction between the categories of “private”, “public” and “common”. A process and historical analysis of these arenas will furthermore allow us to shed light on the way in which different publics make use of the contexts and categories on which their experience rely to initiate, through a unique, exploratory trajectory, new institutional, political and legal models.

Keywords: Collective Action (Community Gardens, Energy Cooperatives, Community Re-Use Schemes), Urban Sustainability, Re-Appropriation Of The Commons As A Social Movement, Pragmatism, Ethnography

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Commons governance and long-term provision of ecosystem services: The case of multi-level water governance in rice producing region, Isla Mayor, Andalusia, Spain

Competing demands for water, increasing water scarcity and contamination all put the governance of common-pool water bodies on top of many policy agendas. This paper focuses on how commons' governance, in terms of formal and informal institutions, rules and power relationships governing them, could play a critical role in the sustainable management of common-pool resources and their ability to provide ecosystem services. We propose a case study approach centred on Isla Mayor's social-ecological system. This small southern Spanish municipality is located at the lower Guadalquivir River Basin, where rice paddies cover 90% of the territory and part of the region is inside Doñana National Park. Rice farming as the key social-ecological element of the system reflects its great reliance on water resources. Our empirical findings show the evolution of water management towards a co-managed multi-level governance scheme, where various formal and informal stakeholders are taking part at different levels: European, national, autonomous, province and local. Results highlight some tangible success of this improved commons governance configuration at least in two areas: (1) water management for rice cultivation and, (2) the enhancement of some ecosystem services of the zone (rice provisioning, paddies as habitat for birds and ornithological/ gastronomic tourism). The linkages among stakeholders have also fostered their collective power in decision-making as well as their adaptive capacity, preparedness and responsiveness to possible emerging threats. This is the case, so far, in the river dredging project conflict, which has been put on hold through these stakeholders' pressure, as it could negatively affect the river ecosystem. This new governance system, however, has introduced some challenges and trade-off. On one hand, there is the extra informal power of irrigators in decision-making regarding water allocation at the whole basin level. On the other hand, there is the conflict within the irrigation sector, especially between upland and lowland farmers.

Results suggest that co-managed multi-level governance of the commons with the highlighted role of local stakeholders can be effective in commons' sustainability and their ability to provide ecosystem services. However, it is necessary to analyse whose desires are to be prioritized regarding delivery and distribution of the ecosystem services that are being generated by the commons; and this requires the expansion of our focal social-ecological system at scale and time.

Keywords: Common-Pool Resource; Co-Managed Multi-Level Governance; Ecosystem Services

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Risk Sharing and network economics of coastal communities: A case study of the small-scale fishing communities in the Java and Bali, Indonesia

Small-scale fisheries constitute to more than eighty percent of fishing vessels in Indonesia. They play a critical role in providing jobs, foods and livelihood for coastal communities where unemployment and poverty are quite persistent. It is known that in Indonesia, the majority of more than twenty million people living under poverty is fishing communities. Nevertheless, small-scale fisheries are facing enormous challenges both from fishing uncertainties and economic disturbances such as fluctuation in fuel prices and other fishing inputs which make them vulnerable both socially and economically. To cope with such circumstances, fishing communities in the Java Sea have developed various strategies that have been evolving through risk sharing and developing network economics. These mechanisms are not only a sensible way to reward efforts when revenues fluctuate according to catch but also serve as a social cushion to cope with vulnerability. This paper explores such strategies in terms of their complex mechanisms as well as their social function in two distinct small fishing communities of Java and Bali. The study shows that risk-sharing and building network system of local economy play a critical role to serve as social cushion against fishing uncertainty as well as to serve as social capital among coastal communities. Institutional arrangement is carefully designed and agreed among fishing communities and the system is employed without any intervention from fishery authorities or other fishing industries. The paper also describes the implication of such strategies for fisheries management, especially for coastal and small-scale fisheries management

Keywords: Risk Sharing, Fishing Uncertainties, Coastal Communities, Network Economics

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The Ethics of Allocating Health Care Resources through Institutions for Collective Action

Health care expenditures are rising rapidly across most of the developed world. The increasing cost of health care combined with the sluggish growth of gross domestic product causes economists to believe that many developed countries are on a path to spending an unsustainable amount of money on health care in the next few decades.

Traditionally, economists and ethicists have considered two ways to allocate health care resources: Either through a centralized, single-payer system or through a distributed, market-based system. I suggest an alternative way to allocate health care resources, namely through common-pool resource institutions (CPRI). I argue that these sort of institutions can, in local contexts, allocate resources more efficiently and more fairly than (a mix of) the traditional allocation systems. Therefore, CPRI are a valuable complement to existing allocations systems or they can function as a stand-alone allocation system, for example in a developing world context.

My argument consists of two parts: First, I discuss the way in which CPRI can be used to allocate health care resources, which is an economic issue. Much work has been done on institutions for collective action since Elinor Ostrom brought attention to them almost three decades ago, but until recently little effort has been made to apply this work to the governance of health care resources. Second, I consider the ethics of allocating health care resources

through CPRI, which is a philosophical problem. Several philosophers have done research on issues of local justice, but relatively little of their work applies to health care and none of it considers justice issues surrounding the use of CPRI. Moreover, the ethics of allocating scarce health care resources through CPRI consists of more than issues of justice alone. Therefore, I propose the allocation of health care resources through CPRI requires the development of a middle-level ethics of health care institutions. Such an ethics of health care organizations received some attention at the turn of the century, but not much work has been done on developing a middle-level ethics of health care since. The two parts of my argument are closely related to one another, the economics informing the ethics and vice versa.

I conclude by suggesting a framework for the allocation of health care resources through CPRI paired with a framework for a middle-level ethics of health care institutions. Since my work on the ethics of allocating health care resources through CPRI will result in a doctoral dissertation, I hope to receive valuable feedback on these two frameworks and the relationship between them.

Keywords: Health Care, Resource Allocation, Bioethics, Organizational Ethics

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How what we know and don't know about forest bureaucracies impacts the study of forest management in South Asia

Although there are many reports that forest bureaucrats matter, and may be the cause of disappointing results of forest management programs, there has been limited detailed analysis of the role of forest bureaucrats in most developing countries. In this paper I conduct a structured review of what is known and not known about the role of government agencies in conservation and development policy in India, a country with globally significant forests and where much commons research has been conducted. In particular, I focus on four important areas: Corruption, inter-organizational arrangements, relationships between government agencies and rural people, and the use of science in governmental decision making. I argue that much of what has been previously understood as policy failure can be better understood as the outcome of the incentives faced by government officials. This helps to explain why repeated forest law reforms have failed to address deep structural inequalities. Thus, a viable strategy for correcting some policy failures may be to reform bureaucratic structures rather than to wholly reform forest laws. However, I also argue that much of what we know about forest bureaucrats come from rather casual observations made by authors focused on studying other phenomena, and thus, more detailed study is needed to fully understand the potential impacts of different reforms.

Keywords: India, Forests, Government officials, Corruption, Inter-organizational arrangements

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United We Buy: re-embedding the economy within society for a sustainable world

It is increasingly argued that the environmental and social problems afflicting industrialized societies cannot be resolved without a change in citizens' lifestyles and consumption practices. In recent years, the inability (or unwillingness) of institutions to propose solutions and implement policies to address these issues has stimulated the development of various new social movement organizations which, while raising general awareness of the social consequences of different consumption practices, have also favoured the emergence and spread of forms of provisioning based on direct relationships and solidarity between consumers and producers.

The paper focuses on some new grassroots initiatives promoting alternative forms of consumption as a way to protect the environment and the right of workers in Italy. First appearing in 1994, 'Solidarity Purchase Groups' (or 'Gruppi di Acquisto Solidale') today number more than 900 groups. Their criteria for selecting producers focus on respect for the environment and solidarity, both amongst group members and with the producers. Nevertheless, such criteria are interpreted and appropriated on a strictly local basis.

From many points of view, GAS are an important case study for understanding the mechanisms and decisional processes through which citizens can enter into a cooperative relationship amongst themselves and with individual producers or networks of producers, aiming for reciprocal benefit on a concrete basis, namely modifying the production processes and shifting towards greater sustainability. In this sense, they represent (re)new(ed) forms of collective resilience and solidarity. As the paper will show, in fact, these groups are developing forms of self-organization and self-governance in the context of collective resources. Indeed, GAS create potential common benefits related to the demand for products and food, which is more and more often conditioned by environmental, ethical and food safety reasons, representing a potential answer to a model of society increasingly perceived as unsustainable.

As other forms of collective action in the context of collective resources, GAS groups require their members to participate actively in the management of the group by taking part in the creation of norms of reciprocity. The social and economic exchanges among participants facilitate the circulation of resources for mobilization (information, tasks, and material resources) and for the creation of common interpretations of reality. In such doing, they simultaneously provide preconditions for the development of collective action and the deployment of specific lifestyles.

The paper draws on two online questionnaires completed by 204 members of GAS groups in Lombardy and by 1,658 families belonging to the same groups. It also reflects on the mechanisms that have fostered the spread of these forms of collective action, exploring both the reasons that have encouraged individuals to take part in these experiences as well as the internal organization and strategies of GAS groups.

Keywords: Solidarity Purchase Groups, Social Movements, Critical Consumption, Commoning, Individual and Collective Responsibility

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Cultural evolution theory applied to questions of sustainability in the interlocking politics of resource extraction industries, First Nations sovereignty, food security, and environmental activism in BC, Canada

Cultural Evolution theory is proposed as a framework within which to think about questions of sustainability. Two questions arise. First, are any novel predictions or recommendations generated by this framing. Second if there are any such novel predictions generated, are they useful and worth the effort in translation into this framework. This paper attempts to frame the questions of environmental sustainability and human and institutional behavior that exist in the struggles over tar sands oil and fracked gas development in British Columbia into a cultural evolution framework. The situation in BC is a complex one, involving multiple human/environment interactions and complex relationships amongst energy corporations, a pro-resource-extraction-industry government largely in the pockets of these companies, and local populations in many cases dominated by First Nations communities with a history of relationship to a racist Canadian government characterized by violence and cultural suppression. There is currently a strong resurgence in First Nations identity, interwoven with anti- resource extraction industry activism and the preservation of food security. Social transmission of concepts and feelings of identity, environmental activism, and First Nations sovereignty are critical to the outcomes for the environment in BC. The government, via its heavy handed war on science and censorship of environmental information is explicitly engaging in a battle of information flow. The social transmission of values, agency, and information make this an ideal place to try to apply concepts of cultural evolution to sustainability of lifeways and social and political engagement/disengagement. The complexity of these interrelationships make it a challenging application of theory in terms of quantitative results, but useful dynamics and recommendations may still be revealed.

Keywords: Cultural Evolution, Sustainability, First Nations Sovereignty, Solidarity, Tar Sands Oil

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Partnerships: Innovative collective actions among farmers and non-farmers in the Eastern Brazilian Amazon Region

Although the growing global market has opened new economic opportunities for farmers in Brazil, national policies and legislations have added up complexity to the former regional market, in which farmers were engaged in the past. Opportunities and constraints, however, vary across farmer's group according to their economic assets to undertake a particular crop system, and their ability to build up new social connections to comply with the multifaceted policy circumstance including increased number and categories of stakeholders, spatial scales, and political-institutional relations. Due to increased level of restriction, procedural complexity, and monitoring system in the past decade, Brazilian farmers have been required to follow numerous environmental (Forest Code), financial (farming credit lines), territorial (land tenure), and labor (employment regulations) legislations in order to use their land, to participate in the production chain of cash crops, and to guarantee their food security and livelihoods. In order to meet all requirements, farmers have been more and more compelled to set up partnerships or to connect to engage in networks. On the one hand, partnerships help farmers to meet their legal targets; on the other hand, it demands knowledge about when and how to team up with other stakeholders. This process of social interaction complexity will be illustrated by the recent transformations in the land use activities in the Eastern Amazon (Tomé-Açu region), Brazil. Oil palm plantations have expanded since 2008-2009 alongside the expansion of agroforestry systems. Both productive systems involve several partnerships and network building between small, medium and large-scale rural producers and other non-farmer actors (companies, grassroots organizations, banks, state agencies). We will analyze seven of these interactions aiming at common goals of improving production and of having access to commercial production chain of several cash crops (e.g., food, agroenergy and wood crops): (1) Private company and Private company; (2) Private company and Family farmers; (3) Private company and Business farmers; (4) Cooperative and Agroforestry farmers; (4) Union and Family farmers/Rural Workers; (6) Rural Association and Business farmers; (7) Municipal Secretary and Rural Associations. Our goal in this paper is to analyze these different types of partnerships in Tome-Açu region and to understand how they have been built up, who have been involved, the power relations among stakeholders, and their outcomes. Our preliminary results indicate that partnerships and closer connections with other organizations have contributed to small farmers (or family farmers). They have shown increased political awareness and negotiation skills and have been able, at least partially, to overcome technical and legal barriers and to produce and commercialize their products. However, power asymmetries remained in some types of partnership and need to be better understood. In sum, partnerships and networks were an important strategy to increase the ability of marginalized groups to be included in the rural development programs. On the other hand, similar strategies used by more powerful groups have also influenced the level of impact of the small- farmers' networks. Thus, there has been a growing process of negotiations and trade- offs between groups.

Keywords: Partnerships, Farmers and Non-Farmers, Multiple Agents, Policies and Scales, Brazilian Amazon region

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Is Commonisation possible in shrimp aquaculture? A case from northwestern Sri Lanka

Aquaculture remains an understudied area in commons research. Can commons theory be applied to understand and resolve problems of aquaculture? Commonisation is understood as a process through which a resource gets converted into a jointly used resource under commons institutions and collective action that deal with excludability and subtractability. The purpose of this paper is to (1) understand how commonisation can occur in shrimp aquaculture, and (2) explore factors contributing to the process of commonisation. We examined three coastal lagoon communities in northwestern Sri Lanka and their community-based shrimp aquaculture operations, using a case study approach. Coastal shrimp farms are individually owned, but farmers use collective rules to overcome common challenges such as shrimp disease. Government helps enforce these rules and coordinate at the higher level. Thus, the overall governance regime is a mix of private, communal, and state management. The source of aquaculture intake water is shared among the farms, creating a corridor for the spread of shrimp disease. The regulation of water intake and discharge and the control of disease is the primary driver of commonisation. That is, without collective action, the rate of disease and loss of income, or even collapse of aquaculture, would be much more common, as was the case in the 1990s. The interconnected body of water is therefore managed as common-pool resource under commons rules. The governance system consists of multiple layers of institutions: community-level shrimp farmers' associations; zonal-level associations; and a national-level sector association. Decision making follows a bottom-up participatory approach. Collectively managed individual farms with government oversight and coordination paves the way towards commonisation.

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helen.gambon@cde.unibe.ch**Fixation or dynamics? Governance of an indigenous territory and Biosphere reserve in the Bolivian Amazon**

The new political constitution of the Plurinational State of Bolivia approved in 2009 has been mainly elaborated by indigenous peoples, having through this for the first time the possibility to define the terms of the legal recognition of their own governance regimes. The key features of this recognition are TIOCs (Indigenous Native Peasant Territories, Territorios Indígena

Originario Campesino) which are defined as an ancestral territory where common lands or a community of origin was constituted. Although the legal term of indigenous territories existed since 1996 (then called Indigenous Community Lands, Tierra Comunitaria de Origen TCO) at the level of a law, its legal, political and symbolic importance has increased significantly since becoming a central category of the new constitution. TIOCs go beyond the mere legal recognition of land rights as the constitution grants its inhabitants exclusive rights to renewable natural resources and the possibility to achieve an autonomy status. TCOs, and even more so the newly created TIOCs constitute an important institutional setting for stable common poor resource management as these formalized governance models incorporate Elinor Ostrom's eight design principles.

The empirical case of the TCO and Biosphere Reserve Pilon Lajas in the Bolivian Amazon region however challenges this assumption. The local population vehemently opposes the conversion of their TCO to a TIOC. There are two— at a first glance contradicting – reasons for this: 1.) The Tsimane, Mostene and Tacana indigenous peoples inhabiting Pilon Lajas fear that a conversion to a TIOC would open up the area for campesino settlers from the Andean part of the country, as the new name invokes. They consider this a threat for their way of life, and argue strongly in favor of closed boundaries 2.) At the same time their own traditional territorial governance model is very dynamic and challenges the clearly defined boundaries established by the TCO. This balance between closure of boundaries for outsiders, and strategic dynamic and permeability related to kinship relations and social practices allows Tsimane, Mostene and Tacana to become active agents in designing the governance model that is most suitable for them and the way they interact with their environment, instead of just being passive recipients of governance structures developed by the national state (TCO and Biosphere Reserve).

Keywords: Governance, Indigenous Territory, Traditional Governance, Dynamics, Bolivia

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Communal land and peasant's living strategies: a case study of an indigenous community in Ecuador

This presentation attempts to analyze the role of communal land in the survival strategies of Atapulo's peasants. In particular, patterns of peasant differentiation created from different access and use rights to collective land are described.

Atapulo is an indigenous community located in the Ecuadorean Andes, integrated by 125 households, 30% of which has the status of commoner and access to communal land. In this land, commoners graze animals and cultivate a diversity of crops for self-consumption and sale. Access to this common, is strictly limited to commoners; in fact, the remaining 70% of households does not have any type of rights to communal land. This situation implies the existence of two groups – commoners and non-commoners-, sharing most of attributes except access to communal land, which can be compared.

In order to contrast the situation faced by these two groups, a sample of 54 households was surveyed. The size of commoners and non-commoners sub-samples was determined using stratified sampling techniques. Based on the data collected, an estimation of income perceived during year 2013 was calculated. Income asymmetry is evident when livestock income of commoners and non-commoners is compared. In fact, commoners had an average income of \$1,005, 2.4 times greater than non-commoners. This gap is maintained when agricultural income is considered: on average, commoners' income is 20% greater than non-commoners.

When livestock is analyzed, the difference between commoners and non-commoners is kept. Considering all types of cattle, the former had a bigger stock than non-commoners. In the particular case of sheep, commoners had on average 7 more animals than non-commoners, which resulted in year 2013, in a sheep income ten times greater than non-commoners. This asymmetry is kept when land assets are considered. Commoners owned on average plots of 2 hectares, 30% bigger than land owned by non-commoners. In addition to this private land, commoners had access to communal land assigned for individual appropriation, which allowed them an expansion of the production possibilities beyond the confinement of their private plots.

Considering the above, it's not surprising to discover different patterns of migration. Despite the fact that migration is a survival strategy adopted by both commoners and non-commoners in order to complement agricultural income and balance household labor, the degree of labor market participation differs between these groups. In fact, 62% of non-commoner households had half or more of their members working outside the plot, in contrast with 50% of commoners. Eighty-two percent (82%) of non-commoner household heads sold their work force, compared to 77% of commoners. This gap widens when females' participation in labor market is assessed. Whereas 44% of non-commoner females perform some type of work outside the plot, barely 16% of commoners face the same situation.

In conclusion, data suggests the existence of significant variations between commoners and non-commoners - at the income, assets and labor market level- based on differentiated access and use rights to collective land.

Keywords: Communal Land, Access To Commons, Indigenous Communities, Peasant Differentiation, Survival Strategies

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Understanding the social and cultural dimensions of cumulative land impacts in a northern Alberta Aboriginal community

Since the 1960s, the ongoing and cumulative uptake of land for oil sands and related development has had a rapid and profound impact on the traditional lands and cultures of First Nations and Métis people in northeastern Alberta. Provincial and federal entities have approved development activity in the region, with minimal assessment of cultural aspects. It is only recently that projects undergoing federal review are required to more specifically consider impacts to culture along with impacts to biophysical dimensions. Nonetheless, Aboriginal people have long been aware of the profound cultural shifts that are occurring as a result of changes to the land. Large-scale land disturbance has involved significant change not only to the quality, availability, and access to traditional resources, but also to intrinsic components of culture, such as knowledge transmission, language and shared values. To understand the extent of this complex and cumulative impact to both culture and land use, we must endeavor to go beyond project-specific traditional use studies and other site-based documentation of use and impact, and explore the complex meanings and values that the land holds for people. In this study, we have partnered with the Métis Local 125 community of Fort Chipewyan to pursue this goal and to gain a better understanding of the cumulative implications of government approved resource development projects on the opportunities of Aboriginal people to sustain and express cultural values. Using a community defined pre-development baseline, the research will examine (i) how the traditional values and practices of ML 125 culture have changed and how are they expressed today, (ii) what are the key factors that have led to these changes, and (iii) what do the ML 125 members believe is necessary to support their culture now and into the future. Some of the aspects of ML 125 culture that we are exploring include the importance of visiting, language, and peaceful (low-stress) experiences on the land. For instance, when industrial development modifies how people move through and access the land, aspects of culture may be affected, such as knowledge exchange, socializing and resource exchange. This study will explore the ways in which the traditional land uses of Aboriginal people serve more than simply a resource procurement purpose and support the physical and social aspects of community and culture.

Keywords: Cultural Impact Assessment, Social-Ecological Resilience, Cumulative Effects, Aboriginal Land Use Patterns, Cultural Risk Thresholds

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The Transaction Costs of Polycentric Water Governance in the Murray-Darling Basin: Tradeoffs and Trends in Sustainable Water Allocation Reform from 2000-2015

Managing large-scale common pool water resources has prompted interest in adaptive water governance to pair local innovation with cross-scale coordination. Adaptive water governance links the capacity for learning under uncertainty with co-management institutions to make tradeoffs and overcome the inertia of vested interests prevalent in irrigation-dominated regions. Polycentric governance is one prominent formulation of adaptive water governance; it features the distribution of authority to encourage experimentation and prevent cascading failures, while ensuring coordination to achieve coherence across jurisdictional boundaries. Despite its

perceived benefits for reconciling local participation, experimentation and cross-scale governance, polycentric governance is not free. Transaction costs constrain both the creation of governance units and their coordination.

This paper explores the theory and practice of polycentric water governance from the perspective of transaction costs. It uses the Murray-Darling of Southeast Australia to investigate the transaction costs of coordination by comparing two institutional alternatives for basin-wide water allocation planning and environmental water management: an interstate river basin commission (late 1980s until 2007) and a federal authority (2008-present). These institutional alternatives entail different decision rules for collective choices about water diversion limits, interstate water distribution and environmental water recovery. The latter involves a unilateral authority which ostensibly allows for lower cost decisions, but potentially at the expense of the legitimacy needed for long-term adaptive capacity. The paper analyzes types of coordination costs and trends in the program budget income and expenses for the Murray-Darling Basin Commission (2000-7) and the Murray-Darling Basin Authority (2008-2015). The two periods straddle the height of the Millennium Drought, which ran from 1997 to 2009 and peaked in 2006, underscoring how decisions taken during crisis affect long-term resilience. The preliminary findings highlight the importance of disaggregating the concept of transaction costs to understand the tradeoffs across different types of transaction costs and the relationship between transaction costs and adaptive capacity over time.

Keywords: *Polycentric Governance, Transaction Costs, Resilience, Water Allocation, Murray-Darling*

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Droughts, Disturbances and Diagnosis: Triangulating Analytical Techniques for Assessing Robustness to Climate Extremes in the Rio Grande/Bravo Basin

Droughts and other social-ecological disturbances create situations ripe for opportunistic behavior in transboundary rivers shared by federal countries. Such events expose underlying structural weaknesses for distributing authority and achieving horizontal and vertical coordination. This raises questions about the conditions under which federal water governance arrangements enhance or reduce robustness to different types of climate extremes. We build on recent advances in the use of diagnostic approaches for the assessment of robustness in social-ecological systems to elaborate a theory of a “robust federal river”, extending the theory of a robust federation developed by Jenna Bednar. A robust federal river is governed by constitutional arrangements (treaties, compacts), which are expected to require a complementary set of structural, popular, political and judicial safeguards to: ensure the benefits of divided sovereignty are realized; cover different forms of opportunism; and provide redundancy if one safeguard fails. The Rio Grande is the ideal laboratory to advance diagnostic

approaches and our understanding of large-scale institutional collective action in the face of disturbances; the US and Mexico are both upstream on a major tributary of the Basin which allows a comparison of two contrasting approaches to federal design (more centralized in Mexico), as well as insight into the interactions between internal and international constitutional arrangements. We characterize social and natural dimensions of historic droughts since the 1980s; examine governance responses at different levels and their coordination, including the evolution, configuration and performance of safeguards; and assess robustness at multiple scales in terms of compliance, adaptation and resilience to drought. The initial findings reveal that structural safeguards have enabled adaptation to droughts by specifying responsibilities and using international and interstate commissions or councils to adjust rules and manage conflicts. However, the lack of judicial, political and popular safeguards at the international level has limited binational compliance in meeting downstream water delivery obligations. The US has failed to meet its commitments to Mexico in one of every three years since 1939 on average, while Mexico has accrued a water debt to the US in three of the past six accounting cycles. This track record of compliance has concentrated at domestic level, where safeguards are more readily available (at least in the US). Mexico's centralized federal system lacks the safeguards to resolve internal tensions and improve international compliance, while the US has depended on the threat of Supreme Court action to give force to the structural safeguards created by the Rio Grande Compact Commission. In both cases, the lack of political and popular safeguards, e.g. to facilitate participation and accountability, has elevated the importance of joint monitoring, which we propose as a vital new form of safeguard for a robust federal river. The triangulation of analytical techniques for diagnostic assessment is proposed to guide longitudinal and comparative research on adaptation to climate extremes in transboundary federal rivers of North America.

Keywords: Social-Ecological Systems, Diagnosis, Federalism, Drought, Rio Grande

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Long-term adaptation in historical Forest Commons: experiences from the South-Eastern Alps

South-eastern Alps are characterised by a still significant number of historical Forest Commons, some existing since more than eight hundred years. For centuries these Commons have been a typical institution in the area, one of its property regimes and a factor of regulation of resource use based on consensus building and nested hierarchy. During history, they have been exposed to disturbances of different nature and scale, however they have survived, showing today renew vitality and central role in natural resource management.

Through a historically-embedded analysis of the factors of disturbances and response of Commons the paper aims at identifying what made the Commons' institutions persist over

centuries. The analytical framework is based on Ostrom's principles for long-enduring institutions. The geographical focus is on two countries of the South-eastern Alps, namely part of Italy (Veneto and Friuli Venezia Giulia) and Slovenia. A comparative perspective is used in the paper, based on the observation that this area, now divided by a state border, had a largely shared history during the Middle Ages and modern times, with very similar and parallel development patterns up to a certain point in time. However, during the last century, the history of Commons in Italy and Slovenia diverged due to State actions – the advent of fascism in Italy and of the Socialist Federal Republic of Yugoslavia in Slovenia. This comparison allows a deeper understanding of state action as a factor of disturbance and contributes to explain the present situation of Commons in the two countries. Data have been drawn from multiple sources, mostly following a case-study approach. Stability of internal rules proved to be crucial for robustness of Forest Commons on both sides of the border, however results show that Commons also had to react to changed external circumstances by adapting their constitutional rules changed community needs and societal demands.

Keywords: Robustness, Adaptation, Historical Forest Commons, Italy, Slovenia

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Forests in commons between production of timber and provision of ecosystem services: an analysis in the Veneto region of Italy

Italy is characterised by a rather meaningful presence of farmed or forest land under different forms of common ownership: more than 600 thousand hectares according to the last Agricultural Census. The North-east of the country is very rich of cases, due to historical reasons and to a present favourable political milieu. Because of their location in the most environmentally-outstanding spots, and thanks to careful forest management by the communities over centuries, these areas provide today many public goods such as landscape,

amenity, recreation, improvement of water regimes and biodiversity conservation. In addition, they give benefits to the community of members, namely private goods linked to extractive timber activities and club goods related to harvesting activities amongst which hunting and mushroom picking. A rather high minimum level of supply of public goods is prescribed by law through a strict control of forest management practices while there is room for providing additional services through different forms of incentives and payment mechanisms. Understanding factors and motivations underpinning forest owners' decision making in this regards would provide useful indications for forest policy design. This issue has been widely explored in the literature in relation to productive functions, but less with a focus on ecosystem service provision. In addition, not much research has considered this issue across different types of ownership regimes.

In this frame, the paper seeks to understand the determinants of decision making towards the provision of ecosystem services by forest owners in the Veneto Region, based on a representative sample of forest owners including 16 commons and 139 private owners. Information on the bio-physical and infrastructural characteristics of the forest estates, on features of the forest owner including tenure systems, and on the forest management practices were collected. Additionally, owners were asked to state their willingness to re-orient forest management objectives towards an increased provision of at least one out of four ecosystem services including recreation, biodiversity conservation, water regimes and soil erosion prevention and Carbon sequestration. Preliminary results based on statistical analysis aiming at exploring the factors affecting owners willingness to provide the above mentioned public services show that the provision of multiple goods and services is a challenge for forest management, in which the ownership regime plays a certain role but seems to be less relevant than other factors like the assets of the forest estate (physical and natural capital) and the perceived risk of occurrence of biotic and abiotic hazards.

Keywords: Forest Commons, Ecosystem Services, Forest Owners, Determinants, Italy

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Potentials and Conflicts of Managing a Valued Common: Study of “Himalayan Gold” Management in the Alpines of Nepal

Globally recognized as Himalayan Gold and Caterpillar Fungus, scientifically identified as Cordyceps or Ophiocordyceps sinensis and locally known as Yarsagumba in Nepal, “Himalayan Gold” is Non Timber Forest Product highly valued for its medicinal significance, high market price and unique ecology. Found at high alpine pastures, it is primary (though seasonal) source of income for many rural households in Trans Himalayan districts of Nepal and in Bhutan, China and India. A comparative analysis of several case studies on Himalayan gold ecology, harvesting, economy and management were conducted to assess current trends, potentials and conflicts of managing this valued common. “Himalayan Gold” as its name stands, is one of the most expensive biological commodity on earth formed as a result of parasitization between the fungus Cordyceps and the larvae of a Himalayan ghost moth and is sold at rates even expensive than Gold. In struggle to extract the most of Himalayan Gold from the harvesting grounds, every year during the collection period, several conflicts are

reported sometimes resulting to the “Himalayan Gold Massacre” in the alpine pastures of Nepal. Over-exploitation linked by global market demands and being extracted as an open access resource, further exacerbated by climate change impact and ambiguous management rules and policies have raised concerns that harvesting levels are unsustainable and that the resource base is declining. This will jeopardize the ecology and the linked livelihood in near future, therefore effective and appropriate rules and management are deemed crucial at local level to sustainably harvest and manage this highly valued common, to sustain alpine ecology and rural livelihood for generations to come.

Keywords: Himalayan Gold, Valued Common, Livelihood, Over-exploitation, Management

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Applying institutional logics theory to understand how community heterogeneity impacts establishing successful commons: A case study of the International Barcode of Life Project

Heterogeneous communities of actors are often less successful at establishing and operating commons. Differences in values and expected behaviours of heterogeneous actors reduce their ability to develop appropriate rules and behavioural norms, essential to the governance of commons. We apply institutional logics theory to understand how a heterogeneous research community develops and applies rules and norms for participation in a global knowledge commons, specifically the International Barcode of Life Project (iBOL). Institutional logics are a branch of institutional theory aimed at understanding how overarching societal principles (logics) inform behaviour within organizations. Logics have been used to understand organizational practices in multiple contexts. Logics can overlap within organizations, and they often compete and interact with each other when multiple logics inform behaviour. Our empirical case study of iBOL focuses on how researchers within the barcoding community use multiple logics to inform their behaviour. We examine how these logics compete and conflict with each other to enhance our understanding of how heterogeneity impacts the establishment and operation of knowledge commons.

iBOL is an international biodiversity monitoring effort to create a publicly accessible database of short DNA sequences (barcodes) of thousands of species that link via metadata to reference specimens in global repositories for biodiversity, such as museums and botanical gardens. Collectively, the barcodes and specimens are genetic resources, governed by national laws that implement the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity. Concern over the use of genetic resources differs between researchers in the Global North and the resource poor, but biodiversity rich Global South. These cultural, societal and legal differences contribute heterogeneity of researchers, which are part of the global barcoding community. In addition the success of iBOL as a knowledge commons is contingent on the

fact that its value increases as more people use or contribute genetic resources, known as the “network effect”. However, users are not obliged to be contributors, resulting in a potential free-rider problem. Promoting use of the resource as well as contribution or re-contribution of value-added data, while remaining sensitive to the divide in interests of researchers in biodiversity rich and poor nations, requires a set of rules that coordinates the behaviours of the heterogeneous actors that comprise the international barcoding community.

Our analysis of semi-structured interviews with 26 iBOL researchers from 11 countries identifies the differing and sometimes conflicting logics used by the iBOL researchers internationally. Our analysis identifies rules, expectations, and behaviours described by interviewees and categorises them according to defined logics. For example, we categorised behaviours promoting unity and cooperation as community logics, while we categorised behaviours promoting individual achievement as market logics. We compared how different actors’ behaviours and expectations were informed by different logics, and the challenges arising in creating rules due to conflicting logics.

We demonstrate that the application of institutional logics provides a useful framework for understanding how a heterogeneous community can create rules and norms to govern a knowledge commons.

Keywords: Genetic Resources, Rules-In-Use, Heterogeneity, Global

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From Common Goods to Public Goods – the Effects of Legal Intervention on Codification of Traditional Knowledge

Bioprospecting projects that are conducted to identify new drugs are highly unpredictable and costly. As a result, pharmaceutical and biotechnological industries are increasingly looking to Traditional Medicinal Knowledge (TMK) – the medicinal know-how, skills and practices of indigenous and local communities – for help in guiding their research. However, after TMK is used and a successful drug is produced, companies in such industries do not share their profits with knowledge providing communities. These practices have resulted in passionate objects from indigenous communities and governments of developing countries in which local communities reside. As a result discussions of the protection of TMK are increasingly taking center stage both nationally and internationally. TMK and genetic resources of such communities have been considered to be a ‘common heritage of mankind’ until the 1980s. However, because of the alarming rate of loss of such resources and the increasing recognition of their value (inherent or otherwise) there has been a shift in approach. The new perspective brought in by the mechanism of the Convention on Biodiversity considers such resources as the ‘common concern of mankind’ over which communities have ownership rights.

Intellectual property laws – the main instruments through which the modern world regulates the production, use and dissemination of innovative knowledge – has by far considered TMK to be in the public domain free for anyone to use. However, consistent with the above discussed shift in approach, scholars have attempted to provide different theories that would

justify the protection of TK. These attempts involve both equity based and utilitarian arguments; however the former dominates the field.

This paper adopts a utilitarian framework for justifying the protection of TMK. Here, the term ‘protection’ is used in the legal sense to mean the recognition of a positive right to share benefits from activities involving TMK. It proposes an ‘incentive to codify’ theory to justify the protection of TMK as complementary to other utilitarian and equity based theories. It argues that legal protection of systematically documented TMK will encourage knowledge holder communities to codify their knowledge and disclose it to users. Such incentive is indispensable for collaborative research that is a key ingredient for innovation. In order to support such claim, TMK is analyzed as a public good with non-rivalrous and non-excludable features. This will be contrasted to the older approach of considering TMK as a common heritage. In such analysis, the failure of alternative channels of collaborative and private knowledge production will be examined in the context of TMK before proceeding to outline the need for government intervention.

To further clarify the ‘incentive to codify’ theory a parallel analogy is made with the way patent laws have been used to encourage the codification of knowledge. As recently argued, patent laws encourage the codification of tacit knowledge (know-how) by recognizing and protecting codified knowledge (Burk, 2008). It is claimed that a similar legal intervention that protects TMK will encourage indigenous and local communities to codify their knowledge which is usually transmitted orally. Following analysis, some preliminary thoughts on the framework of protection that could be adopted will be discussed.

Keywords: Traditional Knowledge, Medicinal Knowledge, Public Goods, Intellectual Property, Codification of Knowledge

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Discrepancies between paper and practice: Farmers’ perception of land and water property claims in Tajikistan

In most arid regions, irrigation systems and access to irrigation water is mandatory for agricultural productivity growth. However, intensive irrigated agriculture along with not maintained irrigation and drainage infrastructure also increases problems of soil salinity, an inevitable process limiting soil fertility. Secure property rights are one important driver for sustainable resource management and to combat resource degradation. The key role of strong property rights is to empower individuals and to create incentives to invest in sustainable resource management. However, perceptions of property claims and consequently the resource

practices, can differ among various resource users and create different discrepancy levels towards the property rights defined by law.

Also in the lowlands of Tajikistan, irrigation schemes play a central role for cotton production of large- scale farms, commercial crop production of peasants and for households' food security. However, due to irrigation and drainage canal mismanagement, 16 % of the irrigated areas is already affected by soil salinity, which is reducing crop growth potential and threatening food security. Despite several reforms and the introduction of individual property rights in the land and water sector after independence, resource degradation is still ongoing and productivity growth in the agricultural sector is still beyond its potential. One reason is that farmers are often not aware of the full potential of their individual property rights.

This paper's objective is to assess the difference between the perceptions of farmers' land and water property claims and the legal regulations within the context of a transition economy. It further determines linkages between soil management and the land and water property regimes.

We developed and applied the method of measuring the perception of property claims to contrast this in a second step to the property rights on paper. We did that in a quantitative way by conceptualizing and coding the bundle of rights approach to measure the discrepancies. The study relies on a farm household survey (N=399) and qualitative interviews conducted in 2013 in two agricultural districts in Tajikistan.

Our results were manifold showing diverse property claim perceptions among different groups of farm types as well as different discrepancy levels between the land and water sector. Whereas the land sector is increasingly being individualized and individual property rights are transferred to farmers, our results support that water rights are still not transparent enough. However, without long-term and secure water use and drainage management, agricultural land in Tajikistan remains of less value. These findings also help to point to better policy recommendations to limit resource degradation. Where perceptions are weak an even more advanced legal rights system with canal and soil improvement mechanisms would be required.

Keywords: Perceived Property Claims, Property Rights, Resource Degradation

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Re-forming the Western Canadian grazing commons: Community and co-operative pastures under neoliberal restructuring

The grazing commons in Western Canada includes several varieties of federally and provincially administered community and co-operative pastures, grazing reserves, special areas, long-term leases on crown lands, and grazing co-operatives that manage a mix of state-owned and deeded ranch lands. Neoliberal restructuring is most evident in recent initiatives by the federal government to divest itself of a long-standing system of community pastures located in the

provinces of Manitoba, Saskatchewan, and Alberta. This has given rise to a variety of provincial government responses and has spurred the formation of several new organizations contesting restructuring proposals and representing the (sometimes shared) interests of pasture patrons, conservationists, civil servants, Aboriginal communities, and grassland scientists. It has also given rise to new organizational arrangements to collectively manage individual pastures or systems of community pastures at the provincial scale. Recent developments kicked off by the federal government's divestiture of former Prairie Farm Rehabilitation Administration community pastures are not the only instances of neoliberal restructuring. Other examples include the formation of new partnerships to co-manage blocks of grazing land that have been assembled through a mix of private philanthropy and public initiative, and proposals to privatize provincial government-owned grazing lands. Based on field interviews and documentary evidence, this paper looks at the various interests involved in recent restructuring initiatives, environmental risks, implications for producer livelihoods, and the ways that alternative responses may advance conservation, rural development, and cattle producer agendas. It also looks at the roles of powerful actors such as the beef packers, oil and gas interests, and agricultural real estate investors. Finally, it considers the prospects for preservation, enhancement, or loss of multifunctionality under existing, proposed, and alternative organizational arrangements. In particular, we look at a range of co-operative models that may be useful in responding to contemporary restructuring challenges.

Keywords: Community Pastures, Co-Operative Pastures, Restructuring, Canada

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From open access to a regime of mixed common- and private property: Indigenous appropriation and regulation of the fodder tree *Euphorbia stenoclada* in southwest Madagascar

The research presented here deals with the long-term development of the common-property regime for the important fodder tree *Euphorbia stenoclada* used by pastoralists in southwest Madagascar. While open access and the absence of use rules dominated the use of the trees in pre-colonial times, the institutional setting has changed over the decades. Driven by a growing scarcity of the resource, individual users started to claim private property rights on certain stocks. As a reaction, the users organized in village communities have struggled their way through a process of creating new community-based arrangements which define a proper usage and most importantly restrict private property rights and declare certain stocks as inappropriable commons.

The qualitative case study traces the processes of appropriation and regulation and analyzes the factors influencing the procedures and their outcomes. A framework for institutional change (Ensminger 1992) is used for exploring the interplay and changes in the constellation of the users' organization, formal and informal institutions and ideology, collective action and bargaining power and behavior of individual actors. Field research was carried out in 2012 and 2013 and is based on open, semi-structured and structured interviews with pastoralists and local authorities in over 20 villages in the Mahafaly Plateau region.

The results indicate that individual appropriation has started in the 1960th, gathering pace after 2000 and leading to the development of a regional market for harvesting rights. While some claims for private property rights have for ideological reasons always lacked social acceptance, the majority of has been widely tacitly accepted by the village community and later de jure legitimized. The rights got established by an unnoticed evolution ending in a fait accompli difficult to undo. At the same time, the local society' focus on ancestors' rules, norms and taboos and their value for maintaining harmony and avoiding open conflicts first hampered the creation of regulative institutions and later hindered their successful enforcement. This constellation of informal institutions and ideology, paired with the ongoing transition of the local society towards commodification and individualization, made the appropriators winners in the bargaining process over the way the property rights regime evolved. Today, appropriation has reached a dimension which in the world view of most villagers is not good for the society.

The case study gives an example how an indigenous resource regime evolves when the socio-economic and ecological context changes and the old regime does not fit anymore. In this case, the outcome of the adaptation is not fitting the needs of the society, but results from a bargaining process where individual actors use their power resources in order to push through their claims. Their rich power resources are mainly not economically founded, but derive from a power vacuum on side of the village communities and their authorities, and from a general floating of the society between traditional norms and values and influences from the outer world.

The study stresses the importance of the interplay between bargaining power and informal institutions and ideology in the emergence and outcome of community-based arrangements.

Keywords: Institutional Change, Pastoralism, Traditional Societies, Ideology, Bargaining Power

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Small-Scale Fishers' participation in Consultative Councils of Protected Areas in the southeastern coast of Brazil: challenges for public participation

Consultative councils of Protected Areas (PAs) are public participation arenas that offer opportunities for improving both the relationships between resource users and government managers, and the decisions aiming at resource conservation inside these areas. Nevertheless, to achieve effective participation, the government must devolve power to the other stakeholder groups involved, like community-based organizations (CBOs) and NGOs. In the municipality of Paraty (Rio de Janeiro State), in the southeastern coast of Brazil, small-scale fishers from the

community of Trindade participate directly, or are represented, in four of these councils, in which they struggle to maintain their traditional rights over fishing territories within PAs. This study aims to evaluate the exercise of participation by small-scale fishers and CBOs' leaders from Trindade, and other organizations representing them, in the Consultative Councils of the Serra da Bocaina National Park (SBNP) and Bocaina Mosaic (BM). The latter comprises a set of 29 PAs, including the SBNP. The evaluation was performed based on criteria from the public participation scholarship, such as representation, communication and transparency. Data was gathered in 2010 through direct observation of the meetings of the two councils, document analysis, and interviews with the head of the SBNP and three community leaders of Trindade.

A qualitative analysis of the data shows that the participation of fishers and other stakeholders in the council meetings occurs by providing information, being consulted, and debating. Communication among participants during the meetings is unidirectional, hierarchical and controlled by the meetings' coordinators – always PA managers. Fishers are represented in the sense that they participate in the meetings but they have no voice in decisions that affect them. Some decisions (e.g. about enforcement of landuse restrictions) are just informed by the managers, without transparency about the processes which created them. Participation in making "decisions" only regards operational issues of the meetings, such as approving the minutes, or setting the dates for further meetings. Fishers wish they could participate in discussing decisions regarding fisheries enforcement and conflict negotiation with the Protected Areas Agency (ICMBio).

Although the councils we analyzed are an achievement in the field of public participation in Brazil since the creation of the National System of Conservation Units in 2000, there are still numerous challenges. The exercise of participation within these councils may either exacerbate the power asymmetries between the communities and the government due to the hierarchical decision-making by ICMBio, or lead to a rich process of collaborative management if managers give up some power and are willing to share responsibilities. Fishers' participation in decision-making processes that affect their access to and use of the commons could be improved by: recognizing the divergent values among stakeholders (managers, members of other government agencies, fishers, NGOs, Universities); building common visions based on shared interests; improving the access to information about management decisions affecting the fishery; adopting conflict negotiation mechanisms; and creating initiatives for capacity building of the different stakeholder groups.

Keywords: Public Participation, Fisheries, Protected Areas, Brazil

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The politics of multilevel governance in land classification and land rights allocation

How land is classified and to whom it is allocated are multilevel decision-making processes; they involve multiple actors with different interests, perspectives and levels of power that may pursue different environmental, social, technical, economic and political goals. Given this complexity, how land rights (e.g. concessions, titling, etc) and land classification systems (e.g.

definitions of “aptitude” or “forest”, field work protocols, land use planning) exert mutual influence on each other remains poorly understood. This influence is not always evident since it can involve hidden interests and power relations. Politics and trade-offs among multiple outcomes become especially intense in developing countries with tropical forests, where there can be multiple norms related to different resources and people, such as forest conservation, climate change, agriculture, oil, mining and indigenous communities. Furthermore, throughout the developing world, land rights tend to overlap over the same piece of land, and the distribution of legal powers across levels and sectors of government tend to change, sporadically, to varying degrees. The purpose of this paper is to investigate these linkages both legally and empirically, in order to understand: 1) how institutions and policies over land classification and land rights influence each other in landscapes that involve actors from different levels and sectors and with different levels of power; and 2) the implications of these dynamics for forest cover and land use change. Using data from legal reports and case studies conducted in Peru, Indonesia, Tanzania, and Vietnam as part of CIFOR’s Global Comparative Study on REDD+, this study analyzes several cases of land use change at the subnational level by looking at both law and practice. The analysis is based on the multilevel governance framework developed by Mwangi E and Wardell A (2012) and the manual on tenure developed by Larson (2013).

The findings show that the relations between the land classification and land rights are shaped by the unequal (formal and informal) power relations between the different governmental institutions that enforce them. In some of the countries, agencies oriented towards large-scale production (such as oil palm and mining) are in charge of dominant policies (e.g. titles and concessions), while those institutions pursuing land security for local people or sustainable land use enforce policies that are not legally binding or that are not actually applied in practice (e.g. “optional” territorial planning and “use permits” for indigenous people). Each of these institutions coordinates its own classification systems and policies affecting rights, directing them towards its own objectives. Tensions are overwhelmingly resolved in favor of the policies that classify and grant land in ways that are favorable to large industries, while policies for local rights and sustainability are considered as “guiding tools”. Nevertheless, there is variation between countries and between subnational jurisdictions within countries, and there are windows of opportunity when alternatives emerge. Above all, it is clear that supposedly technical classification systems are neither technical nor participatory but highly politicized arenas.

Keywords: Multilevel Governance, Politics, Land Classification, Tenure Security, Land Rights

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Forestry Incentives and its Outcomes: The experience from Chile

The financial incentive based forest management program of Chile has been greatly applauded for its environmental impact measured in terms of forest area coverage and economic impact stipulated from increase in GDP contribution of the forestry sector. The most potent instrument for this achievement is the Forestry Development Act, the Decree Law 701 dictated by the Ministry of economy in 1974. The law stipulates that government grants will cover 75% of the reforestation costs for lands under a Forest Management Plan regulated and approved by the National Forest Corporation (CONAF). In addition, lands under the DL 701 are exempted from the payment of land taxes and will not be expropriated by the government under any circumstance. Even though the country has managed to stop deforestation and increase its forested area in about 2.8 million ha thanks to this incentive based program; the forestry sector has visible weaknesses: excessive concentration of ownership of forests in large companies, situation that generates monopolies; high rates of poverty and migration in indigenous and small landowner communities. Hence there is a need of a deeper analysis of all of the outcomes of these 35 years of operation of the DL 701, not only from the forest cover and GDP contribution perspective but also by considering its wider implication for the society. Data will be collected from policy makers, policy advocates and actors that are directly and indirectly affected by the policy. These include large scale landowners, forestry companies and indigenous people, actors from Chilean forestry sector such as forest workers, forest associations, government officers NGOs and researchers. Thus this research will theoretically contribute to the ongoing academic discourses on incentive based forest governances while empirically it will contribute for improving the forest policy scheme of Chile. The latter is especially timely given that their government is pondering to revise the forestry act.

Keywords: Forest Policy, Industrial Policy, Chile, Incentive Based Forest Management, Case Study

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Seeing the High Seas: Legibility and Governance of the Ocean Commons

From efforts to promote a ‘blue economy’ to resistance against ‘blue grabs’, marine commons are deeply embroiled in contemporary struggles to reshape environmental governance. Marine protected areas (MPAs) are at the heart of these struggles, as total ocean area under protected status has increased more than fivefold in the past ten years. MPAs are represented as both a tool of the ‘green economy,’ to enable the protection of natural capital and ecosystem services, and as a means of resisting the further incursion of capital into ocean space. Supporters argue that they are tools for supporting traditional systems of marine tenure while critics characterize them as externally imposed policies that undermine local access to the commons. In short, the relationship between MPAs and governance of the marine commons is complex and deeply contested. This paper examines the international effort to establish MPAs and remake conservation governance on the high seas. Although the establishment of MPAs on the high seas has been limited to date, given the lack of clear international legal mechanisms for doing so, a coordinated network of scientists, non-governmental organizations, and international institutions continues to work to advance the effort both scientifically and politically. Drawing on the results of collaborative event ethnography conducted at a series of international environmental meetings over the past six years, this paper considers the ways in which knowledge about the high seas is generated and communicated in order to advance

international conservation efforts. Participant observation and interviews were conducted at four international events where high seas governance was discussed and debated: the 2008 World Conservation Congress, the 2010 Conference of the Parties to the Convention on Biological Diversity, the 2012 United Nations Conference on Environment and Development ('Rio+20'), and the 2014 World Parks Congress. I examine the way in which knowledge about the high seas was represented, communicated, debated, and linked to MPAs as governance tools. The analysis reveals some familiar results, including the role of scientific experts in making ocean space legible in particular ways and the 'scaling up' of environmental governance. However, it also raises questions about the potential for science-based conservation territories to assist in the defense of the largest global commons – the high seas. There are both opportunities and limitations associated with how international institutions 'see' the high seas, which will play an important role in how their governance evolves.

Keywords: Oceans, Conservation, Marine Protected Area, International Institutions

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A Power-Based IAD Framework: A Theoretical Approach (with an application to One Italian municipality)

The well know IAD framework establishes a clear setting for the understanding of the ways through which institutions shape social interactions and decision-making processes. What seems to be somewhat lacking is the notion empirical declination of power and its relative relevance in the social interactions that lead to decision-making. The paper intends discussing from a theoretical perspective the ways through which the IAD framework could benefit from the incorporation of some elements of the theory of power and the ways such theory has been empirically applied by Robert Dahl (1961). By providing some exploratory empirical evidence from municipal public policies in one Italian cities (Pavia), the paper intends to critically assess the validity of power- based IAD framework.

Keywords: IAD, Institutional Power, Italy, Institutional Analysis, Local Government

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“We started with a project and ended with a system”: Land tenure and benefit distribution in Acre, Brazil’s environmental services program

This paper examines the Brazilian state of Acre’s System of Incentives for Environmental Services (SISA) as a multilevel land use governance strategy. It focuses on the development of a state-wide system of incentives for low-carbon development, rather than a local, geographically- bounded project to reduce emissions from deforestation and forest degradation (REDD). This approach both takes place along side the primary federal forest management legislation—the Brazilian Forest Code—and impacted its 2012 reform, and has influenced the development of REDD programs in other Amazonian states. The decision to create a state-

wide system rather than a local project was made in part through a consultative process involving many sectors of Acreano civil society, including municipalities, indigenous groups, and smallholders. Through this approach, the state government has tried to side-step the thorny issue of land regularization by decoupling land tenure from both SISA's carbon credits and its economic benefits, in part because of concerns that smallholders would be excluded from SISA if clear land tenure were the criteria for receiving benefits. Instead, SISA links economic benefits to something other than land rights—the concept of ecosystem service provision. Benefits flow to small-scale producers, extractivists, indigenous people, and others seen to be providing ecosystem services like carbon sequestration, rather than to owners of specific parcels of land. This form of 'jurisdictional REDD,' as it is sometimes called, is meant to allow the state to channel benefits to those seen as historical protectors of the forest like extractivists and indigenous people, rather than just to those threatening forests. In so doing, SISA both eschews the emphasis on land tenure from the literature on tropical forest governance and gives the state government significant power in deciding who will benefit from SISA and how. The paper explores this effort as a redistributive land governance strategy, assessing the opportunities and risks of Acre's innovative and influential approach to benefit distribution and land tenure as a low carbon development strategy. It situates SISA within Brazil's land use governance system, including the ongoing development of a federal REDD strategy. The paper is based on over 16 months of ethnographic research including participant observation, formal and informal interviews, archival research, and survey collection.

Keywords: REDD, Land Tenure, Redistribution, Land Governance, Scale

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Understanding polycentricity in practice: (How) does it work?

The concept of polycentricity is foundational in Bloomington institutionalism in a general sense, but its specific operational characteristics are understudied, limiting its theoretical and practical applications. While a coherent definition remains elusive, most conceptualizations of polycentricity reference multi-level, nested governance units that have overlapping jurisdictions and some decision-making autonomy. This paper argues that there are tensions and gaps in current conceptualizations that warrant further exploration. With the goal of advancing understanding of the form and function of polycentric commons governance, we engage anthropological theory on legal pluralism and an institutional analysis of small-scale fisheries in the Republic of Palau to interrogate whether and how different attributes of polycentricism may co-exist in practice. Palau is a small island nation in the tropical western Pacific that gained independence from U.S. administration two decades ago. Similar to other newly independent Pacific island nations, Palau adopted a constitution that embraces egalitarian democratic ideals yet also seeks to preserve a system of traditional governance administered by hereditary chiefs. The democratic system is a federalist system with a strong central government and 16 states. Both state and national governments retain the right to manage state-owned natural resources, and traditional leaders also assert authority to make rules concerning the usage of natural resources. Palau's inshore fisheries governance system exhibits many defining attributes of polycentric governance but not all, supporting an argument for theoretical work that better reflects messy empirical realities of polycentric governance as a continuum of multiple

characteristics that present in degree, in various combinations, and with varying outcomes. Palau's version of polycentrism is leading to an outcome we understand as legal pluralism, with different versions of the same rule type co-existing in a given action arena. Results illuminate the utility and limitations of polycentricity in theory and practice, and demonstrate the value of cross-disciplinary theoretical engagement for institutional theory-building.

Keywords: Polycentricity, Small-Scale Fisheries, Legal Pluralism, Pacific Islands, Commons

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Managing palm species in evolving social-ecological systems; insights on different forms of resilience in the Colombian Amazon

We investigate natural resource governance in three indigenous communities in the Colombian Amazon. The less accessible of the communities represent earlier steps in governance evolution while the more physically accessible is more integrated into the western scene. We observe how increased physical accessibility in a community brings in western governance models which hybridise with more traditional ones, influencing the couplings between the social and ecological systems. We base our analysis on an evolutionary governance model in which governance dimensions emerge as relevant through time. We zoom in on changing management of three commonly used palm species and illustrate how detailed studies of natural resource management contribute to understanding governance evolution. The palm analysis does not allow us to say that local or traditional knowledge in governance would bring a necessarily healthier socio- ecological system, but one can say that it illustrated how the coupling between social and ecological system was weakened by its gradual inclusion in modern institutional arrangements. At the same time, rules and regulations which in western societies serve to manage undesirable outcomes are still not in place. As these changes take place the perception of the impact of governance on the environment becomes blurry, incentives for sustainability are undermined and conflict resolution strategies and strategies to envision a common good are not in place. By comparing governance evolutions we were able to gain insights and improve our understanding on how natural resource management changes in communities transiting into western ways of living. In doing so we recognized points of rigidity and flexibility which might influence the social ecological systems capacity to adapt to changing conditions. An evolutionary governance perspective allows us to see options and restrictions for adaptive governance and by enabling us to distinguish governance paths this perspective also allows us to see different forms of resilience.

Keywords: governance, institutional change, natural resource management, Amazon, palms

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Conflict and cooperation strategies in the management of commons. A case study from Isabella, Galapagos Islands

Galapagos Islands might be considered as a global commons of nature, a safe haven for many species and ecosystems, where Charles Darwin noted many of his most important contributions to the theory of evolution. A closer look, however, unveils a more complex situation. In this paper, we explore and try to contribute to the understanding of Isabella's island social-ecological complex. We focus on mapping the multilevel governance configuration relative to main socio-economic activities and biophysical flows, in a context where there is a constant – tense- interaction of local inhabitants with an officially protected ecosystem that takes up 95% of the Island's territory. Within this system, we pay attention to identify specific local common pool resources (CPRs) and the many strategies -governance configurations- people follow to manage them. In particular, agricultural and cattle activities taking place in “las partes altas” located uphill “sierra negra” volcano, the interactions with other activities down in “Puerto Villamil”, and a context of fuzzy frontiers of interaction with the Galapagos National Park (GNP) provide a quite interesting and challenging landscape to explore. The results of our study show a variety of co-adaptive schemes in the management of commons as diverse as specific species or tourism, and the identification of formal and informal rules and institutions that prospectively may foster or evade tragedy. This study is methodologically based on two research projects in collaboration with the Charles Darwin Foundation (2010-2013), one on conservation anthropology and another on social-ecological interactions in the face of growing local and touristic activities.

Keywords: Common-pool resource; social-ecological system, governance configuration, Galapagos Islands

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Sustainable Livelihoods of Women in Small Scale Fisheries

Fisheries management policies require physical and socio-economic information to devise the measures that need to be incorporated in reducing the adverse impacts on fishing. Mahon and McConney (2004) suggest for an essential shift in emphasis from technology to people. Such shift requires the use of socio-ecological system (Berkes, Mohan, McConney, Pollnac& Pomeroy 2001) and becomes easier with rich social capital among the stakeholder groups. This study, hence, provides a socio-economic perspective of retailing units with a focus on their management practices. The analysis is based on the data collected from the primary survey of 268 respondents of small scale retailers. The post stratification of the retailers showed that 56 per cent of the sample represents women fixed point traders, 10 per cent women dry fish

retailers, 21 per cent women head loaders (mobile) and 12 per cent mobile (two-wheeler) men retailers. There is high diversity among small retail business in fish trade. The study reveals that women dominate the marketing who have excellent skills and knowledge critical to product quality and thus market access. In small scale fisheries women participate in productive (household family related) and non-productive activities which contribute substantial part of the social capital and family income. The study reveals that the women play a very important role in maintaining economic status of their families in terms of their substantial financial contributions, in addition to many unpaid/non-productive support services provided by women which are not represented in official reports. The study shows that the sustainability of the livelihoods of these women sellers is in danger due to the entry of men-sellers with technologically advanced transport and communication system in addition to the entry of big retailing companies.

Keywords: Characteristics Of Small Scale Fisheries, Market Structure, Selling Strategies Of Women Traders, Livelihood Sustainability

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Empowered Social Capital to manage Conflicts in making Irrigation Common Work - Multiple Cases from grassroots in India (POSTER)

Poor marginal farming communities of drought prone rain shadow regions of Deccan plateau mostly depend on small freshwater traditional commons namely minor irrigation tanks and village ponds. However these water bodies are predominantly viewed as an irrigation source in India, these water bodies irrespective of their fulfilling multiple uses like source of drinking water, livestock use, water spread area cultivation, grazing land, command area agricultural use and the like. In southern peninsular India, such traditional irrigation commons are hydrologically linked in to groups called tank cascades. DHAN Foundation spearheading community based development programme aiming at rehabilitation of tanks to perform their optimal functions in India. In Gundar basin, one of the non-perennial river basins in Tamil Nadu, DHAN Foundation implemented as a demonstration of tank cascade development comprising of 250 tanks in 15 cascades of tanks in head, middle and tail regions of the Gundar basin. In the areas of lower rainfall like Gundar basin, water resource centric conflicts are common. Gundar basin is with 2276 tanks and most of the tanks are rain fed tanks with no dams built across the river, the agricultural and allied livelihoods of the small and marginal farmers depend on the functioning of tank systems. The Paper and/or poster attempts to capture the multitude of conflicts emerged in implementing the Hindustan Unilever funded Programme and the approaches followed in resolving conflicts by involving the community in a fruitful dialogue process, negotiations with impartial elders and conflicting parties, use of government revenue machineries in revenue survey to lay boundary stones etc. The intensity of the conflicts arose were due to various factors like social structure, land use change, hydrology, rainfall, socio-economic status and other related factors. The paper or poster presentation would highlight the typology of conflicts vis-à-vis impact on the benefits realization to poor community with successful and workable solutions emerged with socio-political processes in the basin.

Keywords: Gundar Basin, Irrigation Tank, Tank Association, Inter and Intra tank water conflicts, building consensus, conflict resolution, sustained impact

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Bridging across institutional analysis frameworks: challenges and opportunities

The “Berlin Workshop in Institutional Analysis of Social-Ecological Systems” (WINS) is an international forum that aims at developing a culture of deliberation and discussion on how institutions and governance structures regularize the interaction of human actors that is mediated by linked social and ecological systems, usually employing specific technologies and infrastructure. The scientific communities involved in institutional analysis of such linked social-ecological and social technical systems have often developed their own and sometimes very specific analytical frameworks and use quite different heuristics and languages. This diversity reflects the differences in physical transaction and transformation activities through which humans interact in social-ecological-technical systems (SETS). Specialisation of scientific communities on a limited range of these activities explains the emergence of different analytical frameworks.

Analytical frameworks as research heuristics entail different scientific languages and views on what a SETS is and how it is best analysed. To understand this we must be aware that these research-guiding approaches are developed as the outcome of iterative processes involving interaction between theory and empirical study. Accordingly, analytical frameworks grow from the problems, the intentions and the theoretical and empirical background of their producers. They depend on disciplines and schools scholars belong to, theoretical and empirical process used, the specific object of research interpretative perspectives internalized by the researchers (mental models), and the scale at which analysis takes place. Therefore, in short, analytical frameworks differ in the intentions, meanings and relevance they carry within themselves.

Analytical frameworks with their incorporated heuristics and languages may only have meaning for some research communities and appear to be unreasonable or at least confusing to other research communities that also work on SETS, because they have developed their own analytical frameworks, heuristics and languages in other areas of problem solving, theorizing and empirical work. If this is the case, “generalizing” one analytical framework will only improve the research capacity of the scientific communities addressed, if they find their problems, intentions, meanings and what is considered relevant by that specific community reflected in it.

Instead of assuming that one overarching analytical framework should prevail, which would be a bonding strategy, recognizing the necessity of diverse analytical frameworks, heuristics and

languages is considered a better principle. Accordingly, WINS develops an integrative bridging strategy across scientific communities by involving scholars from different scientific communities and networks pro-actively in a process of mutual and interdisciplinary learning. To this end, it aims to engage with three relevant areas of activity: Integrative Discourses for institutionalising communication between members of the research communities, Interdisciplinary Research based on multiple theoretical and empirical approaches and an Advanced Studies Programme addressing the interests of both junior and senior researchers.

Keywords: Bridging, Institutional Analysis, Social-Ecological-Technical Systems

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Indigenous knowledge sharing and relationship building through narrative storytelling and creative activities

Throughout the human history indigenous cultural stories have been transmitted orally through narrative storytelling, music, art and ceremony. Research suggests that storytelling is at the heart of social and personal identity; whether the story relates to our daily activities or what type of stories the elders share to others (Ahn & Filipenko, 2007). As a result, stories told by the elders are more powerful and meaningful compared to writing or watching a movie. Another reason is that our brains are hard-wired to respond well to repetitive storytelling – this is how we find meaning, sense of connection to the land and immediacy of emotion.

This paper presents the first series of a doctoral research study involving a specific group of Indigenous community in South Australia. This paper imparts on the importance of indigenous people's stories to the current discourse on the role of elders in facilitating and generating interaction among people through creative activities. This discussion has been focus on the role of creative activities in relation to the Ngarrindjeri Weaving and the Welcome to Country Ceremony. The method of research focused on non-verbal exposition where the emphasis was observing the Elders' interaction with the younger people and how knowledge was passed and shared during the weaving and ceremony activities. Using this method creates an effective structure of research that was appropriate in capturing and illuminating live experiences of knowledge sharing situated during creative interaction. These live experiences were captured in photovoice and act as artefact document of human engagement thereby allowing a better understanding of indigenous knowledge sharing that cannot be captured through quantitative measures (Wang, 2003).

Preliminary results are heightened that indigenous knowledge sharing through creative activities is a way to build and maintain relationship for indigenous and non-indigenous communities. In

the course of this research, there is a clear indication that young indigenous participants' literacy learning are heartened from birth and draws upon on oral tradition via storytelling, land-based experiences, art & craft activities and ceremonial practices. This approach to future educational knowledge orientation will be invaluable in improving educational outcomes for indigenous students whose relationship with school retention remain below compared to non-indigenous students.

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Keywords: Narrative Storytelling, Indigenous Knowledge Sharing, Digital Storytelling, Indigenous People, Oral Tradition

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Land Acquisitions, Common Pool Resources and Common Property Institutions: Some Theoretical Reflexions from an Anthropological Perspective

Recent discussions in social anthropology on land acquisitions highlight that we need to go further back in history in order to analyse impacts on local livelihoods. The debate over the commons in economic and ecological anthropology helps to understand some of today's dynamics by looking at pre-colonial common property institutions and the way they were transformed by western colonialisation.

Pauline Peters indicates for Africa that traditional land tenure was misinterpreted as customary tenure without full property, which still poses a legacy. Studies in African Floodplains additionally indicate that before colonial rule local groups developed common property institutions including ownership, use and governance (membership, monitoring and sanctioning) as a complex interrelated web of access to land AND related resources.

These institutions were based on local power relations and crafted in order to buffer risk in the natural and political environment. Understanding their transformations is key to today's land debate.

Keywords: Institutions, Common Pool Resources, Common Property, Land Tenure Transformations, Social Anthropology

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Commons or Boundary?: Negotiating Knowledge and Oysters through Watershed Restoration in Eastern Hokkaido, Japan

The ecological restoration through reforestation and afforestation produces humic substance in soils and enhances balanced nutritional cycle and the overall ecological wellbeing in coastal areas (see, e.g. Matsunaga, et al. 1999). Many coastal communities in Hokkaido (and other parts of Japan) have recently been making reforestation efforts in and near river catchments, and it was coastal fishers who initiated and organized those treeplanting activities. In Akkeshi of eastern Hokkaido, a group of young oystermen started treeplanting and reforestation efforts in the 1990s. Municipal governments have assisted their efforts and now taken major roles in organizing annual tree-planting events, and Akkeshi now has planted over 50,000 trees in nineteen hectares of both private and public lands.

Planting six different kinds of trees, various stakeholders mobilize their social network, and more than 600 people participate in the annual tree planting event every spring. This treeplanting movement in Akkeshi may be seen as a successful case in which scientific and local knowledge is integrated for ecosystem stewardship. However, it is still unclear the ways that different stakeholders interpret, accept, use and mobilize knowledge for watershed restoration. More importantly, how do they assess and perceive the benefits of the treeplanting practice after nearly twenty decades of their efforts, when it probably takes them several dozens of years, if not a hundred, to tangibly recognize the recovery of river catchments?

This paper examines knowledge and the oysters from the concept of commons and boundary, for understanding how stakeholders interpret the changes in coastal ecosystem with their tree-planting efforts. The ethnographic component of this paper revolves around the discourse of reproductive rate, growth and taste of oysters, or ultimately, what makes good oysters. Knowledge is a commons—a shared resource—(Hess and Ostrom 2011), but this paper also examines knowledge as a boundary that differentiates heterogeneous actors. I pay attention to oysters because they are iconic beings that peoples of coastal fishing communities symbolically share and use together, though they are materially private properties of individual oystermen. this paper examines the oysters as a boundary object (Star 2010) to capture the interpretive flexibility among resource users for the continuous collaborative efforts of tree-planting and watershed restoration in eastern Hokkaido.

Keywords: Co-Cultivation, Ecosystem Stewardship, Knowledge, Japan, Watershed

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Policy networks and climate change adaptation in the Lake Victoria Basin: a multilevel perspective

We study patterns of interaction among actors participating in collaborative decision-making institutions designed to increase adaptive capacity to the effects of climate change within the

Lake Victoria Basin in East Africa. Over the past several years, heightened attention to climate change has significantly restructured the policy landscape within the Basin, for example through the creation of new policy institutions, the expansion of some actors' mandates and the growing need for policy-relevant information on likely effects of climate change.

In this evolving institutional setting, adaptation policy outcomes reflect processes such as social learning and cooperation among groups of actors seeking to develop and implement policy. We contend that outcomes are also strongly contingent on linkages between institutions stemming from individual actors' involvement in multiple institutions such as legislative bodies, working groups and steering committees. In these multilevel systems, patterns of interaction within levels (e.g., collaboration between actors) and between levels (e.g., participation by actors in institutions) help reveal the underlying processes that drive policy development and implementation. Yet the ways in which these cross-level linkages shape actor behavior remain poorly understood. Our research addresses this gap.

We collected data through in-person surveys, semi-structured interviews and follow-up web-based surveys with representatives of 148 stakeholder organizations involved in climate change adaptation within the Lake Victoria Basin. Respondents were the climate change adaptation focal persons for their organizations. From the survey data, we constructed a network of linkages among organizations that collaborate to develop or implement climate adaptation policy. We constructed a separate network representing organizations' participation in climate adaptation policy institutions. We draw upon recent developments in statistical analysis of exponential random graph models for multilevel networks to test hypotheses about the processes that drive the structure of the policy networks we observe.

Preliminary results indicate that when collaborating with each other, policy actors predominantly form "closed" network structures associated with cooperative behavior, but their participation in policy institutions tends to create "open" network structures associated with social learning. This distinction highlights the importance of assessing not only linkages between policy actors, but also between actors and institutions. We will also discuss conditional factors associated with collaborative behavior, such as the high tendency for international NGOs, donors, and research organization to work with other international NGOs, donors, and research organizations, respectively, while national government organizations and national NGOs tend to maintain more diverse collaborators.

Keywords: Climate Change Adaptation, Network Analysis, Public Policy, East Africa

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Framing Climate Change in Alberta: Protecting the Commons?

This paper is based on work arising out of the five-year community-academic research project, Alberta Climate Dialogue (ABCD): Deliberative Democracy and Climate Change in Alberta and Beyond. ABCD scholars and deliberation practitioners from across Canada and the world hosted and participated in three public deliberations that engaged citizens across Alberta in informed and reasoned discussions related to climate change policy. Using an action theory

approach that included participants surveys, in- depth interviews, observation and participant journaling, the research conducted by those affiliated with ABCD broadly explored the impacts of the design of these deliberations on the participants and policy outcomes.

Framing was a key design feature that received on-going attention over the course of the deliberations. Be it in terms of the initial contact of potential participants, decisions about the background materials, or design of the process, questions about framing arose with respect to terminology, bias, inclusion of values, role of experts and the media, scope of the deliberation, and role of personal stories. The framings were significant in constructing the phenomenon of climate change, as well as outlining what were considered appropriate responses to it. While often not an explicit focus of the deliberations, nonetheless, the framings also implicitly supported particular institutional arrangements for implementing specific adaptation and mitigation strategies.

Drawing on the work of Hulme, M (2009), Lakoff, G. (2004) and Crompton, T. (2010), I undertake a comparative analysis of ABCD's three climate change deliberations to examine the meanings ascribed to the phenomenon of climate change (i.e., what kind of problem is this?) and identify any mention of institutional governance arrangements that surfaced in how to deal with this global threat. I explore communications about climate change as interpretative narratives that forge connections between specific values and principles with certain public policy choices. While climate change is a problem associated with a global common-pool resource, nevertheless, as remedying the depletion of the ozone layer taught us, the management of such issues does not necessarily result in equitable burden-sharing. Moreover even though deliberative democracy processes are intended to generate inclusive conversations that lead to collaborate strategies, throughout ABCD's deliberations there existed a strong narrative about Alberta as a province whose government strongly supports neo-liberal entrepreneurialism and whose population are often characterized as mavericks, rugged individuals, and fiercely independent. Keeping these tensions in mind, I examine climate change adaptation and mitigation strategies that surfaced across the three deliberations that support feasible pathways for sustainable and equitable management of the global commons.

Keywords: Climate Change, Deliberative Democracy, Alberta, Adaptation And Mitigation Strategies, Framing

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The collective river management based on water transportation culture – A case of Hozugawa River

In modern Japan, rivers are managed by the national and the local government based on the River Law. On the other hand, the traditional water transportation and fishery have disappeared, or the function of the river as play area has being lost due to excessive river improvement, thus many rivers in Japan are far from people's lives and losing social relationships between natural environment and people living based under it.

In this study, we would like to explore the commonality and the changes of people involved in the river transportation, which is on Hozugawa (Katsuragawa) River runs through Kyoto Prefecture, by generations since early modern to the present, and discuss the answer “Whose is the river?” from the point of view of Commons. In the Hozugawa River, log-raft transportation started 1300 years ago, and then the boat has established 400 years ago. During the time various relating entities repeatedly conflicted and adjusted over the river transportation, the lowest workers as raft masters and boatmen gradually established their legitimacy, by constructing their own techniques that go down choke points on rapids, the advanced river route management technology, and a unique rotation system to build completely equality. In addition, the Hozugawa-kudari boat trip service at present, which had experienced labor dispute with major capitals, assembled the autonomy of the organization by adopting the only cooperative association system in Japan. Under these backgrounds, “wise use” of the Hozugawa River is defined, and as a result, environmental conservation functions were increased and distinctive rich ecosystem has been brought up. However, after the World War II, raft trip was to the end and the boat was completely transformed into a tourist attraction. Furthermore while the legitimacy of raft masters and boatmen was being lost, the government influenced very strongly by a huge dam construction and its compensation. Against this backdrop, in recent years, issues such as deterioration of river environment involved drifted litter, and loss of traditional river transportation culture have occurred. These issues cannot be solved by the administrative agencies only. The existence of boatmen of course, and the citizen’s support are indispensable. Therefore, when the Hozugawakudari had a 400-year anniversary in 2006, a new framework was constructed by boatmen involving companies, NGOs and local government, and a new effort toward river environment conservation and river transportation culture have started.

Why local residents commonly use natural resources? Intuitively, it is considered to be communal use and management rationality. Also to be a role to ensure the survival foundation as a safety net of community. Or even if there were without the economical rationality, the Commons is maintained with the consciousness such like local residents’ attachment to home and respect the local tradition. In this study, we discuss the reason why the Commons is maintained, the definition in the community and sustainable use and management of natural resources through the relationships of the people around Hozugawa River.

Keywords: Commons, River Management, River Transportation

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How rights of public access affect performance of ecosystem services?

This study focuses on institutional aspects which may determine quantity and quality of ecosystem services and especially investigates empirically rights of public access which allow any people not only land owners to enjoy some benefits from ecosystem to some extent. To overlook institutional situation of various countries, they can be categorized in three types roughly. 1) Full public access situation; not only passing through but also collecting NTFPs (non-timber forest products) or other minor natural resources is allowed to public, 2) Limited public access situation; only passing on foot or by other measure is allowed to public but

collecting NTFPs or so is only allowed to land owners, 3) Non public access situation; anything is never allowed to public other than land owners. Then, the ability of each field of ecosystem service, i.e. provisioning services, cultural services and regulating services, is estimated according to public access rights situations above respectively. Under the full public access situation, people can gain high level of both provisioning and cultural services. Under the limited public access situation, people can gain high level of cultural services. Under the non public access situation, people can gain only low level of any ecosystem services. Further, from a case study on NTFPs collecting under the full access situation in Japan, it is shown that full access situation may derive a synergy effect between provisioning services and cultural services. Although open access situation has been often regarded as a vice custom in terms of resource management, but it is thought to be worthwhile to reconsider in terms of enhancing performance of ecosystem services.

Keywords: Rights of access, Ecosystem services, Open access, NTFPs

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Negotiating the tricky terrain of Indigenous rights, markets and the notion of the Commons, or, if water belongs to no one, why are we sending shiploads to China?

This presentation draws on recent debates in Aotearoa New Zealand regarding the ownership of water and the extent of Maori customary rights to examine the debate around Indigenous relationships to water and widely accepted conceptions of the commons from a decolonizing perspective. In challenging common conceptions of the commons, including those of ... we will draw on theorists of settler colonialism and intersectional politics.

Keywords: Indigenous customary rights; Maori; commodification; decolonizing; intersectional theory; cultural politics

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Leadership, control mechanisms and networks for sustainable fishing

This article is about regulatory compliance to improve the conditions of Mexican fisheries. By incorporating theoretical arguments from the neo-institutionalism and the social capital approaches, the findings of this research point to the role of fishing cooperatives' structural organization on the attitude of individuals to comply with regulations. It was found that fishers with higher scores of compliance belong to cooperatives that have an outstanding leader, control mechanisms, as well as multi-actor external networks which connect the organization with other networks, facilitating the access to knowledge, technology and activities related to conservation and sustainable fishing. The research findings may help in the design of strategies

to address situations with low state capacity to ensure compliance and contribute to solve problems of commons, such as the one in marine fisheries.

Keywords: Common Goods, Illegal Fishing, Regulatory Compliance, Leadership, Control Mechanisms and Networks

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Do economic incentives drive collective behavior to govern the commons? An assessment of Ecuador's Socio Bosque program

The proposed paper examines the impacts of Ecuador's payment for conservation program on local governance and land-use behaviors on communal lands. Over the past decade, Payment for Environmental Services (PES) has emerged as a prominent tool to promote ecosystem conservation. Originally conceptualized as a market-based tool in which a buyer pays a seller to provide a specified environmental service or activity, when implemented in less developed countries, it is uncertain how the PES model corresponds to the management structures and decision-making models of the rural poor. Of particular concern is how PES operates in common-property settings found in many rural areas of Latin America and Africa.

We have limited empirical knowledge of the relationship between PES, the development of local land-use institutions, and individual behavioral change. Work in common-pool resource management demonstrates the challenges involved in crafting communal management institutions as participants must organize, negotiate, create, and ultimately apply a rule. While some PES scholars suggest that payments may thwart intrinsic motivations to collectively manage a resource, others suggest that PES may strengthen collective action for resource management.

We provide empirical evidence to this debate by analyzing the results from a study of Ecuador's Socio Bosque payment for conservation program implemented on communal lands. The study uses a quasi-experimental design to assess the additional benefits with respect to collective resource management, and individual land-use behaviors. Data was gathered in the Ecuadorian highlands from 2012-2014. Data include (1) a survey of leaders in 67 communities (44 participant and 23 non-participant); and (2) 420 household surveys conducted in 12 community case studies. We use bivariate statistics and a multivariate model (logit) to assess the impact of the PSB program on communal governance institutions and individual behavioral changes. Preliminary analyses suggest that the Ecuadorian payment program is strengthening the creation of land-use rules. It is uncertain the degree to which the rules and associated payment structure are changing individual land-use behaviors.

Keywords: Payment for Environmental Services, Collective Action, Governance, Policy impact, Latin America

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The Kotsunagi Archive: from legal disputes on the commons to large-N analysis of Commons in Iwate Prefecture in the Twentieth Century

Villagers of Kotsunagi in Iwate Prefecture in Japan fought a famous legal battle over the span of four generations to recover their lost commons; the courts have assigned the case to mediation, with negotiations currently at a stalemate. During the struggle many citizens and scholars from around the nation formed a support group, called Iwate Kotsunagi no Kai [Supporters of Kotsunagi in Iwate]. In 2003 our group established the Kotsunagi Archive [Kotsunagi Bunkō] to collect, preserve and study historical documentation on as many of the Commons [Iriai] in Iwate as possible, which also required that we persuade Japan's courts not to discard records from completed court cases.

Our group aimed to gather documents on the commons in Iwate, and especially on disputes about the commons, as comprehensively as possible, to elucidate the actual variety as well as the shared features among all these cases from many points of view. We are also entering the results of government surveys of the commons into a database, which we will augment with material from the Kotsunagi Archive. In some cases the Kotsunagi Archive includes documents produced by the protesting commoners themselves, their arrangements with lawyers, and their thoughts after particular developments or events; thus the archive can actually illuminate the ways in which the experience affected their thoughts about protest, rights, and environmental management. We are presently working on the government's nationwide survey of 1911, which in Iwate Prefecture alone examined 275 units of common [Iriai] lands, subsuming a total area of 110,478 hectares of commons. This survey was detailed enough to include inquiries about rules for managing resources, the user groups, income from the commons, and the local economy. This survey did not examine all of the commons in Iwate at that time, but we have reason to believe that there were approximately 600 commons in Iwate in the late 19th century, which suggests that the survey sampled almost 50% of the available commons. These commons were lands that were not merely used in common but were actually owned jointly either by villages (村有) or by the hamlets within villages (部落有) – in Iwate. This survey is the only one done on hamlet-owned and village-owned commons over a 140 year period of modern Japanese history that will allow us to deduce the real figures for total common land (by adding two additional categories of commons -- state-owned commons (国有地入会) and commons nominally registered as the land of individuals (名義個人有入会地) with an additional legal agreement on file stipulating that these individuals are simply representing the community of customary owners. Insofar as the Kotsunagi Archive and other records permit, our plan is to trace the history of every Iwate case that appears in the 1911 survey for which we have archival documents before and after the 1911 survey date, and to build a secure and reliable database useful for many kinds of quantitative and qualitative analysis.

In this paper for Edmonton we will offer examples of the legal disputes to be included later in the database we are now building, as a prerequisite for large-N analysis.

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Causes and Consequences of Resource Shortage on the Japanese Commons in the early 20th century

As in most countries with commons that go through industrialization, critics of the commons in Japan also viewed the existence of commons as antiquated and inconsistent with capitalist economic development. Some critics in Japan and elsewhere also argue that the commons inevitably become neglected and degraded, just as Garrett Hardin would have predicted. The Japanese government itself was one of these critics, but in addition to issuing policies intended to undermine the existence of commons, it also surveyed the commons periodically. In conjunction with the national government's policy to amalgamate the commons taken from former rural communities and convert them into the property of newly created municipal governments in 1911, the government also conducted surveys to promote this policy of unification from 1911 to 1930.

As part of a much larger national survey, Iwate prefecture conducted a detailed survey of 131 commons in 1911 at the request of the chief of Japan's Forest Department. The survey records the location of the commons resource, the locations and sizes (numbers of member households) of user groups, the history of resource use for each commons, the amounts of harvests, community restrictions on resource use, conditions that the community establishes for awarding and confiscating use rights from individual members, the state of the resource, and more. Some commons were used by one user group and some were used by two or more groups. Almost all of the user groups were rural communities that had exercised these common rights since the Tokugawa period (that is, since well before the middle of the 19th century).

We used the data from this 1911 survey in Iwate to see if people actually did report shortages of the resources on the commons and to find out if there was any link or mechanism by which experiencing resource shortages might be related to making rules and creating restrictions on use of the resources. Our idea was that a community experiencing shortage while it was failing to apply restrictions on use might then resort to creating more restrictive rules on the commons. (For now, we doubt the unlikely possibility that making rules to restrict harvest would somehow cause an angry backlash and thereby actually stimulate the resource degradation that we suspect restrictions were devised to prevent, but as we create time-series data out of these several government surveys, we will be able to test for peculiarities such as this one.) We found that shortages and restrictions varied, depending on whether the resource was used by a single user group or by multiple groups. Commons with multiple user groups were more likely to institute restrictions than were commons used by just one community. In

85% of the commons used by multiple user groups, the users had encountered shortages and had established some sort of restriction on the users. On commons with single user groups, we found restrictions in only 59% of the cases, and we did not find a relationship, negative or positive, between the existence of restrictions and the occurrence of resource shortage. We hope to look further into these data as well as accompanying documents from the Kotsunagi archive to understand the relationship between shortages and creating rules on the commons.

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The Evolution of Policy-Relevant Beliefs and Advocacy Coalitions in Southern Alberta Water Governance

This paper addresses one of the factors often overlooked in analyses of social-ecological systems: the role of actors' beliefs in shaping resource governance. It does so by focusing on water governance in Alberta's portion of the South Saskatchewan River Basin over a period of almost 30 years, from 1978 to 2005. Water governance during this period went through a significant change, from an emphasis on hard, supply-based water governance to a much softer, demand-oriented form of governance utilizing such policy instruments as water licence trading and water conservation objectives. Using the Advocacy Coalition Framework (ACF) as a theoretical foundation for the analysis, the paper documents the changing policy-relevant beliefs and advocacy coalitions prevalent in the subsystem throughout the period of analysis. It does so through a qualitative content analysis of stakeholder submissions during water governance public consultation processes in 1978, 1995, and 2005. What emerges is a policy subsystem in transition, from a prolonged period in which an irrigation-based advocacy coalition (labelled the 'Aggies') monopolized the subsystem, to a period in which the Aggie coalition is challenged by an increasingly powerful environmentalist advocacy coalition (labelled the 'Greens'). The rise of the Greens coincides with most of the major water policy reforms introduced in southern Alberta, and is posited as an important factor in southern Alberta's shift in water governance. Ultimately, the paper lends credence to the notion that ideas and policy-relevant beliefs should be given more attention in the governance of social-ecological systems.

Keywords: Water, Advocacy Coalition Framework, Alberta, South Saskatchewan River Basin, Policy

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A cultural evolutionary model of crop disease prevention in a networked social-agroecological system

Crop diseases play an important role in the economic and environmental sustainability of social-agroecological systems. Crop disease prevention involves a cooperative dilemma to the extent that a particular farmer's use, or lack thereof, of a preventative practice influences disease incidence on a neighboring farm. The degree to which such spillovers occur is a function of both the biological and social particulars of a given disease context, including pathogen dispersal rates, landscape and social connectivity, and the individual and social

learning strategies farmers use to guide their decision-making. Here we use a cultural evolutionary, agent-based model to examine disease incidence, as a result of some of these important biological and social parameters, including the costs and benefits of disease prevention, the risk of future infection, the degree to which disease prevention embodies a cooperative dilemma, landscape and social connectivity, and the specific individual or social learning strategies farmers use to guide their decision-making. Our model makes explicit two aspects of a cultural evolutionary perspective that enhance the ability of sustainability science to inform our understanding of the commons: 1) a dynamic account of cultural change and 2) biological and social interactions across multiple scales. We thus highlight the potential of a cultural evolutionary perspective to inform established approaches in both plant pathology and sustainability science more generally.

Keywords: Social-Ecological Systems, Agriculture, Sustainability, Cultural Evolution, Agent-Based Model

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Climate Change Adaptations through Collective Reconstruction: Case of Jharkland in India

Annual rainfall pattern has adversely affected the agrarian economy of the state of Jharkhand in India. Jharkhand consists of two plateaus viz. Chotanagpur and Santhal Paragan including Rajmahal hill. The state used to receive 1200 -1400 mm annual rainfall. Ninety percent of this rain used to be received during 80-90 effective rainy days during June to October. During past ten years, situation has changed abruptly. Annual rainfall has come down to 800-1200 mm and effective rainy days have reduced to 45-55 days during June to October. Economically Jharkhand stands among three bottommost states of India in terms of poverty index. Agriculture has seriously been affected by changing rainfall pattern. This has resulted in farming class being converted into non farming wage labour. To tackle these challenges, under Mahila Kisan Swashakti Project (MKSP – Framing Women Self-empowerment Project), forty four SHGs are formed having around 450 women members in a community development block Bero located in Chotanagpur plateau of Jharkhand. The project was coordinated by a NGO Asian Institute For Sustainable Development (AISD). These women have initiated many climate change adaptations like System of Rice Production (SRI) in drought prone area, growing low water requiring millets, pulses and oilseeds and reviving Lac cultivation which was discontinued during past 10-15 years. Mutual labour help was organised by SHGs during paddy transplantation and weeding and also during Lac cultivation has been the key factor in spreading and popularising these adaptive changes. MKSP is expecting around 30-50% annual income enhancement for farming household during first 3-4 years. This paper discusses the process of group mobilisation and equipping women farmers to adapt climate change coping mechanisms and inter group knowledge disseminations. Paper also shares the process of collective action reconstruction in the face newer challenges, community interactions with

technical and economic interventions and linkages and offsetting social and economic disturbances.

Keywords: Climate Change, Collective Actions, Resilience, Women, India

Revisiting the Participatory Watershed Development Programmes of India

Participatory watershed development (PWD) has attracted most popular investment from development agencies and international donors during last two decades. The logic behind such investment lies in a promise to satisfy agenda 21 of earth summit held in Rio. Commitment of Rio summit was further reiterated in Johannesburg summit. During 1993 – 2000, an estimated US \$ 13 billion was spent for PWD in developing countries. Enthusiasm was so high that virtually all major development organisations had promoted hundreds of community oriented PWD in Asia, Africa, Australia, Europe, North and South America. Agencies as diverse as World Bank, DFID to the smallest local NGOs in developing countries have promoted PWD paradigm under different banners. India, China, Philippines and Indonesia have large domestic programmes aimed at watershed management. In Australia, Integrated Catchments Management (ICM) is being promoted as a strategic stakeholder oriented approach for natural resource management. In New Zealand, the parallel framework is Integrated Systems for Knowledge Management or ISKM. In North America, PWD approaches have virtually replaced the more conventional approaches to watershed management.

Despite this flood of interest and outpouring of funds, however, strong evidence indicates that well intentioned development agencies and specialists are venturing into unknown theoretical and management territory. The complexity and ambition of multi-purpose, multi-scale watershed approaches makes success elusive even in the best of circumstances. Project implementers have to manage an organisational complexity hitherto unheard of in their fields. In addition, co learning methods and information network are needed to deal with plural stakeholders with conflicting goals operating at different scales over time and space. This article critically examines some of conceptual and operating issues for the purpose of working out viable strategies for future projects and programmes particularly in Indian context. Four questions will be explored in the search of lessons learned and offer new directions for PWD:

1. What is the comparative advantage of participation in watersheds?
2. Did PWD suffer from methodological weaknesses?
3. How can an appropriate balance between interests of stakeholders at a local level be achieved and how can the interests of the poor be represented?
4. How can the capacity of individuals and organisations at all levels be raised so as to enhance the qualities of implementations of PWD?

Paper also reviews the fate of 1994 guidelines for watershed development and successive government policies. It is found that PWD implementation although has been successful in several places; has elicited less participation in most government projects.

Keywords: Watershed, Participatory Development, Tribal, India

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Power and Power in Use: Fisheries Co-management in Tam Giang Lagoon, Vietnam

Co-management is a management strategy of choice for managing common pool resources, yet the practicalities of introducing it in developing countries are not well understood. Tam Giang lagoon in central Vietnam is an example of an open access common pool system undergoing a transition to co-management. Fisheries co-management in Tam Giang lagoon was initiated by external agencies and built up through a bottom-up approach under the support of co-management consultants. In 2009 the first territorial use rights for fisheries (TURF) in Tam Giang lagoon and also in Vietnam was allocated to a fisher's organization (Fishery Association) by district government. This process of allocation of managing powers then was expanded to another 33 out of 64 Fishery Associations in the lagoon. Along with TURF, fishers were granted with some power in management of lagoon resources. This paper examines the powers that fishers nominally hold and actually exercise in fisheries co-management in Tam Giang Lagoon, Vietnam and the factors preventing fishers from exercising their power in fisheries co-management. The paper starts with an analysis of the policy context supporting decentralization of powers from governments to fishers in Vietnam, and continues with an analysis of fishers' powers and their exercise of the powers based on (Agrawal & Ribot 1999)'s three types of power: legislative, executive and judicial. We find that power sharing between government and fishers is intended in the design of fisheries co-management in Tam Giang Lagoon, but in practice fishers are unable to exercise the shared powers due to lack of legal support and the influence of other policies at higher levels of government. The bottom-up approach for arranging co-management without adequate connection to a higher level results in a legal mismatch between co-management rules and national regulations. In addition, national policy systems have not kept abreast of the changes in fisheries management systems at local level and make them unsupportive to co-management. We suggest that policies need to change at the national level to fully support a co-management system and to make fishers' exercise of powers feasible.

Keywords: Power, co-management, decentralization, TURF, fisheries management

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Problems and Opportunities of Informational Governance in the European Seas.

Many European Union member states are involved in fish quota swapping, which is the practice of exchanging quotas assigned to Member States across country borders. Quota swaps (QS) are occurring since 1983, and have increased ever since. Although the practice of exchanging quotas across country borders is not new, the increasing use of information technology is a recent development. In the Common (EU) Fisheries Policy reform of 2002 it was stated that fisheries policy should become less centralized (CFP, 2002). In line with this development, the initiative for quota swapping by the fishing sector increased the last 10 years. Before that period governments mainly initiated the swaps. Now these quota swaps rely on formal and informal processes of information exchange between individual fishermen, fishermen organizations and (supra-) national governments. Although this information exchange plays an increasingly crucial role in efficient exploitation and sustainable governance of marine resources, little is known about these informal information exchange processes.

In the analyses of how changing information impacts on resource management in the context of quota swapping in the European Seas, the research project Informational Governance; Virtual Quota swaps (IPOP IG VQS of Wageningen UR) project is directed towards several questions, here in this presentation the focus will be on:

- How does informational governance affect multi-level European fisheries policy making and fishermen's behaviour?
- What is the role, potential and problems of informational governance in the European Sea context?

The scales or levels range from EU level-to Member state level- to groups of fishermen level and to the individual fishermen or entrepreneurial level. Although there is one EU fishery policy, every member state has its own way of governing their fish and fishermen. Some Member states have a state oriented style of governance like France and Belgium, while others have a more co-governance approach like the UK and the Netherlands. In the latter this governance style is mixed with market style governance. These different governance styles have consequences for attitudes towards fish quota but also towards information flows and the degree of participation. What are these consequences? What problems are occurring in relation to coherence, equity and transparency issues?

Keywords: European Seas, Equity, Informational Governance, Quota Swaps, Transparency

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Carbon economy of the commons: biochar-based Bioenergy System in Ontario (POSTER)

Bioenergy is widely considered as a carbon neutral solution for the current environmental crisis. The use of biomass feedstock for energy generation not only has the potential to address the environmental problems related to air pollution and climate change, but also ensures energy security for local communities. Biochar is a by-product of bioenergy that can sequester carbon

for longer time if applied in soil, which is claimed to be carbon negative in the life cycle. Fossil fuel related emissions are often considered to be one of the biggest contributors of current environmental crisis including greenhouse gas (GHG) emissions and subsequent global warming. Fossil fuel makes a significant proportion in the current power-supply-mix in Ontario. In order to reduce GHG emissions from coal fired power stations, the province of Ontario has phased out coal firing plants and replaced these with forest biomass plants. We conducted a thorough life cycle assessment (LCA) of biochar production and land application using SimaPro® Ver. 8.0 to assess the energy consumption and potential environmental impact within the system boundary. Results show that biochar land application consumes 4847.61 MJ per tonne dry feedstock more energy than conventional system but reduces the GHG emissions by 68.19 KgCO_{2e} per tonne of dry feedstock in its life cycle. Biochar land application improves ecosystem quality by 18%, reduces climate change by 15%, and resource use by 13% but may adversely impact on human health by increasing disability adjusted life years (DALY) by 1.7%. The LCA results of bioenergy production when compared with conventional energy production for GHG emissions and other environmental consequences show that replacing fossil fuel with woody biomass has a positive impact on the environment. LCA results are further analysed in life cycle cost analysis (LCCA) and a case study of the carbon economy is presented.

Keywords: Biochar, LCA, Bioenergy, Ontario, Carbon

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Social Practices of Knowledge Mobilization for Sustainable Food Production: Nutrition Gardening and Fish Farming in the Kolli Hills of India

Concerns about food security are growing around the world, precipitated by climate change, resource degradation, a growing population and increasing income disparity. In India, food insecurity is high in many rural farming communities, especially among isolated tribal populations. In this study we examine how knowledge about sustainable food production is acquired and mobilized among small-scale farmers belonging to the Malayalis Tribe, who reside in the Kolli Hills region of Tamil Nadu, India. We focus on nutrition gardening and fish farming, two production practices recently introduced to alleviate poverty and malnutrition in the region. Using qualitative participatory rural appraisal methods, we explored ways in which farmers are accessing, using and sharing knowledge about these practices, and barriers to equitable access. We also asked farmers what information is still lacking about these practices and what mechanisms could be put in place to improve access. This research revealed that participants in both nutrition gardening and fish farming rely primarily on external experts (non-governmental agricultural research and extension) for formal training (e.g. workshops)

and advice, despite a long history and traditional knowledge of gardening and river fishing. Agricultural knowledge is also mobilized within the region less formally between individuals and households through face-to-face contact or verbal communication via mobile phones. The use of additional communication technologies (e.g., computers) to enhance access and mobilization of knowledge was perceived to be most relevant and beneficial for young, educated people.

Keywords: Sustainable Food Production, Knowledge Mobilization, Social Practices, Formal and Informal Knowledge, Information and Communication Technologies, Fish Farming, Nutrition Gardening, Kolli Hills, India

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What Promotes Community Collective Action? Qualitative Analysis of Community Forest Management in Cambodia

Community-based forest management, also known as community forestry (CF), is now widespread all over the world. However, performance of CF varies depending on the CF communities. Using eight CF communities in Siem Reap Province in Cambodia as a case study, I will demonstrate mechanism of community collective action in community forest management in the form of participation in community forest patrolling, attendance in CF-related meetings, and the imposition of sanctions against offenders. In particular, role of existing social capital such as social networks, cooperation norms, and trust among CF members in promoting the community collective action will be highlighted. Cambodia experienced tragic violent armed conflicts for over twenty five years, and the conflict decreased social capital among members in the community, which can be a potential resource for the promoting community collective action. I will also explain the importance of other factors in promoting community collective action such as leadership of CF management committee, CF members' needs of forest resources, CF members' awareness about forest degradation, and assistance of local forest department and donor agencies.

Keywords: community forest management, collective action, social capital, Cambodia, CF community

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Developing a Social Political Decarbonisation Pathway to Protect Our Global Atmosphere Commons

In the fall of 2014 a Deep Decarbonization Pathway Project (DDPP) report, funded by the UN and managed through the Sustainable Development Solutions Network (SDSN) was presented. It offers an optimistic and technically feasible pathway for 15 of the highest carbon emitting countries to take by 2050 to reduce greenhouse gas emissions and keep the global temperature below the critical 2 degrees threshold required to avoid the worst climate change scenarios from occurring. It is assumed that the DDPP will have a major and positive influence on the climate negotiations in Paris at the end of 2015.

This presentation will give a brief overview and critique of the implications of this proposal. It will present an inquiry into the need for co-constructing an equally necessary social and political pathway that is both centralized and decentralized to implement this pathway. Without this pathway for collective action, only a techno fix seems to be offered. At present the DDPP presents a picture of what can be done but not of who or how this very necessary but rapid transition will occur in a society that is still deeply embedded in an economy based on privatization and enclosure. This inquiry includes Ostrom's concepts of collective action and her eight principles of sustainable governance of common pool resources.

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Keywords: Social Decarbonization Pathway, Collective Action

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Individual risk, Collective Rationality and Commons use: a theoretical debate

Beck (1992) explained that that individual risk perception mostly draws inspiration from the positivist approach. This perception is heavily dependent on natural science's methods and tools, yet it also delves into social science, psychology, economics and other empirical quantitative studies of social phenomena. The central idea of an individual perception of risk is that it believes that this method helps to calculate the probability of risk. Beck's analysis of risk was largely focused on the reflexive modernity approach of modern industrial capitalism. Modern capitalism has redefined the use value of common pool resources in a big way.

Hardin (1968) defined that, every addition to the commons was influenced by somebody's personal liberty. The modern liberal democracy is all set to defend the personal liberty of the individual and such person's liberty is the deciding phenomena of risk perception. The critical concern is that the individual perception towards reflexivity of modern industrial capitalism seldom works towards preserving commons. The individual choices to make use of the commons indeed question Beck's theory of risk perception. These two theoretical models put individuality upfront on decision making and individual perception of utility as the deciding factor. The rational choice of individuals does not have common existence in these two models.

Hardin's model puts the individual rational choice as a destructive force which neglect the ecological importance of natural resources, and Beck model explains how the individual perceives the impact of such destruction. This paper attempts to explore this theoretical debate in detail with the help case studies.

Keywords: Individual Risk, Collective Rationality, Commons, Liberal Democracy, Rational Choice

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Between a business and a social enterprise: the Norway House Fisherman's co-op, northern Manitoba, Canada

Fisherman's Co-op in Norway House Cree Nation (NHCCN) deals with the fine line between fisheries as a regular business and fisheries as a social enterprise. Fisheries as a regular business enterprise would focus on maximizing fish catch and profit, following government regulations (e.g., the quota system) and generate employment. Fishing as a social enterprise would address multiple objectives, both economic and social. It would focus more on social benefits than just profit maximization. A social enterprise may address the community's various needs, including food security and Cree cultural values of sharing. Commercial fishers in the Co-op are not allowed to sell fish directly to the market; they have to sell through the Freshwater Fish Marketing Corporation (FFMC). Fishers bring their catch to the Co-op and FFMC buys fish directly from the Co-op. Can a commercial fishery act like a social enterprise? For example, it is a challenge for Co-op fishers to deal with wastage of fish that the quota system inevitably produces. That is because any over-quota species and the incidental catch (by-catch) have to be discarded. However, some fishers are able to bring in the fish to share with family and friends (they just cannot sell them). Partly as a result of this sharing, the level of food security in Norway House is higher than in many other northern communities. However, they can do even better. If fishers are given incentives by the Co-op to bring back more of the by-catch to the community for sharing, it would further reduce wastage on one hand and increase community's food security on the other.

Keywords: Social Enterprise, Fisherman's Co-Op, Commercial Fisher, Food Security, Sharing

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Traditional Ecological Knowledge on wildlife as a subsidy for Ecosystem-based Management in Brazilian protected areas

Ecosystem-based Management (EBM) has been a widespread approach focusing management actions on maintaining a healthy, productive and resilient ecosystem, particularly in protected areas. Despite success in other countries, this approach is poorly studied and rarely used in Brazilian protected areas (PA) – most of them showing conflict between traditional people (e.g., Caiaçaras) and PA managers due to these people use of natural resources, such as wild animals. Although hunting is prohibited in most part of Brazil, it may be allowed within sustainable-use PA, if managed to ensure both resource conservation and people subsistence. In this paper, we explore the use of Traditional Ecological Knowledge (TEK) of local communities as a subsidy to develop EBM focusing on wildlife within PAs in Brazil. We carried out semi-structured interviews with 39 residents and four local experts from a Caiaçara community living within a PA in the Atlantic Forest of southeastern Brazil in order to understand their use and knowledge of wildlife. We also carried out semi-structured interviews with 10 managers and staff of this PA to assess their willingness to take TEK into account an EBM plan. The community has its own management system, known and respected by the locals, in which hunting is allowed only during winter months (March to July), when game is fat and not reproducing. Caiaçara often leave fruit in the woods to fatten the animals during the winter. Their main interests in wildlife include a source of food, medicinal use and as Pets. Conflicts emerging from wildlife inside Caiaçara communities relates to disturbances of vegetable gardens, consumption of domestic animal and human fear. Based on the prevalence of use and conflicts 10 species were selected to further explore TEK related to them for EBM. These include: the mammals paca (*Cuniculus paca*), agouti (*Dasyprocta leporina*), opossum (*Didelphis sp.*), armadillo (*Dasyprocta sp.*), coati (*Nasua Nasua*), deer (*Mazama americana*), collared peccary (*tajacu peccary*), monkey (*Sapajus nigritus*) and ocelot (*Leopardus sp.*); the birds guan (*Penelope obscura*), macuco (*Tinamus solitarius*), toucan (*Ramphastos sp.*); and the reptile tegu lizard (*Tupinambis merianae*). Seven out of the ten PA staff interviewed believe TEK is an important factor to consider for management; they also understand that it is necessary to make new management arrangements and provide alternatives to hunting for local communities in order to ensure the wildlife conservation and local livelihoods. Main suggestions for management include formalize local Caiaçara hunting rules through legal agreements; create other necessary rules under a systemic view; clearly define species that can be hunted and those that need conservation measures or population studies; and propose participatory community monitoring, using the community as partners in protecting animals from other threats such as poachers and wildlife traffickers. Wildlife uses and conflicts in Brazilian PAs are real issues and cannot be neglected. Our study highlights TEK relevance in providing critical information for EBM in protected areas in Brazil.

Keywords: Terrestrial vertebrates, Conservation, Hunting, Local Knowledge, Caiaçara Community, Brazil

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The Political Dynamics of Nature Restoration: Law, Local Knowledge, and Commons in Japan

This paper seeks to document local knowledge and practice that have contributed to the sustainable governance of river catchments. Through ethnographic fieldwork in the Kushiro region of Hokkaido, this paper will look at the ongoing efforts among government officials, experts, nongovernmental organizations, and local people to restore and protect various ecosystem services in the Kushiro Wetland. The government enacted Law on the Promotion of Nature Restoration enacted in 2002, and standardized the way in which nature should be restored and protected across the country. With the goal of achieving the sustainable use and management of the Wetland's ecosystem services, the law established the Kushiro Wetland Restoration Committee in 2003 which consists of government officials, experts, nongovernmental organizations, and local people. Through an analysis of the collaboration between government and community in the restoration of the Kushiro Wetland, this paper elucidates a) how the interests of the state and community come to an agreement, and b) how policy/scientific knowledge and local knowledge are brought together, in order to c) achieve the protection and restoration of the natural environment. This research, by examining the process that takes a river catchment community from a) to c), will contribute to the institutional arrangements required of a sustainable management of a commons.

Keywords: Rivers, Commons, Environmental Governance, Local Knowledge, Japan

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Potentials and historical process of new forest commons from fishers' initiatives in Japan

Loss and deterioration of forests have occurred especially in the depopulated areas of Japan due to stagnation of the forestry industry. As a consequence of forest degradation and its land conversion, there are growing concerns about weakening roles of forests to act as a variety of environmental functions, thereby requiring proper conservation and management of forests.

With this recognition, this paper highlights an evolutionary process of creating new forest commons from fishers' initiatives in Japan. Forests exist not in isolation but are interdependent to the broader ecological-social-economic system in which fishery resources are present. The research introduces a historical approach for forest plantation at the base of fishers in Japan by illustrating the movement of fishers-based forest conservation as well as by analyzing the data of plantation activities from all fisheries cooperative societies at the regional and national levels during the period from 2001 to 2012.

In the former, the study classifies new forest commons from fishers' initiatives into four groups which are likely to be interrelated: (i) customary forest management, (ii) asset building, (iii) plantation movement under the banner of fisheries cooperative societies and (iv) support programs related to forest conservation by other stakeholders. Historically, their initiatives have been evolved for forest management over the hundreds of years dating back to the 17th century at least, called as fish-breeding forests or 'Uotsuki-rin' in Japanese. Although the scientific relationship between forests and fish productivity has not been sufficiently understood, fishers in many parts of Japan had a special interest in environmental functions of forests for stable fish production. On the other hand, afforestation in response to the past growing demand for wood were triggered by asset building to make money and enhance land value of real estates in

some areas. However, there is a tendency to change their attitudes from economic to environmental incentive as a result of a decline in environmental functions that forests perform. Accordingly, coordinated efforts of plantation activities have been made by the initiatives of Hokkaido Association of Fishery Cooperative's Women's Groups since 1988, expanding the activities at the national level in collaboration with various stakeholders especially by using government support programs.

In the latter, the study develops the whole picture of fishers-based forest conservation in which fishers were involved, in terms of numbers of plantation activities, the hosts and land ownership and contents of forest management in Japan. It reveals that their initiatives differ from place to place particularly between Hokkaido and other areas, but the fishers tend to collaborate with relevant stakeholders in various ways. Based on these findings, this paper provides new insights on illustrating the historical and on-going process of creating the new forest commons from fishers' initiatives and clarifying major challenges related to their initiatives toward long-term sustainability.

Keywords: New Forest Commons, Fishers-Based Forest Conservation, Environmental Functions Of Forests, Collaborative Partnership

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Collaborative Research and the Integrated Cooperative Model in the Context of the Commons: Promise and Praxis

Linking research on cooperatives with theory and reflection on the commons suggests new avenues for understanding the development of decentralized, but collective forms of production, distribution and marketing. Further, interpreting collaborative university-university-organization-community research within the context of the sociology of the commons can offer insights into developing an intellectual commons across cultures and organizational forms. We propose a session that will explore the conceptual support that perspectives on the commons can offer a collaborative project on cooperative development. This session will cover the conceptual context and initial findings of an IDRC- funded project in Uganda, Tanzania, Rwanda and Canada.

- 1) Sharing Knowledge; Collaborating Across Cultures and Organizational Forms—Lou Hammond-Kettilson, Suleman Chambo, and Johnny Mugisha
- 2) Cooperative Rural Development through Public and Common Goods—JoAnn Jaffe, Terra Brockett, and Bernard Oba
- 3) Building Cooperation, Community, and the Commons through Collaborative Research—Cindy Hanson and Adeyemi Ogunade
- 4) Considering Gender and Other Social Cleavages in the Context of Cooperative Development—JoAnn Jaffe, Cindy Hanson, Esther Towo, Vincent Rutaremara, Java Semana, and Diana Namwanje

Keywords: Cooperatives, Africa, Collaborative Research, Gender, Livelihoods

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Using agent-based models to compare behavioral theories on experimental data of irrigation games

Behavioral experiments have demonstrated that people do cooperate in commons dilemmas. The traditional theory of selfish rational behavior is clearly falsified. However, we lack agreement on alternative formal models to explain the observations in the lab and beyond. We will use agent-based models to compare alternative behavioral theories on a series of experimental data of irrigation games. The irrigation dilemma captures situations where farmers at the tail-end or head-end can experience differences in influence on the collective action problems related to the maintenance of the irrigation system and allocation of water (Ostrom and Gardner, 1993). Anderies et al. (2013) and Janssen et al. (2014) use irrigation experiments to systematically vary the biophysical complexity to better understand governance of irrigation dilemmas. The fundamental problem facing irrigation systems is how to solve these related collective action problems: 1) provisioning for the resource, such as in building and maintaining physical infrastructure, and 2) the asymmetric common-pool resource dilemma, where the relative positions of resource users at the head and tail of the system generate asymmetric access to the resource (Ostrom and Gardner, 1993). The set of experimental data we will use differ in the way participants are able to communicate and vary in the disturbances they experience. This led to significant effects on the outcomes (Janssen et al., 2014). In experiments with full information participants in all positions invest similar levels in the public infrastructure, while this is more unequal for experiments without full information. When participants can only communicate with direct neighbors downstream participants start to invest less in the public infrastructure. This is not surprising given the limited level of water participants downstream receive in the second phase of each round in the irrigation experiment. This inequality of extraction is also less when all participants can fully communicate with each other and see who is taken water when. In our model analysis we will compare various alternative theories, such as naïve simple ones like selfish rational actors, and altruistic actors. We contrast this with various alternative behavioral models inspired by the behavioral model for collective action as proposed by Ostrom (1998), as well as inclusion of other-regarding preferences. The systematic comparison of alternative models on experimental data of 44 groups enable us to test which behavioral theories best explain the observed effects

of communication, and its consequences to experimental rounds where participants were exposed to disturbances.

Keywords: agent based modeling, experimental economics, irrigation games, asymmetry, other-regarding preferences

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Different extraction methods and resource appropriation in CPR game

The issue of heterogeneous extraction method is often neglected in Common Pool Resource (CPR) experimental research. We designed two set of experiments in order to explore the effect of extraction method and extraction level. In the first set of experiments participants had to choose the level of effort put into resource extraction under different extraction methods. The extraction methods differed based on their effort-to-extraction and damage-to-extraction ratios. In the second set of experiments participants could choose between different extraction methods as well as their effort level. The experiments were conducted with fishermen in Zanzibar.

Our results indicate that (i) participants increase their extraction levels when using less labour-intensive extraction methods (ii) increasing resource destruction doesn't have any significant effect on the overall extraction level (iii) the possibility of choosing between different methods decreases resource extraction by allowing damage conscious participants to opt for less destructive methods.

Keywords: Common-Pool Resources, Resource Damage, Private Benefits, Experiments, Extraction Methods

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To cheat or not? Behavioral experiments on self-monitoring in Vietnam, with implications for REDD

This paper uses an interdisciplinary approach to study behavioral aspects of self-

monitoring in REDD. Monitoring is crucial for REDD, particularly when external incentives are conditional on how well local communities protect their forests. Often, however, external supervision cannot be provided (remote location of forests, small forest patches that are expensive to cover through remote sensing) making it necessary for communities to self-monitor their environmental performance. This creates a conflict of interest among community members and a possibility for misreporting the extent of forest conservation. However, the existing studies on monitoring in REDD have mainly looked at technical aspects such as role of training in reducing measurement errors. In this study, we focus on the behavioral side of self-monitoring through a set of three experiments with 487 subjects in Vietnam. In the first one, 243 rural subjects participated in a randomized field experiment where they received an economic incentive for filling up a questionnaire. However, participants were unsupervised when they collected their incentives, creating an opportunity for dishonest behavior. We varied experimental treatments by whether (i) participants went alone or in groups to collect their incentive, (ii) participants received cash or in-kind incentives, and (iii) participants collect incentives for themselves or for others. Our results show extreme honesty among participants with no evidence of any misreporting. However, participants were even stricter when collecting incentives for others, especially when cash was involved. In our second study, we asked 157 rural subjects to predict behavioral outcomes when community members acted without supervision. Again, 99 percent of our participants predicted honest behavior, which was consistent with our results from the first study. Finally, in a set of lab experiments in an urban university in Vietnam, we asked 87 subjects received a payment depending on the number of correct answers to a written questionnaire. In contrast to our rural studies, our urban study showed evidence of significant cheating when subjects collected their payments unsupervised. Overall, our results belie existing studies in behavioral economics that predict that most people will cheat when unsupervised. Instead, we find that existence of strong social norms makes rural communities extremely honest as compared to their urban counterparts. While more behavioral studies are needed to establish the generalizability of this finding, an immediate implication for REDD is a greater role for local communities in monitoring forest conservation, and for design of protocols that strengthen social norms among community members.

Keywords: Self-Monitoring, REDD, Cheating, Behavioral Experiments, Vietnam

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Cree Economies: Indigenous Governance and Resistance to Settler- Colonial Logics

Having good relations with the land – through acts of resistance and resurgence – has intrinsic value, even if the land no longer provides for all of the subsistence needs of a people. This paper analyzes and substantiates Cree economic relationships as well as principles that guide these relations. Given the past and ongoing economic exploitation of Indigenous peoples and territories, how do Indigenous, and more specifically, Cree economies operate in contemporary times? The goal of my current research project is to understand and theorize Cree economic relations, practices, and principles, which informs the following questions: how do neoliberal practices impact Cree relationships? What are the principles around Cree economic

relationships, found in oral stories and from Cree knowledge holders that can help guide alternative economic practices today?

In many Indigenous nations' views, a reciprocal relationship between economic interactions (relations to land) and modes of subjectivity (relations with land) is demonstrated. A changing economy has fundamentally altered the relationships with *askiy*, the land. The current neoliberal ideology impacts Indigenous peoples in very specific ways, often revealing the contradictions and inherent problems within capitalistic systems. By 'alternative,' I am referring to Indigenous economic relations that stray from the guiding neoliberal framework. I argue that these renewed relationships can be acts of resistance to the economic exploitation within settler-colonialism.

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Nurturing Adaptive Peace: Resilience Thinking for Peacebuilders

During the past few years, the concept of resilience has entered the field of peace and conflict research, and is now being used by academics as well as practitioners of peacebuilding. However, as has been the case in other social sciences earlier, the use of the concept draws more upon engineering resilience than ecological resilience, thereby failing to appreciate the broader implications of resilience thinking, including such central notions as threshold effects and adaptive cycles. This limits the usefulness of resilience both as a tool of analysis and as a guide for policy making.

The current academic debate on peacebuilding is largely focused on critique of what has become known as "the liberal peacebuilding paradigm," which, briefly, aims at turning war-torn states into liberal democracies. Critics argue that this has led to *templet-style* peace implementation, more concerned with stable institutions than with viable relations or processes, and they call for more inclusive and contextualized ambitions.

Resilience is now making its way into those ambitions. So far, however, the use of the concept in the context of peacebuilding has primarily concerned the everyday lives of people affected by conflict, the argument being that it is their capacity to bounce back from challenges and setbacks that needs strengthening. In other words, it is once again taking the form of engineering resilience. While the everyday lives of people is certainly important for long-term peace, the wider implications of resilience thinking are not yet appreciated within peace and conflict studies, where they could, I believe, be very relevant and useful.

In this paper, I therefore develop resilience thinking for a peacebuilding context by discussing the notions of expecting change rather than stability, of understanding social development in terms of adaptive cycles, and of relating resilience to thresholds between alternative regimes rather than to return to a global equilibrium. With the help of empirical examples, I illustrate how various analytical tools of resilience thinking can be understood and employed in the analysis and development of peace and peacebuilding, both in the short and the long term. I conclude that some aspects of current peacebuilding are in line with a resilience approach, whereas others require fundamental reconsideration.

Keywords: Armed Conflict, Peacebuilding, Ecological Resilience, Adaptive Cycles, Thresholds

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Huckleberries, Food Sovereignty, Cumulative Impact and Community Health: reflections from northern British Columbia, Canada

For many communities around the world, ability to access healthy and culturally valued foods is compromised by cumulative impacts on the local or regional land base which impact the landscape ability to provide these foods. We argue that the land base required to provide these foods can be conceptualized as a commons, and that diminishing the ability of communities to access or manage traditional foods on the land can be understood as a threat to food sovereignty. Our paper reviews the intersection of traditional Gitksan/Gitanyow food resources, and their management and allocation systems, with a series of challenges presented by development on the land base traditionally managed by the communities of Gitwangak and Gitanyow (British Columbia, Canada). These include commercial forestry, pipeline , transportation and power transmission corridors, and mining as well as farming and settlement. We focus particularly on black huckleberry (*Vaccinium membranaceum*, sim m'aay) availability and management. This was traditionally the most highly valued and highly managed plant food, and berry patches were named and owned sites. In recent developments, commercial harvest of black huckleberry further threatens local access to this most significant traditional plant food, whose Gitxsan name means 'real or true berry'. These impacts affect social, cultural and ecological health and are issues of food sovereignty. Gitxsan and Gitanyow territories in the aggregate form commons characterized traditional rules of access, management for specific territories and sites, and are associated with specific delimited social groups. Johnson argued earlier that the traditional Chiefly territories could be seen as a form of corporate property in which access rights are allocated through Chiefs and through kinship ties who are responsible for care of the territories. This system has been disrupted and overlaid by a series of historical and contemporary changes mediated by colonial, provincial and federal governments which have both treated the land base as open-access, and also have privatised a range of resource rights. These changes have impacted the productive capacity of the land itself for important traditional foods, and also impacted access to these foods.

Keywords: food sovereignty, food security, cumulative impact, traditional foods, community health

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Formal to Informal: Transitions in Institutions and Governance of Gold mining in Nilgiri-Wayanad Region of India over last 170 years

Artisanal mining is an important source of livelihood for the poor, especially in developing economies. Possibly over 20 million people in the world depend on mineral resource extraction for their living, mostly in the developing countries. Caught between legality and the informality, this occupation is barely visible and has not received adequate attention from scholars in South Asia in general and India in specific. In addition to the size of the production of minerals and the numbers of people involved, it is important to understand the institutional characteristics of informal mining and factors compelling the miners to get into this occupation. Informal mining assumes significance for two reasons: the collective size of total production of minerals in the sector, and the employment by these mines of a very large number of people. Only very low levels of technology and simple tools are used, and only basic machines are used at different stages of processing. Artisanal i.e. informal mining, is carried out by local communities in remote locations on and from common lands. Such mining is neither recognized, nor authorized or licensed.

Informal mining of gold assumes a special significance for India which imports somewhere between 500 and 800 tonnes per year; gold is not only highly valued economically, but has a cultural importance for many Indians. Besides, gold being used as a currency, it has a long history, influenced by international trade. However, what is less known is the role of speculation leading to floating of numerous gold mining companies in India during the colonial period in early 1880s. This time period also coincides with the international trade moving into monometallic currency i.e. to gold alone from bimetallism (of gold and silver). It would therefore be interesting to look at historically the role of corporate speculation giving rise to informal gold mining. Even prior to that, there has been interest in gold and there has been some documentation available on the institutions governing gold mining.

In this paper we are exploring informal gold mining in the Nilgiri-Wayanad region of Southern India through a chronicle of gold-mining and informalisation processes in the region from the available records and historical documents going back more than 170 years and attempt to understand the changes in institutions and governance structure using the property rights framework. The 170 years of documented history of gold mining in the region can be divided into four phases namely early colonial phase up to 1870s, corporate sepecultion phase from 1870s to 1900, open access phase from 1900 to 1970s and current phase from 1980s onward. In the last phase of this, settlement of Tamil repatriates from Sri Lanka in 1970s adds a new dimension that played a critical role in continuation and growth of informal gold mining.

Our attempt in this paper is to understand and contextualize the governance structure of gold mining in the region using the concepts of property rights that would also help explaining current structure of informal gold mining in the region.

Keywords: Gold mining, informal, Governance, property rights, Historical, Nilgiri-Waynad, India

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Resource Endowments and climate change governance in the East African Community

The East African Community (EAC) countries have made strides in forging a climate change governance regime, and the EAC has even sought official status in the UNFCCC process. The major thrust in these endeavors has, however, been characterized by an emphasis on adaptation while mitigation was relegated to a secondary significance. The climate change policy categorically states that the Community's pursuit of climate change actions is primarily that of adaptation. The underlying rationale for this approach is the doctrine of common but differentiated responsibilities that inform developing countries' negotiating position in the UNFCCC process. Recent developments in some EAC member states, however, suggests that there may be reason to expect that some of these countries will not be enameled against emission reduction activities as has been the case in the past. In both Kenya and Tanzania, emerging cheap and clean energy sources (geothermal and gas, respectively) could imply that these countries can now execute a low-carbon development pathway without necessarily hurting their economic development potential as would have been the case under the previous regime of fossil-fuel propelled economic growth. This paper investigates how the EAC climate change framework policy that was based on a supposedly common view of the resource endowments of the member states and their common economic development trajectory will be impacted by the emerging clean energy dynamics given that these dynamics will pose different incentive structures for the member states. Thus the objectives of the study are, (a) to identify the different incentive structures that these emerging clean energy opportunities present to different member states and, (b) to inquire into how these incentive structures are likely to change the calculus of negotiating a regional climate change governance regime. The study will be based on field data that was collected between 2012-2013, primary data from EAC and member states' archives, electronic web searches, and secondary literature.

Keywords: Climate Change, East African Community, Governance, Resource Endowments, Mitigation, Adaptation

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Institutional change and sustainability of a pond irrigation system in the Sanuki plain: A historical analysis

This paper analyses the process of institutional change and the sustainability of a pond irrigation system in the Sanuki plain, focusing on the effect on local institutions of two distinct events: the construction of Kagawa Canal in 1978 and the occurrence of a severe drought in 1994. I will show that the newly constructed the Kagawa Canal had a profound impact on the way people used and managed water for irrigation in the Sanuki plain. For example, many farmers decided to abandon their original rules and traditions developed over long historical experience because the new Kagawa Canal delivered a greatly increased amount of water. But the drought of 1994 made everyone aware once again of the importance of such local rules and traditions.

The severe 1994 drought also caused institutional change in the use of water in the Sanuki plain. Two distinct changes (among others) occurred in 1994: the revival of "abandoned" traditions and the creation of a new custom called "Mizu-yuzu"(水融通) or water sharing. "Mizu-yuzu" is an informal institution aimed at rescuing those farmers who suffer the most from crop damage by re-allocating water resources among the members of pond irrigation system. In conjunction with revived the traditions that augmented the efficiency of water use, mizu-yuzu effectively alleviated the loss of agricultural crops.

Based on the results of these observations, this paper argues that farmers' perception of water scarcity was a key factor determining the institutional changes in the Sanuki plain: that is, perceived abundance leads to more individualistic water use, and perceived scarcity leads to more communal sharing of water to prevent individual disaster. This means that the system for management of water changes in accordance with expectations about the scarcity of water resources expected in the future. In actual fact, it has recently become more difficult for farmers to implement communal water management. Some might argue from an economic point of view that we do not have to maintain a communal management scheme, but the history tells us the importance of local communal institutions for pooling risk and providing insurance in order to cope with uncertainty and drought in the Sanuki plain. Because communal arrangements are crucial during bad times, we need to ask how we can sustain the community-based water management system even in an age of water abundance that might only be temporary. I will explore key factors that would determine the sustainability of the communal management scheme for the pond irrigation system in the Sanuki plain.

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Managing Commons during Rapid Economic Growth: A large-N analysis

The purpose of this paper is to examine how Japanese people were managing their commons during the era of rapid economic growth, using quantitative analysis of a 1972 survey of 1440 cases of Japanese commons (iriai), done by three legal sociologists: Saburo Kuroki, Kaisaku Kumagai, and Hidetoshi Nakao.

Many critics of managing land in common emerged in Japan after the Meiji restoration. Just as critics in Britain, Germany, Spain, and elsewhere argued that there was something fundamentally “backward” or inefficient about common land, Japanese critics have argued since the 1870s that common land is antiquated and should be converted into land owned by individuals. A corollary of this position is that we should expect to see a natural evolution from common ownership to individual ownership, and even within commons we should expect people to change the way they manage commons, from totally free access (resembling Garrett Hardin’s unmanaged pasture) to parceled or subdivided management in which individual commoners each acquire an exclusive patch of land over which they have nearly complete control. One would expect to find that commons surviving into the postwar period in Japan would have shifted, after a century of evolution in the context of capitalist growth, toward the last type of de facto individual control.

I examined the 1440 commons reported in the 1972 survey by ownership, usage, and types of management to see what a century of government pressure and economic change did to the postwar commons. I used a statistical technique known as latent class analysis, which can identify unobservable subgroups in a population (basically, the cases sort themselves without prior imposition of the researcher’s categories). This process yielded four types of commons. The (a) free access type in which residents use the commons freely without any central control (Garrett Hardin’s type) was used in only 5.8% of the cases. By far the majority of the 1440 commons surveyed in 1972 were (b) the communal control type, in which the user group controls usage in commons and hence residents are expected to use the commons not freely but only in accordance with the group’s rules (68.3%). In 16.4% of the commons, residents adopted an arrangement largely overlooked by fans and critics, alike, a type that we might call (c) “free exchange of rights,” in which residents keep the number of users constant but freely allow exchange or trading of rights among users. This type of commons may have emerged in response to social change, including high rates of migration to urban areas. But only 9.5% of the commons adopted (d) parceling of the type Garrett Hardin might have recommended, in which commoners have subdivided the commons into patches each used by an individual resident. Thus commoners surrounded by market capitalism had not altered their commons management in the way that anti-commons critics might have expected. Finally, I also found that most commons were used as artificial or plantation forests that did not allow free access by residents. At least on the commons that remained commons, then, most communities found that limiting access and/or making rules was a sufficient method for managing the commons, and did not need to go to the extreme of using Garrett Hardin’s suggestion of parceling to individuals.

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Community forestry program in protection forest and its impact on local livelihoods: Case studies in Lampung Province, Indonesia

This study analyzed the impact of Community Forestry (CF) Program in protection forest, a type of Indonesian's state forest, on the local people and forest by using livelihood capital framework. The study is conducted in Lampung Province of Indonesia where CF has been implemented since 1995. Data was collected by interviewing purposefully selected farmers from 2 forest farmers group located around protection forests. By categorizing members of the two forest farmer groups in to three wealth classes, i.e. rich, middle and poor, using simple wealth ranking method, then a total of 60 households from Bina Wana and 75 households from Jaya Lestari forest farmer groups representing 12.5 % of the members were randomly selected for the data collection. In addition to these randomly selected forest farmer households, data were also collected from government official in village, sub district, district, province and national level, representatives from trading association, Electricity Company, NGO, and Universities. The data was analyzed using SPSS ver. 17. The study found that CF has improved human capital of farmers through trainings on forest and farmer's group management; natural capital by increasing the number of trees planted, planting agroforestry crops in their cultivate land and; financial capital by increasing their income by selling NTFPs and crops. The increased in income improved farmers' housing as well as their capability to purchase different physical capitals such as motorcycles, mobiles and household appliance. One of the requirement to get CF permit, i.e., formation of farmers group and routine meetings within the farmer groups enhanced the social capital of farmers. Through CF program, farmers were also able to extend their networks to external agents such as government officers and NGOs. Although the management of the protection forest under CF has also improved, the ongoing conversion of it to plantations dominated by coffee and rubber needs consideration of balance between income generation for local people and conservation of biodiversity.

Keywords: Community Forestry, Livelihoods, Protection Forest, Hutan Kemasyarakatan, Lampung

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Living on the Land: Indigenous Women's Understanding of Place

Indigenous knowledge has introduced new ways of thinking about different ways of inhabiting the world and knowing. However, less attention has been paid to how knowledge is gendered. In this panel, the participants will present their upcoming book: *Living on the Land: Indigenous Women's Understanding of Place*. By presenting samples of the contributions in the book, the participants will examine how patriarchy, gender and colonialism have shaped the experiences and knowledge of Indigenous women in various locations. The analyses presented provide insights into how ancient stories, landed livelihoods, and responsibilities guide contemporary Indigenous women's actions and resistance in a time of climate change and resource extraction.

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Payment for environmental services for collectively managed natural resources

This paper introduces the panel titled, “Under what conditions will PES strengthen resource users’ motivations to conserve forests?”

Payment for environmental service initiatives for collectively managed multiple-use natural resources raise substantively different design issues than those for individually managed resources. In particular, PES for a multiple-use natural resource will privilege some uses over others, and thus some people’s interests over others. Most likely the distribution of benefits will be uneven, and possibly there will be outright losers. Collective action is essential to making a PES arrangement work under these conditions but it may be difficult to attain.

The incentive structures that might be appropriate for individually managed resources will not necessarily promote the collective action required to manage the commons. Locally established rules and strong mutual trust are well known as factors that can support collective action, but they both take a long time to develop and PES arrangements may not allow that time. Trust is particularly important because a collective PES arrangement normally will involve cash payments made on a group basis, but there is evidence to suggest that people will not cooperate in exchange for a group payment made to leaders that the group does not trust.

In addition, a group of users will more likely self-organize to protect a natural resource that is very important to their livelihoods and there is high demand for its sustainable management, but in PES the source of that demand is outsiders. It is not clear if this will have the same motivating effect as when demand is endogenous to the users.

Alternative forms of “payment” other than cash, such as conditional land tenure security and development benefits, have the potential to have better properties to promote collective action, but they do not have favorable properties for enforcing conditionality, which is one of the key features of PES. In particular, even if such benefits are nominally conditional, in practice it may be difficult to take them away in the event of failure to comply with the PES arrangement.

To reconcile this disconnect between those approaches best suited to promote collective action and those best suited to promote conditionality, PES can be conceived more broadly by using multiple forms of cash and noncash payment simultaneously and placing greater focus on building institutions for collective action than on strict conditionality.

Keywords: Payment for Environmental Services Collective Action Conditionality

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The Influence of Short-Term Financial Incentives on Social Norms and Behaviors

The motivation crowding-out literature suggests that the incentive for conservation that payment for ecosystem services (PES) establishes may be less straightforward than previously believed, but limited theoretical explanation for motivation crowding out hampers our ability to understand it. We focus on the long-term effects of short-term payments, because most PES initiatives are government- or donor-funded, with budgets subject to funding constraints, political processes, and changing patterns of what kind of program is in vogue. We summarize a theoretical model that combines insights from economic and communication theory in an effort to predict the long-term effects of short-term incentives for promoting socially desirable behavior, and to gain insight into conditions under which monetary incentives could crowd out other sources of motivation. Our theoretical model incorporates social norms into a utility function to explain and predict the ways that monetary incentives influence social norms and behaviors that play a role in in the longer term, after financial incentives have ended. We test our model using a public good (PG) game with student subjects and real cash payments, including a temporary bonus payment for cooperation that is subsequently withdrawn. We find that the temporary incentive has a small but statistically significant negative effect on contributions to the public good after the incentive has ended, and that this effect can be explained by subjects' perceptions of descriptive social norms as predicted by our model. We are in the process of further testing our model in Qinghai, China, where the Government of China is implementing a PES program to encourage Tibetan herders to protect grasslands and discourage poachers. These herders already have a strong social norm in favor of conservation and this makes the Qinghai context an excellent case in which to apply our model.

Keywords: PES, Social norms, Motivation, Crowding out

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Decommonization and Decommonization of Mountain Commons and their Impact on Livelihood Security

This study, in the context of Northern Pakistan, seeks the answer to the question of “how to retain commons as commons” at a time when they are becoming non-commons (State-controlled Protected Areas - PAs), and are facing increasing challenges from external drivers and other factors associated with the conversion of the commons into so-called Protected Areas. Interventions by the State to conserve biodiversity have led to the “decommonisation”

of the commons and with strict sanctions on the local communities restricting their access to the resources have resulted in conflicts between the State and the communities. The parallel interventions by international NGOs' "new commonisation" for resource management with efforts to involve local communities are also facing challenges in providing livelihood security to local communities. Our research empirically examines the livelihood strategies of mountain communities in northern Pakistan and the impacts of decommissioning on the traditional management systems. We collected evidence from two communities in northern Pakistan, namely, Shimshal and Naltar Valley, during July 2006 - September 2009. A four-tier field method was used that included introductory workshops, household surveys, focus group discussions, and data validation. The findings included the following: 1) there has been a significant reduction in the livelihood options of local communities due to State-induced "Protected Areas;" 2) traditional pasture management systems have been facing serious threats from State-induced institutional measures; 3) some communities have proactively attempted to diversify their economy by expanding household portfolios into non-agricultural sectors; and 4) external drivers of local socio-economic conditions have augmented local vulnerability. Our study concluded that there is an utmost need to comprehend the local livelihoods from the perspective of the local community members, particularly to advance effectively the conservation of natural resources in the context of mountain areas.

Keywords: Mountain Commons, Commonisation, Decommissioning, New-Commonisation, Sustainability of Mountain Commons; Revitalization of local Institution, Traditional Practices as Symbol of Sustenance, and Livelihood Security.

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Livelihoods of local communities in Ayubia National Park of Pakistan: The impact of Tourism and common pool resource management

Pakistan is the meeting point of three great mountain ranges viz., Himalayas, Korakoram and Hindukush. Most of the natural forests are situated in these mountains. These mountains are rich in common pool resources such as biodiversity, forests and water, but the mountain communities are among the poorest and most disadvantaged. Forests which are common pool resources are an integral part of daily life of mountain people. They provide wood, food, fodder, fuel, medicine and many more goods and services to the rural people of these areas. The present paper, which is the outcome of an on-going research project in Khyber Pakhtunkhwa province of Pakistan, explores the impact tourism on livelihoods of people living in Ayubia National Park. Ayubia National Park is a national park in the in the western Himalayas about 75 kilometers from the capital Islamabad. It was declared a national park in 1984 with the aims of preserving its landscapes, forests and biodiversity for scientific research, education, and recreation. The Park is surrounded by seven major villages and three small towns. The paper also analyzes how management of common pool resources (esp. forests) has impacted the livelihoods of the local communities. The Sustainable Livelihoods (SL) framework, which has been used in this study, has gained increasing acceptance in development policy and practice over the decade. The sustainable livelihoods framework has been used as a

tool to investigate the livelihoods strategies and livelihoods outcomes of the local people in the perspective of the management of common pool resources and tourism.

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REDD+ Rhetoric and Realities: Legitimizations and Legitimacy of REDD+ Benefits in Tanzania

Discourses create an important framework for political decisions and conservation practice. Discourses around conservation and land use are transmitted among actors from multiple levels, including international organizations, national governments, sub-national governments, NGOs, and local communities. A global intervention like Reduced Emission from Deforestation and forest Degradation (REDD+) requires transmission of its global discourse to national and sub-national levels. In this multi-level governance study, I examine how the REDD+ discourse is transmitted to sub-national governance levels in Tanzania. My analysis includes REDD+ narratives of actors interviewed at the national, regional, district, and sub-district levels. I examine legitimizations, i.e. claims that dominant actors make about themselves and REDD+ in order to gain acceptance and trust by less powerful actors who are expected to accept REDD+. Simultaneously, I examine legitimacy, i.e., the condition in which such claims have been accepted as valid by local actors who are expected to accept REDD+. I assess the legitimacy of REDD+ discourses, processes, and outcomes in the context of subnational REDD+ initiatives in Tanzania. Particular attention is given to REDD+ trial payments and land use plans, which are key instruments used to legitimate REDD+. The discourse among dominant actors presents REDD+ as a “win-win” in Tanzania. This discourse assume that poor villagers put severe pressure on forests. Villagers’ involvement will, thus, result in a triple-win situation with poverty alleviation, community development and emission reductions. Villagers’ involvement require mediation by external stakeholders’ activities including conservation education, benefit-sharing, and land-use planning. These will help the local population appreciate the value of protecting the forests. The win-win narrative foresees all stakeholders – governments, conservationists, villagers – as winners. The realities of REDD+ pilots, however, paint a more complex picture. The current REDD+ processes and outcomes are considered legitimate among actors whose interests were reflected in REDD+ payment schemes and land use plans – particularly, district governments and pilot payment villages. REDD+ has given district officials political visibility and resources to engage with villagers via participatory forest management. This enhances their legitimacy over their typical policing of villagers. Villagers have received village forest reserves/commons, household-level REDD+ monetary payments, or funds for village development projects including schools, offices, and infrastructure. In contrast, the REDD+ process is far less legitimate to central government actors who have lost timber-rich general public lands to village forest reserves. Similarly, shifting cultivators and pastoralists, who have been disenfranchised by village land use plans, do not consider land use change processes linked to REDD+ to be legitimate. Inter-village boundary conflicts, and deliberate non-participation and/or exit from REDD+ pilots by some villages that feared land-grabbing also undermined the legitimacy of REDD+ decisions. These findings suggest that REDD+ and similar conservation approaches may achieve more legitimate and socially just conservation through a realistic understanding and representation of diverse interests involved in decision processes and expected outcomes.

Keywords: Equity, Forest Access, Forest Conservation, Legitimacy, Multi-level Governance, Power, REDD+, Representation

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Institutional interplay and institutional diagnostics for landscape level governance

Landscape level environmental and protected area initiatives pose significant challenges for governance. Local level commons are embedded within larger landscapes, whose resources are often governed under an array of different, overlapping and interconnecting tenure types. This results in complex governance systems at the landscape level. In the Governance Assessment Framework for Landscape Level Ecosystem-Based Management project, we conducted primary research in four different landscape ecosystems in three countries to analyze and assess governance architectures at the landscape level, as well as drawing on other research on landscape approaches in which team members have been involved. In some of the cases there are structures and/or processes designed specifically for landscape-level decision-making; in others there was only an emergent “governance system” made of up various components, few or none of which corresponded in space to any meaningfully defined landscape. In both conditions, governance resources—authority, subjective legitimacy, accountability, the ability to generate human, political and financial resources, etc.—are distributed differently among various institutions, organizations and other components of the governance system. All of the case studies revealed that the nature of organizational and institutional linkages among these various components of the governance system was pivotal in determining the strengths and weaknesses of the overall governance architecture. The nature of these linkages helps to determine whether and how the governance resources are mobilized or sidelined and whether they work in synergy or opposition. The important role played in these cases by linkages beyond the landscape—upward to higher levels, downward to lower levels, and horizontally to other landscapes—remind us that we should not simply redirect our attention from discretely conceptualized local commons to discretely conceptualized larger landscapes. Governance analysis and design must reflect the fact that landscapes, as commons, are embedded in a multilevel world.

Keywords: Environmental Governance, Landscape approaches, Institutional interplay, Institutional Diagnostics, Multi-level Governance

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Institutional Innovation, Livestock Corridors, and Ecosystem Services in Agropastoral Drylands

Studies of non-equilibrium dynamics emphasize the role of grazing (maintaining herbaceous communities, facilitating nutrient cycling, and nutrient transfer to croplands) in maintaining the flow of ecosystem services in drylands. This has led to development interventions to protect livestock mobility. Corridor networks optimize use of complementarities among spatially dispersed resources in terms of functional variety, nutritional quality, and temporal availability. However, mobility is often treated abstractly with insufficient attention to the associated institutional requirements. New legislation at the national level, consisting of broad statements recognizing pastoralists' customary rights, is only a starting point for grappling with the complex governance requirements of corridors. Historically, state resource management often undermined existing local institutions, replacing them with an effectively open access system. Given the diversity of customary and informal institutions that continue to play a role in managing mobility, protecting corridors entails interaction among a range of institutions with diverse territorial logics. Analyzing local perspectives on corridors can illuminate the collective action difficulties associated with corridors.

This paper presents qualitative data from 14 communes located along livestock corridors in eastern Senegal. The communes differ with respect to cropping pressure, dominant land uses, and the nature of institutions for managing mobility. In each commune, group interviews were conducted with 5-10 participants, including farmers, herders, and commune officials. Discussions focused on the perceived purpose of corridors and the socio-political dimensions of resource control. Debates about corridors were shaped by questions about: 1) what protections should be accorded; and 2) under whose authority. Resource users hold two competing perspectives on corridor protection. The first is control-oriented, focusing on preventing crop damage and reducing conflict; the second is access-oriented emphasizing corridors as a means to ensure access to pastures. Without a clear understanding of the functions of corridors, formalization can result in corridors acting as restrictive spaces for livestock. Further, pastoral mobility is effectively in different institutional hands at different points along the corridor. The development of management strategies is hindered when debates about corridors become proxies for struggles over authority. The operationalization of corridors requires acknowledging conflictual relations among institutional authorities and attending to the political process in which rules and powers are defined (Ostrom's collective choice rules). Maintaining services derived from grazing in agropastoral systems requires building new collective action institutions on the basis of shared norms among transhumant herders and commune residents. Informal institutions that emphasize mutual obligations among user groups offer a starting point.

Keywords: Transhumance Corridors; Mapping; Local Politics; Land Use Planning; Formalization

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The Impact of Changes in Forest Ownership in Japan: Cross-Sectional Time-Series Analysis of the Prefectures in the Late 19th and Early 20th Centuries

Forest ownership in Japan changed drastically during Japan's rapid modernization due in no small part to the government's policy of capturing commons as prefectural and national forest. From the late 19th century, the Japanese government introduced what it considered a more "modern" system of land ownership in Japan, by launching a registration of all forest land. The initial phase of this process was to evaluate each piece of land, sorting the forestry commons jointly used by local people into private land (owned by individuals or groups) or public land (owned by municipalities, prefectures, or the national government). Any community that lacked documents to confirm its claims of community ownership lost that ownership to the government. These policies shrank the commons and created large prefectural and national forests from inadequately documented commons and from lands formally owned by the former feudal domains (including much land that had actually been used regularly by communities as common land).

In order to examine the impact of these changes in ownership on agricultural production and the forest condition, we analyzed cross-sectional time-series data on forests. Historical records and evidence from case studies indicate that the shrinkage of jointly owned (common) forests had a big impact on the condition (health) of the forests and on the livelihood of local people. In many of these former commons now converted to national forests, the government cut down natural mixed forests and planted high-value timber trees in order to monetize the forests. Although the government argues even today that public management of those forests successfully increased timber tree production, some historical records suggest negative impacts. First of all, the change in ownership caused local people to lose the incentive to manage forests that they had managed quite well before the change; illegal cutting and forest fires (due either to inadequate clearing of undergrowth or to arson by people angry at losing their forests) increased greatly during the late 19th century. Second, farmers suffered from shortages of forest resources that they had collected for use as agricultural inputs. Public officers in government-owned forests served as guards to prevent the gathering of leaf litter for fertilizer or grasses to feed to cattle and other work animals. In the worst cases, government bodies completely prohibited any uses by local people. Finally, the government itself had incentives to overcut timber and to maximize short-term profit without regard to the long-term health or productivity of the forest, to raise funds to invest in modernizing and industrializing the country. Records show overcutting by government in some places.

This paper investigates these various findings drawn from case studies by analyzing quantitative data on forest ownership and conditions in the late 19th and early 20th century. Using prefectural-level data, I examine the influence of forest ownership on forest fires, incidence of illegal cutting, levels of rice production, and land area under forest coverage. I will report results at the conference.

Keywords: Forest Ownership, Historical Record, Aggregate Data Analysis, Nationalization Policy

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Landscape level governance in the GSET: Lessons learnt and way forward

Governance at landscape level remains a challenge particularly where it involves many actors with varied and often antagonizing interests. The Greater Serengeti Ecosystem in Tanzania (GSET) is one such a landscape with governance becoming a challenge owing to the presence of many governance foci with sometimes exclusive and incompatible powers in decision making. Such a governance setup has remained a problem with various actors crying foul play from other landscape actors. In most instances communities have been by-passed in most decision making. The Landscape Level Ecosystem Based Management (LLEBM) project in GSET carried out a study of landscape level governance using a LLEBM governance assessment framework. The findings revealed a lack of governance at landscape level particularly in decision making, planning and management of protected areas in the landscape. Various governance decisions that affect conservation and social outcomes at the landscape level have been done loosely without involving all potentially affected actors. Most governance functions have been carried out within the confines of individual protected area bodies and district authorities. This lack of coordinated governance framework at landscape level jeopardizes attainment of both conservation and social goals.

Keywords: Environmental governance, GSET, Landscape approaches, LLEB

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Integrated Local Environmental Knowledge for Actions Aimed at Encouraging Adaptive Societal Change: Community Initiatives in the Nishibetsu Watershed, Japan

Rural communities today face numerous challenges, including environmental degradation, resource depletion and economic decline. The sustainability of these communities depends largely upon the adaptive governance of natural resources and the environment. However, it is often difficult to identify, design and undertake concrete actions for sustainability.

Our research focuses on integrated local environmental knowledge (ILEK) shaped by interaction between local and scientific knowledge systems. Where effectively applied, ILEK promotes actions by individuals and small groups along with adaptive institutional changes in communities. Preliminary analysis identified four hypothetical categories of drivers in this transformation: knowledge translation, creation/visualization of values, opportunities to collaborate with diverse actors, and the provision of new sustainable options.

On the basis of these hypotheses, we examined the case of watershed restoration along the Nishibetsu River in Hokkaido, Japan, where the principal livelihoods of residents consist of agriculture and fisheries. Here, in 1994, local people established a voluntary organization; since then, they have undertaken various actions to restore the watershed environment, applying their own knowledge on social-ecological systems as well as restoration technologies. These actions include annual tree planting, workshops and a series of concerts organized by local residents to enhance awareness of the watershed environment. Blakiston's fish owl (*Ketupa blakistoni*), an endangered species that breeds in riparian forests and feeds on fish in the river, serves as an environmental icon for the organization and its actions.

An important first step was made when members of the organization developed technologies based on their knowledge for initiating actions. Their actions activated all four drivers, thus prompting the process of change. The values of watershed environments were translated into an easily understandable and persuasive story, with the owl as an environmental icon. This series of practices facilitated collaboration among a wide variety of stakeholders within the community, as well as from the outside. These bottom-up actions also encouraged the three municipal governments covering the water source and the entire watershed to collaborate beyond their jurisdictional boundaries.

The organization's most recent initiative is the restoration of water crowfoot (*Ranunculus nipponicus*), a waterweed in the river that symbolizes healthy streams. This waterweed provides a refuge for fish and supports the ecosystem's functions, with the owl at the top of the food chain. However, it has been seriously damaged due to extensive feeding by wild deer and waterfowl in the winter when other food sources are scarce. In order to reduce such damage, experiments have been initiated to cover the river surface above the waterweed with used fishing nets and other locally available materials during the winter season. This new initiative is further generating opportunities for collaboration with broader stakeholders, such as recreational fishers, underwater photographers and researchers, with collaboration providing each participant with options for sustainable actions. Analysis of this case will help advance our understanding of the underlying mechanisms of adaptive societal changes, and provide implications for other communities in need of promoting their own collective actions for transforming formal and informal institutions.

Keywords: Integrated Local Environmental Knowledge; Sustainability; Adaptive Institutional Changes; Community; Collective Actions

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Learning about living well in the land: Decolonizing the economics curriculum

In recent years, efforts towards "decolonizing the curriculum" have begun in diverse fields including education, literature and the natural sciences. Decolonization, in this respect, involves challenging the dominance of Eurocentric ways of thinking in the existing K-12 and post-secondary curriculum, and "respectfully blend[ing] Indigenous epistemology and pedagogy with Euro-Canadian epistemology and pedagogy to create an innovative ethical, trans-systemic Canadian educational system" (Battiste 2013, 168). Proponents argue that the total exclusion of

non-Eurocentric ways of knowing from the existing curriculum perpetuates colonialism; that Indigenous and non-Indigenous students will both benefit from the incorporation of Indigenous perspectives and pedagogies in the curriculum; and that reconciliation between Indigenous and non-Indigenous people in Canada requires education that gives Canadians a better understanding of the history, culture, and rights of Indigenous peoples.

However, little or no progress towards decolonization appears to have been made in the field of economics. This is perhaps not surprising, given the discipline's historical (and arguably misguided) aspirations of becoming an "objective" science, free from any need to consider history, culture, or values. However, such decolonization is essential, for all the reasons above, but also because of the nature of the discipline. Economists are coming to realize that all economic activity is fundamentally dependent on the finite biosphere – the global Commons – and that the most pressing economic challenge of today is how to provide for human needs in a way that does not place insupportable burdens on the natural environment. This challenge is at the root of many issues of special concern for Indigenous groups, such as debates around the management and use of natural resources and concerns about the impacts of industrial activities on traditional ways of life. Moreover, Indigenous peoples have thousands of years of experience in living sustainably in the land, and the field of economics has much to learn from Indigenous traditional knowledge and perspectives. Decolonization of the economics curriculum is necessary to prepare students to address challenges related to the Commons in ways that are responsive to the needs and rights of Indigenous people, respectful of their culture and traditions, and appreciative of what can be learned from Indigenous ways of knowing and living in the land.

This presentation explores the possibility of working towards such a decolonization of the economics curriculum. It examines what might be involved in such efforts, and the barriers that arise from the peculiar nature of the economics discipline. It considers a variety of models of decolonization in other fields to see whether they might serve as a template. Finally, it proposes a series of practical beginning steps. It is the hope of the presenter, who is non-Indigenous, that the presentation will serve as an invitation to others, particularly Indigenous scholars, to partner in this work.

Reference

Battiste, Marie. 2013. *Decolonizing Education: Nourishing the Learning Spirit*. Saskatoon: Purlich Publishing.

Keywords: Indigenous Peoples, Sustainability, Decolonization, Education, Economics

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Contested Commons: The Forest Rights Act 2006 and Indigenous People's Land Struggles in Kerala, India

The indigenous people of India (*adivasis*) were subjected to large-scale dispossession of their common forestlands during the colonial and postcolonial era. Officially designated as Scheduled Tribes (ST), the *adivasis* have been continuously struggling to reclaim their lost rights in land and forests. The resistance took more organized forms in the post-independence period as political parties began to recognise their significance as vote banks. Six decades after independence the Government of India responded to the demand of the *adivasis* with the Forest Rights Act 2006 (FRA). Initially diverse political parties and concerned groups welcomed the Act as a potential instrument that could rectify the historical injustices suffered by the *adivasis*. However, the interpretations and the operationalization of the provisions of Act have failed to meet the demands of large sections of the dispossessed *adivasis*. This paper locates the FRA in the broader context of neoliberalisation of the Indian economy since 1991 and argues that the FRA is a dual-purpose intervention that grants limited access to forestlands to certain categories of *adivasis* while at the same time making available large extents of forestlands for conservation and commercial investments. The paper provides an analysis of the larger Indian national context and looks in- depth into the implementation of the Act in Kerala. Fieldwork was conducted in Wayanad district in Kerala, where the *adivasis* have been engaged in protracted struggles for land rights in the last three decades. The paper also draws on secondary literature and the authors' insights from long- term studies on indigenous peoples' development, particularly in the study area. On the one hand, the FRA was beneficial to a small number of *adivasis* as they were able to gain 'record of rights' to the land they had occupied as part of the protracted struggles. On the other, the vast majority of the landless *adivasis*, who fall outside the ambit of the FRA, have stepped up their struggle for land by occupying forests. The study shows that the *adivasis*' struggle for land is not for gaining common property rights, but for individual rights to realize their aspirations to become landowning cultivators in a changing socio-economic environment.

Keywords: Indigenous, People, Forest, Rights, Kerala

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Exploring the dimensions of power in co-management arrangements: A synthesis of the literature

In absence of a land claim agreement, northern Indigenous governments and federal government agencies engage in the negotiation of co-management agreements. The negotiation of these co-management arrangements does not occur in a power-neutral setting. The actors engaged in negotiations possess disproportionate degrees of power that significantly affect the process and outcomes. This asymmetry of power is produced by existing socio-political structures and reproduced by actors. Agents also possess the capacity to resist, and potentially transform the very structures that suppress them. Despite the existence of power in the negotiation of co-management agreements, the co- management literature largely overlooks the historical, political, and economic contexts that pervade the negotiation of co-management arrangements. In response, I will present a synthesis of how the co-management literature currently addresses power at the agency, institutional, and structural levels. Agency power refers

to the ability of an actor to influence the behavior of another actor. Agents may also resist, influence, and transform the existing systems of powers. Institutional power focuses on the norms, rules, and procedures defined by dominant institutions that enable and constrain how agents act may think and act. Structural power pertains to the societal systems, such as the state and market that are produced and reproduced through social interactions and relations, and can be difficult to transform once established. Through an examination of these multiple and interrelated layers of power a more holistic understanding of how power dynamics affect the negotiation process and outcomes may be uncovered. The multi-layered approach to examining power dynamics has important implications for understanding how co-management regimes are created and how they can perpetuate existing power inequities. This approach can be meaningfully applied to the negotiation of co-management arrangements for natural resources in northern Canada. In particular, in areas where Indigenous rights and title has been asserted and a land claim agreement has not been reached.

Keywords: Co-management, Power, Indigenous Peoples

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Ecologically sustainable but unjust?

Community-based fisheries management can support resource stewardship and local economic benefits under appropriate conditions. Using a case study on the central coast of British Columbia, Canada, we evaluate indigenous peoples' involvement in commercial sea cucumber and geoduck fisheries. Stock assessments characterize the current social-ecological system configuration as relatively ecologically sustainable. Many indigenous resource managers and collaborators, however, perceive the existing system as inequitable with regards to decision-making processes, harvesting allocations, and socioeconomic benefits. Consequently, coastal resource managers based on British Columbia's central coast envision a transformation of the governance and management institutions of these fisheries. We used Elinor Ostrom's common-pool resource design principles to assess the potential robustness of proposed institutions. Our analysis, contextualized in the region's legal and political history, suggests that enhancing local involvement in these invertebrate fisheries and their management could benefit local communities more than the status quo while ecologically sustaining the fisheries resources. We emphasize the importance of explicitly addressing historical context and equity considerations in social-ecological system analyses. This case study has important lessons applicable to opportunities for renegotiating institutions that govern common-pool resources.

Keywords: Common-Pool Resources, Fisheries, Marine Spatial Planning, Equity, Design Principles

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An alternative water governance framework bonding the pathways to deliver the human right to water

The debate surrounding water as a human right or water as an economic good is flawed on the basis of illogical comparison and is no longer relevant to push forward water governance research. The human right to water (HRW) cannot be understood to be in conflict with the pathways that deliver it. Rather, a discussion is warranted on the various pathways that can be used to realize the HRW. This paper identifies the strengths and weaknesses of each of three pathways delivering the HRW: government regulated, priced and privatized, as well as community managed. It is evident through literature as well as case analyses that these pathways are often applied as single-source solutions or panaceas, but each pathway on its own has failed to deliver the HRW. None of these pathways can ensure water rights in isolation. We argue that a polycentric governance approach would be more suited to ensure access to water. Polycentric governance is characterized by embracing complexity through the retrofitting of existing institutions, context specific institutional structure, capacity for adaptation and resilience, as well as multiple nodes of authority. In doing so, we hope to push the debate towards a discussion of using all three pathways to realizing this basic and fundamental right.

Keywords: Commons, Complexity, Human Right to Water, Polycentric Governance, Water Governance

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Approaching the Food-Energy-Water Nexus: From Watershed to Megaproject Based Perspectives

The Food-Energy-Water (FEW) Nexus has been presented as a new topic. In some of the developed analytical frameworks, the watershed has been presented as the basic scale, placing water in the center. At the same time, the FEW nexus has been developed as a security issue and has proposed that exogenous factors such as urbanisation influence the nexus. Nevertheless, this analytical framework is flawed on the basis that it does not expose the significance of how the watershed is utilized as a tool to legitimize resource allocation in the name of security. These allocations are often diverted towards megaprojects, such as hydropower dams and biofuel. This is problematic as megaprojects, deeply affect the FEW nexus often through a radical transformation of space. We suggest that by placing megaprojects at the centre of the nexus we can truly expose the challenges entrenched within resource governance: 1) power asymmetries, 2) contradictions of development and the right of the individual, and 3) the hierarchy that exists in how resources are managed and where resources flow.

Keywords: Watershed Management, Food-Water-Energy Nexus, Biofuels, Hydropower, Megaprojects

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How Migration Transforms Institutional Choice for Indigenous Mexican Communities

Mexican indigenous communities possess 10% of Mexico's mega-biodiverse territory, making them crucial actors for environmental governance. They manage their territories as collectively-owned commons, and this requires community members to commit their time and resources to attending village meetings, serving in village government, and providing labor for village public work. Migration transforms many of these communities, with an estimated 1 out of 7 indigenous Mexicans living in the United States. On one hand, this removes the hearts and brains and backs of important environmental managers, threatening a kind of 'tragedy of the abandoned commons,' a garden gone to weeds. On the other hand, this stress is mitigated because migrants often send remittances and return after stints abroad. Communities have developed a wide range of institutional responses to the pressures and opportunities of migration, with some imposing little barrier on leaving or returning, while others impose rather draconian rules limiting time abroad and requiring migrants to meet community obligations while absent or pay substantial fines upon return. These approaches, together with factors such as population and natural wealth, affect the ability of communities to harness the participation of migrants. At the same time, migration dynamics are changing as rural Mexico adapts to increased border enforcement and declining economic opportunities in the US. This presentation examines community case studies and Ostrom's model of institutional choice to identify key factors affecting the ability of communities to be successful at environmental governance in the context of changing migration pressures.

Keywords: Migration, Trans-Border Communities, Institutional Choice, Mexico, Oaxaca

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Forest Commons and Community Forestry in Evolution in Europe

Forest commons in Europe are composed of particular set of resources, their users, institutions, and mutual interactions, adaptable to natural and social disturbances often in the absence of external authority. When management is carried out in common, further opportunities to learn come from issues of participation, collective decision-making and shared responsibility. Worldwide forest commons are providing a wide range of different arrangement between and even within countries. Hence, there are also different understandings of “forest commons” and “community forests” and related concepts such as “common (or community) ownership”, “common arrangements”. Forest property itself is thus not only important category but property regime. Collective forest property regimes are complex, as ownership refers to bundles of rights that together constitute resource ownership arrangements, including access, withdrawal, management, exclusion, and alienation from which first three categories are essential to be able to shape management practices and regimes.

Processes of globalisation affect forest management performance by accentuate economy of scale; thus actors at global scales who are not embedded in local institutional arenas may challenging local institutions’ ability to effectively govern forest resources and landscapes. Survival of forest commons under a new set of vulnerabilities depends on institutional Capacity to learn and adapt to on-going changes and offers promising learning experiences. This relates to European community forests, traditional commons as well as newly constituted commons.

Under the Cost Action Facemap we provides cross country meta analyses to identify key variables that makes forest commons regimes in Europe robust and adaptable to changing External conditions. In the context of sustainable use of forest resources we examine harvesting rules, collective choice arrangements, conflict resolution mechanism, congruence with local conditions, type of monitoring, sanctioning, and recognition of rights at upper governance level. Thereby we intend to contribute to the understanding of the diversity but also the typical and specific features of common pool resource regimes (CPRs) in industrialized and post-industrialized societies and (ii) to discuss how common pool resources regimes (CPRs) in European forest contribute to Sustainable Forest Management and typology of small Scale forestry.

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Bhutan's gentle transition: organic agriculture and natural resource use in the Himalayan Kingdom

Efforts towards agricultural modernization in Bhutan started in the 1960s after the official opening of its borders to the outside world. Since then, extensive material and technical assistance have been provided by the national as well as international governments in an effort to increase and diversify agricultural production and increase food self sufficiency. Heavily subsidized support has been provided by the government, ranging from the incorporation of farm machinery, hybrid seeds, new varieties of vegetables and fruit products, extensive farm road and infrastructural development as well as synthetic fertilizers, and pesticides. While farmers remain greatly dependent on government support, considerable heterogeneity remains in terms of socio-economic status, as well as how farming is organized. Farmers in the more remote areas largely remain subsistence based with minimal market access, while some others have transitioned into market-oriented entrepreneurial systems of agriculture. Taking advantage of the still largely traditional forms of small scale farming with minimal external inputs, the Ministry of Agriculture and Forests of Bhutan established a policy to promote organic agriculture in 2007, which was then followed by an announcement at the Rio+20 conference, committing itself to becoming 100% organic by 2020.

How is such a uniquely government-led effort towards the promotion of organic agriculture influencing how farmers have traditionally practiced agriculture and natural resource management? How are such “transitions” being perceived and playing out at the policy and ground levels? To answer such questions, a structured questionnaire survey was conducted with 134 farmers in four districts in western Bhutan during January through March, 2014. The survey assessed the changes observed in the socio-economic traditions as well as techniques of farming, and farmer's general perceptions on “organic agriculture” as well. To supplement the survey, personal interviews were conducted with farmers, agricultural extension officers, horticultural and livestock specialists, researchers, and government workers during January to March, and September to November of 2014.

Despite the rising concerns over a changing agricultural landscape, there are traditional expressions of collective natural resource management that remain. One such example is the tradition of sokshing forest management, which are forest plots managed for leaf litter collection. These plots, passed down and managed through generations, have been important sources of fertility for the farmers' fields. With Bhutan's efforts towards increased agricultural production alongside an emphasis on organic agriculture, demand for forest leaf litter is changing. Despite continued access to the forest plots for leaf litter, concerns remain regarding the long term sustainability of sokshing management and use. This paper will introduce Bhutan's progress towards its vision in organic agriculture, while highlighting changes and challenges in local natural resource use, such as with the sokshing forests, in recent years as it reflects the various policies and the patterns of agricultural transitions that are being experienced.

Keywords: Bhutan, Organic Agriculture, Forest Resource Use, Fertilizer

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Resource Entitlement and Social Vulnerability to Climate Change in Bangladesh: Experience from Community based Conservation Initiatives

Focusing on community based conservation initiatives, this paper intends to understand whether and to what extent these initiatives can address the social vulnerability of forest communities in Bangladesh. It also examines why the conservation initiative in Bangladesh remains limited in scope to address vulnerability to climate change. Bangladesh is one of most vulnerable countries to climate change; especially the southern coastal belts of Bangladesh are much more vulnerable where the majority of the forests are located. Based on the resource entitlement framework, this study analyses the local power relations and the institutions that controlling the access and ability of the socially vulnerable people to take the advantage of the conservation initiatives. Analyzing two empirical case studies; one on the integrated conservation initiatives in the Sunderbans forest and another on the co-management initiatives in the Chunut Protected areas, this study argues that vulnerability of forest communities is largely related with their livelihood security problem; where the central issue is not only in terms of scarcity of environmental resources, rather to secure access to and control over the available natural resources.

This paper found that despite some positive signs of forest devolution, the community based conservation initiatives fail to address the dynamic relationships among the formal and informal institutions that largely shape the rights and access of forest communities to forest resources. These policies ignored the social construction process that generated inequality and marginalization in gaining access to forest resources. This paper argues that various forms of institutional arrangements and their relationships are of central importance in determining which social actors gain access to and control over their local natural resources. This, in turn, contributes to the forest communities' limited ability to ensure their livelihoods, their basic needs and their capacity to cope with adverse events such as climate induced hazards. Without addressing the equitable distribution of resources and access and without addressing the political economic settings where access and opportunities are captured by elite, community based conservation initiatives cannot be an effective channel to address vulnerability to climate change.

Keywords: Social Vulnerability, Entitlement, Community Based Conservation, Climate Change, Institution

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Applying the Governmental Impacts Framework for Analyzing the Impact of Governments and NGOs on Collaborative Natural Resource Governance: A study of 12 Indian Forest Committees

This study highlights the tendency within existing commons literature to focus on self-

governance and how appropriators are capable of self-organizing and managing resources on their own. The study argues that in most situations these self-organized efforts do not operate on their own and that some level of external influence in the form of federal, state, and local level agencies and/or nongovernmental organizations (NGOs) exists. This study aims to analyze the impact of external agents (government and nongovernment) on: (1) issue definition, (2) structure and decision making, and (3) resource distribution by using the Governmental Impacts Framework (GIF) developed by Koontz and his colleagues (2004). Though GIF was developed to analyze the impact of government agencies, this study extends the framework to the role of NGOs. The framework is very helpful in understanding the impact that government (at federal, state, and local levels) and NGOs have on the collaborative partnership in all three stages of the framework and the possible environmental and social outputs generated by the partnership. In addition, it is helpful in determining how NGOs function in the presence of government agencies by directing the communities to the resources that government has to offer.

Keywords: Community Based Natural Resource Management, Governmental Impacts Framework, External Impacts On Communities, Forests Management, Institutions

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The legitimacy of multilevel governance structures for benefit sharing: REDD+ and other low emissions options in Peru

Peru has opted to adopt a nested-jurisdictional approach for REDD+, but the development of the national benefit sharing system has only just begun. In this context, an immediate challenge is the creation of a multilevel governance architecture and process that integrates benefit sharing proposals and *ad hoc* arrangements that have been emerging at the project and regional level into a national benefit sharing system that encompasses REDD+ and other low emissions development initiatives.

This paper presents findings from 125 semi-structured interviews with regional-level key stakeholders and 110 key stakeholders from three regions of the Peruvian Amazon where we focused on nine initiatives—including but not limited to REDD+ pilot initiatives—to assess the legitimacy of multilevel governance institutions and processes through which benefit-sharing arrangements are being negotiated. We examine legitimacy by assessing the different normative components of procedural legitimacy, which refers to opportunities for representation, participation, coordination and transparency in all phases of decision-making processes. Given the multilevel and multi-sectorial nature of low emissions development initiatives, benefit sharing arrangements at the subnational level are being negotiated through both multilevel governance forums such as REDD+ roundtables and local organizations created or strengthened by project proponents. Ensuring that these negotiations are open and inclusive is essential to assuring that the benefit sharing arrangements are legitimate and that outcomes for those affected by the arrangement are fair.

Findings indicate that involving a diversity of actors from multiple levels and sectors can improve the legitimacy of processes and outcomes associated with benefit sharing at the project, sub-national and national levels. Nevertheless, while sub-national REDD+ initiatives represent a promising and innovative platform for deliberation over policies related to

REDD+, including benefit sharing, they have limitations. This research suggests that at the subnational level, local governments and indigenous peoples' organizations do not participate directly, and the participation of other civil society organizations such as producer and farmer organizations in regional platforms is minimal. Findings also indicate that the creation of local organizations intended to represent local people in projects does not necessarily guarantee a robust and legitimate benefit sharing arrangement. The quality of information sharing has also been mixed, with considerable information asymmetries between project proponents and local people and differences in the level of transparency through the multiple phases of the projects. As the scope of REDD+ widens, the inclusion of non-monetary benefits has also become increasingly important in the absence or delay of carbon payments from an uncertain global carbon market.

Keywords: Benefit Sharing, Procedural Legitimacy, Low Emissions Development, REDD+

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Sustainability and Collective Social Goods for the Oft Forgotten

Sustainability policy and practice at the community, region, and national scales has made only modest progress at integrating social justice into sustainable development. Efforts to advance sustainability, particularly collective social goods provided by governments, NGOs, and the private sector have oft forgotten the needs of specific classes of persons—in particular the underclass, natural hazards victims, the oppressed, refugees, and the poorest of the poor. As a locus of desolation, these classes of persons may require distinctive and targeted approaches to sustainability. As a fault line in development practices, this issue is both rising in urgency and open to analysis.

In this paper, we examine the implications of explicitly considering these categories of persons in sustainability practice at multiple scales and in multiple sectors. For each category of persons, we: 1) briefly review the available literature linking them (or not) to sustainability concerns, 2) provide specific examples from North America, Africa, and Asia, and 3) propose potential remedies to expand the scope of sustainability policy and practice to include the oft forgotten. Attention to the oft forgotten can significantly advance more comprehensive and just forms of sustainability.

Keywords: Sustainability, Collective Social Goods, Poorest of The Poor, Refugees, Politically Oppressed, Policy, Justice

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Collaborative approach to assessment of social-ecological systems based on ontology engineering

How do we assess the social-ecological systems? There are actually various perspectives towards a social-ecological systems in a particular field among stakeholders, and therefore it is difficult to share this assessment result. The social-ecological systems (SESs) framework supports sharing the perspectives by providing the common items. However, it is necessary to share not only what to be identified as items but also how to link semantically between items in order to understand the mutual difference between perspectives explicitly. Ontology engineering, which is one of the base technologies in semantic Web technology, is a method to design some sort of guideline facilitating knowledge-sharing. It enables us to share a mutual difference between perspectives through explicating a definition of a concept. This paper aims at proposing the collaborative approach to assessment of social-ecological systems by means of ontology engineering approach. For this purpose, we first define the concepts reflected by the items in the SESs framework and incorporate these into the ontology dealing with sustainability science (SS). Second, we incorporate the goal items and indicator items proposed in the workshops of the Satoyama planning. As a target case we review the practice carried out in a Kizugawa city of Kyoto prefecture in Japan, which deals with the planning and management to maintain Satoyama and conserve ecosystems within the city while preserving unique history and cultures by means of the partnerships among various stakeholders. In this planning process a series of workshops were organized in which activity groups and city workers participated and discussed such essential issues as goals of the plan, principles of actions and evaluation indicators between 2012 and 2013. Third, we assess the proposed goal items and indicator items from the aspect of the SESs by means of the constructed SS-SESs ontology. As an assessment result the semantic linkages which represent the knowledge structure of the stakeholders are shown, and it enables us to understand the differences of the perspectives between stakeholders. Finally, we discuss how we actually use the SS-SESs ontology in the context of environmental planning and management. Concretely, we propose some ideas to implement collaboration by sharing all sorts of knowledge in different contexts.

Keywords: Structural Assessment, Social-Ecological Systems, Ontology Engineering, Indicator Design, Planning Process

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Local institutions for cooperative pest management to underpin market access: The Case of Industry-Driven Area-Wide Fruit Fly Management

The impact of pests on food security, livelihoods and environmental sustainability can be devastating, yet pest management remains under-explored as a commons issue. In particular,

mobile pest problems are best addressed when landholders within a region cooperate with each other to prevent infestation from neighbouring land. The concept of area-wide management of mobile pests offers advantages over uncoordinated farm-by-farm efforts as it results in more effective pests control and reduces the need for pesticides. Literature about area-wide pest management focuses predominantly on the technical aspect of these programs, causing a blind-spot for the importance of social and institutional aspects. In addition, in Australia there is increasingly an expectation that industry will play a leading role in managing, funding and implementing area-wide management programs. In this presentation the eight design principles for robust common-pool resource institutions are applied to industry-driven area-wide pest management. Three Australian case studies are compared to gain insight about the social and institutional aspects that affect the success of these undertakings. These cases are focused on Queensland Fruit Fly (*Bactrocera tryoni* (Froggatt)) control to underpin market access. A challenge for growers is to gain support from town residents and lifestyle block owners as backyard fruit trees can present pest breeding spots. The paper illustrates that social aspects—such as heterogeneous incentives, social capital, ratio between town residents and main beneficiary growers—influence the ease at which the design principles can be applied. Market access opportunities impact the ratio of costs and benefits to different participants. The paper concludes that disconnecting the technical aspects of successful programs from the social and institutional aspects in which they are embedded can create unrealistic expectations in socially different regions that intend to replicate these programs.

Keywords: pest management, social ecological systems, market influence, public participation, social dilemmas

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Village Federations: Robust Nested Governance in Northern Spain (Navarre, 14th- 20 centuries)

Among Ostrom's design principles (E. Ostrom, 1990), institutional nesting appears as one of the least explored ones. Despite its acknowledgement as one of the building blocks contributing to the sustainable management of common-pool resources, the amount of works devoted to its study pales in comparison with the number of analyses focusing on, for example, sanctioning or collective-choice arrangements. Some authors have pointed to the relative simplicity of the common-pool resources and common-property regimes originally analyzed by Ostrom and her colleagues as the main reason behind this lack of in-depth analysis (Armitage, 2008). In the last years, however, growing recognition of the complexity of socio-ecological

systems seems to be putting the study of more sophisticated institutional arrangements for the management of common-pool resources back in the research agenda. Notions such as ‘multi-level governance’ or ‘multi-layered institutions’, echoing first insights on nesting, are now becoming buzzwords among commons’ scholars (Marshall, 2008; Poteete, 2012). From the historian’s point of view, however, one concern remains: most of these new analyses focus on contemporary common-pool institutions, hence preventing the deployment of a long-term perspective.

The aim of this paper is to contribute to fill this gap. To do that, we present two historical case studies of nested regimes for the management of common-pool resources. Pre-industrial Europe was rich in the collective management of natural resources (De Moor, 2008). In particular, the Valley of Roncal and the Sierra of Lokiz, both of them situated in Navarre, northern Spain, arranged across several levels the management and use of grazing pastures and forests already by the 14th century. The study of both governance regimes allows us to provide some preliminary answers to our research questions: How was nesting articulated in pre-industrial societies? Which were the factors which gave rise to this particular institutional arrangement? Which were their advantages and risks?

Keywords: Common-Property Regimes, Design Principles, Nesting, Federalism, Multi-level Governance

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Changing the Commons. Understanding Institutional Change in Seven Pre-Industrial Communities, Northern Spain, 14th-19th centuries.

In this paper we bring together Elinor Ostrom’s stress on the ‘grammar of institutions’ and Avner Greif and other’s historical approach to the study of institutions in order to analyze patterns of institutional change in a set of seven pre-industrial communities in northern Spain between the 14th and the 19th centuries. Our focus lies in the process of institutional change within a collective action setting. For much of the pre-industrial era, rural communities in Spain preserved important self-governance features, with village councils and neighbors assemblies in charge of coordinating and regulating interdependences among individuals in every realm of their economic and social life – not the least in the collective exploitation of pastures and forests. By collecting and codifying the regulations these communities produced over the centuries, we have built a large dataset that allows a systematic comparison across them and over time. A preliminary analysis of the patterns of institutional change as reflected in the regulations is presented here.

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Aboriginal fishing principles and values in a globalized world: are remote aboriginal communities along coastal British Columbia able to adapt their traditional use and management of clam fisheries to fit within current environmental, market, and policy conditions?

This case study highlights the importance of coastal aboriginal people's involvement in the governance of fisheries resources, both in an effort to preserve their coastal livelihoods and to maintain their territorial connections. This paper focuses on aboriginal people along the coastlines of British Columbia, Canada, who have a long-standing history of harvesting on, managing, and altering clam beaches. Arguably, these aboriginal people have adapted to changes in intertidal clam fisheries occurring from the pre-colonial to post-colonial eras, using clams for food, trade, cultural practices, and commercial interests. But in recent decades, combinations of environmental, market, and policy conditions have influenced a decline in landings of wild clams along these coasts. Although these fisheries remain significant to local communities, as small-scale fisheries they have largely lost their value to the larger world. At the same time, federal and provincial government initiatives favouring aquaculture have promoted the expansion of finfish and shellfish aquaculture, often on or adjacent to wild clam beaches. This has led to a further loss of space for the wild clam fisheries. Drawing on recent literature, this paper considers how factors such as exotic species introduction, predator reintroduction, shifts in market preferences and pressures, government cutbacks to regulators, modern treaty agreements, and aquaculture expansion initiatives are affecting clam fisheries. Additionally, data gathered during fieldwork in remote coastal aboriginal communities is presented to examine how these communities are adapting and re-instating local methods of managing clam fisheries. Aboriginal fishing principles and values in a globalized world: are remote aboriginal communities along coastal British Columbia able to adapt their traditional use and management of clam fisheries to fit within current environmental, market, and policy conditions?

Keywords: Indigenous People, Fisheries, Bivalves, Governance, Adaptation

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Assessing Recreational Fisher Compliance in British Columbia's Rockfish Conservation Areas

Compliance with rules is known to be an important element of the success of conservation measures. Between 2003 and 2007, a network of 164 Rockfish Conservation Areas (RCAs) was created along the coast of British Columbia in an attempt to protect depleted rockfish populations. As long-lived, slow-developing species, susceptible to barotrauma (overexpansion of the swimbladder when pulled to the surface), rockfish are vulnerable to overfishing. Recent research indicates that, despite more than 10 years of protection, RCAs are not as effective at recovering rockfish as they ought to be. Non-compliance, especially recreational fishing pressure, is suspected to be a problem. Through the use of structured surveys with recreational fishers, including a random response technique (n=325), in tandem with remote photo monitoring of RCA and non-RCA sites (n=40), this project quantifies current levels of recreational compliance within RCAs in the Strait of Georgia in southwestern British Columbia. We found that general knowledge of RCA locations and regulations was low. 25% of survey participants had never heard of RCAs, and 60% are not confident of their locations.

Additionally, less than 1% of respondents know what type of recreational fishing is restricted in RCAs. Remote camera monitoring also provided evidence of confirmed or likely illegal fishing in 65% of RCA locations. We are using generalized linear modeling and an information-theoretic approach on remote camera data to predict illegal fishing activities in RCAs. These models also account for numerous variables such as environmental features (e.g. rugosity, kelp cover) and proximity to boat launches in order to determine if RCAs are being deliberately targeted or accidentally fished. Survey results suggest an overall lack of knowledge is the major cause of non-compliance. However, low-levels of RCA enforcement is also cited as a likely cause of non-compliance. Despite the general lack of knowledge about RCAs, survey participants were largely supportive of this conservation effort and the conservation of inshore rockfish species. The results of this study suggest that an awareness campaign, highlighting RCA boundaries and regulations, could improve current levels of recreational fisher compliance within the Strait of Georgia RCAs.

Keywords: Compliance, Rockfish, Marine Conservation, Recreational Fishing, Remote Camera Monitoring

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From community Based to Community Driven: Creating an empowering environment for communities in management of the commons in the Okavango Delta Botswana

Most studies on community based natural resource management (CBNRM) in Botswana and Southern Africa in general conclude that the programme has had as many failures as successes. Studies associated with this paper also attest to the mixed fortune of failures and successes. This paper however does not focus on these results but on the observation that the programme plays another perhaps unintended role. It has become a platform of interaction for three main actors; the communities, donors and process facilitators, by so doing defragmenting resource management in Botswana and other parts of Southern Africa. While this is to be applauded, it has also emerged that the communities often struggle to maintain or improve the CBNRM projects after the outside actors leave. In this paper we present the results of analysis of the interactions in three CBNRM projects in the Okavango Delta villages of Mababe, Gudigwa and Tubu and come up with a framework for innovation to overcome the problem. We found that these interactions bring other forms of benefits (other than the typical conservation and livelihood), such as community exposure to new production systems, to people and organisations (networking) and views or new thinking. We conclude that the ability of the community to sustain the CBNRM programme after outside actors leave or beyond the mobilization stage depends on the nature of the interactions: Thus, whether they were empowering or disempowering. The design of this interaction should facilitate holistic empowerment of the communities. Interaction should be both socio-politically and economically empowering. Holistic empowerment manifests itself in the ability of the community to mobilise or source further support (technical or financial), without which even those programmes that do not collapse struggle. We recommend a brokerage strategy, to first of all ensure that community empowerment results from the interactions, but also to render

support and reinforcement of community efforts for as long as it is needed beyond the typically short CBNRM mobilisation period. A brokerage system provides a natural resources broker (NRB) who operates on the side of the community during the interactions and beyond.

Keywords: CBNRM, Botswana, Okavango Delta, Community empowerment, Natural Resources Broker

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Conflict resolution mechanisms and the maintaining of an agricultural system: The development of local courts as an arena for solving collective action problems within Scandinavian civil law, 16th century to the end of 19th century

Rapid access to low-cost local arenas to resolve conflicts among appropriators is one of the principle's that characterizes robust CPR institutions (Ostrom 1990, 2005). In spite of this insight we have little knowledge about how these institutions solved collective action problems during the early modern period up to the end of the 19th century in Scandinavia and their impact on the agricultural system they were part of. The larger body of research about management of common-pool resources and collective action has been about self-governing entities. However, to understand the development of conflict resolution mechanisms in early modern Scandinavia one have to examine self-governing in the light of the emergence and development of the strong state.

Arenas to resolve conflicts among appropriators range from informal meeting among users to formal court cases. This paper will focus on local courts within the Scandinavian legal origin and how these courts developed from the 16th century up to the end of the 19th century as arenas for

conflict resolution. Court protocols are the main source material for the study. Preliminary results shows that conflict resolution mechanism for collective action problems developed and became efficient in an interplay between local appropriators and the state up to the end 18th century. Features that made the local courts successful arenas for conflict resolution were high participation of laymen, that the court could combine de jure and de facto rights in jurisdiction and that there were no legal fees for bringing cases to the local court. During the 19th century judicial reforms, from custom law to legal positivism, changed the way the courts judged. The local court thus lost its role as a low cost arena for conflict resolutions and a mediator between appropriators.

The results indicate that the access to a low cost arenas were more important than rapid access to the courts since these only met once or twice every year in rural early modern Sweden. For the court it was more important that the disputing parties could solve collective action conflicts among themselves without a verdict from the court. Lay-judges, peasants from the region, came to play an important role in such conflicts and were appointed by the court as surveyors and inspectors in legal disputes and worked to mediate between individuals or groups with competing interest. In the seventeenth and eighteenth century the court worked to maintain an agricultural system with strong reliance on commons a role they came to lose during the nineteenth century.

Keywords: Commons, Scandinavian Law, Conflict Resolution, Design Principles, Courts

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The politics of multilevel governance in land use change and climate policy: a conceptual framework

This overview paper is intended as an introduction to two panels on “the politics of multilevel governance in land use change and climate policy”. The article provides a review of multilevel governance concepts and practice, particularly in relation to land use decision making and initiatives for Reducing Emissions from Deforestation and Forest Degradation (REDD+). It is based on a review of literature complemented by comparative fieldwork in five countries. The review finds that the idea of “multilevel governance” – in its commonly used, normative expression – tends to be as somewhat of an “ideal state” between centralized and decentralized government systems, strongly related to concepts of polycentrism, and taking into account the importance of non-state actors in decision making. But in practice this conception of multilevel governance falls short.

Efforts to address climate change through mitigation strategies or the promotion of low carbon-emission development alternatives are inherently multilevel and multisectoral. REDD+, for example, cannot progress meaningfully without coordination among sectors driving deforestation, such as agriculture, infrastructure and mining, and forest or environment institutes, and among multiple national and subnational actors. Virtually every aspect of REDD+ requires such coordination: finance and benefit sharing, carbon monitoring and verification systems, land and titling policies, and so on (Ravikumar et al., forthcoming; Korhonen-Korki et al., forthcoming). Current debates over REDD+ architectures are struggling to define “jurisdictional” approaches and the relation of the national government to subnational entities.

Coordinated comparative fieldwork in Peru, Mexico, Vietnam, Tanzania and Indonesia examined multiple cases of land use change with either increasing or decreasing carbon emissions in a total of about 50 case study sites, including REDD+ sites. Methods included hundreds of interviews with key informants and regional and local government officials, as well as in-depth interviews to explore histories of land use change and benefit sharing arrangements. These processes are fundamentally political: they reflect the interplay of diverse political and economic interests and priorities, power relations and histories. This article contributes to our understanding of multilevel governance through research that explores the dynamic power relations and politics of land use decisions across scales and within landscapes.

Keywords: REDD+, Polycentrism, Decentralization, Multilevel Governance, Legitimacy

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The Environmental Governance of the Commons in the Nevado de Toluca Protected Area (State of Mexico). A Critical Analysis of Participatory Mechanisms for Environmental Management

In many countries, the imposition by the State of protected territories on common lands has often been a source of conflict and has led to ineffective conservation. Local traditional authorities, constrained by the inability to ensure effective control on their resources have been forced to abandon their management responsibilities. Concern regarding sustainable development participatory management strategies, such as co-management, collaborative or joint management, has increased over the last twenty years at an international level (Ghimire & Pimbert, 1997). Nevertheless, positive expected outcomes, like environmental effective conservation and environmental democracy, have proved elusive (Pimbert & Pretty, 1995) even if studies show a positive relationship between local management, economic development and social justice (O’Riordan & Stoll-Kleemann, 2002; Brosius et al. 2005; Wilmsen et al. 2008; Merino Pérez & Ortiz Merino, 2013). Besides participatory mechanisms can also act as government tools to eradicate conflict and legitimize public authority decisions. The analysis of these instruments can be used to understand what conditions offer an effective right to participate and other externalities (e.g. conflicts for the access to natural resources), helping to highlight multiple interactions at different levels and environmental governance.

In October 2013 the Nevado de Toluca National Park was reclassified as Wildlife and Fauna Protection Area, based on an expert discourse presenting communities as both responsible for environmental degradation of the park and actors of change in the new status, all justified with economic arguments. This change was, following the Mexican environmental law, based on the participation of stakeholders at different levels. Besides the legally imposed nature of these tools, it appears that they are also used to prevent potential conflicts (as it was the case in other protected areas) and to promote the social acceptability of this public decision. However, guaranteeing use rights, relevance of rules and clarity of institutional rights are more important than the new legal status of the Protected Area.

Thus, in response to the participatory approach implemented by the public authority and the neoliberal orientations taken by the government on conservation policies, conflicts, alliances and innovations have emerged. This communication aims to analyze the interaction among actors involved or absent in the deployment of such participatory mechanism and their impact on territorial governance by adapting the social-ecological system framework (Ostrom, 2007) to fit the collective property context in protected areas.

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Keywords: Territorial Governance, Environmental Democracy, Participatory Mechanisms, Commons, Conflicts

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Factors for Effective Ethical Indigenous Corporate Collaboration: Creating Shared Space With Industry and Community in the Boreal Forest

Canada's Boreal forest has sustained a commons for over ten thousand years, yet oil sands operations have rendered aspects of it unusable other than for industrial resource extraction. Business ethics arguments (Lertzman and Vredenburg, 2005) recognize it is unethical to sacrifice the viability of indigenous peoples and their cultures for the sake of industrial resource extraction, yet it is ethical to engage with indigenous peoples in a manner consistent with their self-determination and community development agendas. Companies have tried various indigenous corporate engagement strategies to offset impacts with benefits. One such strategy involves collaboration between a company and a community for mutual goals of community economic development. These 'indigenous corporate collaborations' tend to fall on a spectrum of engagement from collaborations transactional in nature, to transitional, to those of a more transformational character. While there seems to be agreement on the potential for such for ethical engagement between resource industries and indigenous communities, little formal investigation has examined the conditions under which such attempts at ethical engagement become more or less effective. Grounded in professional practice and literature from the fields of indigenous community economic development, community corporate engagement strategy, cross-sector partnerships and business ethics, we developed a framework with five factors for effective ethical engagement. We applied this to the case of Suncor Energy's collaboration with First Nation communities, mainly in the region of their Boreal forest oil sands operations over the course of about 18 years. Suncor seems to have moved across the spectrum with more

recent collaboration entering the transformational zone. We describe this zone as 'deep collaboration' creating shared cultural and ethical space. In this realm the collaborative initiative creates an opportunity for a new kind of commons emerging between community and company.

Keywords: Boreal Forest, Self-Determination, Community Development

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Network structure and cooperation in agricultural commons management

Assortment of cooperators and non-cooperators is a classic multilevel evolutionary problem. One solution to the problem emerges from social monitoring and reputation. In real-world commons dilemmas, monitoring and reputation exist in the social networks of resource users and managers. Thus, the structure of social networks may evolve to solve cooperation dilemmas in commons management. Sustainable agriculture can be usefully framed as such a multilevel cooperation problem, as costs are generally privately borne while many benefits are public. Here, we investigate the structural properties of information sharing networks of farmers involved with three local sustainable viticulture partnerships (Lodi, Napa Valley, and Central Coast of California). In addition to the environmental commons resources used in agriculture, a regional reputation for sustainable production can bring brand loyalty and price premiums to all growers from a region, adding an additional potential benefit to regions with growers engaged in sustainable practices. We hypothesize that structural characteristics of the grower networks reflect the underlying problems of innovation and cooperation that are required for sustainable commons management. Following Berardo and Scholz's risk hypothesis, more "open" network structures and boundary-spanning actors support innovation, while more "closed" network structures are linked to cooperation. Using exponential random graph models, we statistically test these hypotheses using social network data collected from surveys of winegrape growers, where each grower is asked to nominate others with whom they share information. In all three networks, growers form closed triangles at levels well above chance, which we argue is a consequence of perception of a high-risk environment and is adaptive for solving cooperation dilemmas. We also find evidence for open structures that facilitate innovation diffusion, though the strength of this tendency varies across networks and is strongest in the region with the greatest adoption of sustainability practices and certifications. We argue that these structures facilitate a solution to the multilevel cooperation problem of sustainable agriculture.

Keywords: sustainable agriculture, viticulture, cooperation, social networks, ERGM

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Innovative approaches to challenges faced by projects that link social inclusion with conservation: the Payun Matru case study

In 2012 the Argentinean Ministry of Science and Technology (MINCyT) launched a call for proposals targeted at smallholders, for projects aimed at developing the commodity chain for camelid fibre. Public-private Consortiums had to be established in order to apply for the funding from IDB origin and conduct the projects. A Consortium integrated by the National Research Council (CONICET), the National Institute for Industrial Engineering (INTI), Malargue Municipality and the Payun Matru Cooperative was awarded funding to develop technological innovations towards the establishment of a guanaco fibre commodity chain for the benefit of local pastoralists. The Project included the installation of a fibre processing plant in a remote village in NW Argentina. Multiple challenges included the sustainability of the project; the establishment of a fair and transparent market for guanaco fibre; technological challenges, and strengthening the Cooperative in order to turn it into a profitable enterprise as well as a healthy institution.

This paper analyses the complexities of projects that aim to link conservation of a CPR with social inclusion and rural development based upon the Payun Matru experience. Unexpected challenges faced the project. The IDB funding posed strict restrictions at eligible items. The payment of wages, which were crucial for the viability of the project, was not permitted. Crucial commitments in terms of funding made by the local Municipality could not be met. The different working frameworks and agendas by the project partners created a need for permanent deliberation. As the project developed, conflicts within the Cooperative and struggles for power and resources started to emerge.

A turning point came when project partners sought new collaborations at national, regional and local levels to develop new intervention strategies. The Consortium was able to make the most of its complement of skills and resources. Additional funding sources were sought; the Ministry of Labour, Ministry of Natural Resources and the Secretary of Environment were invited in order to provide different means of support, highlighting the benefit of building networks from the national to the local level for the implementation of projects that aim at social inclusion and natural resource governance.

Keywords: Wildlife Management, Social Inclusion, Rural Development, Guanaco Fiber, Public Policies

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A rules-based classification of payment for ecosystem services programs

While the literature on payment for ecosystem services (PES) programs is developing rapidly in response to increased interest in PES as a tool for conservation, many gaps remain. One of these gaps is a clear understanding of the institutional arrangements of successful and unsuccessful PES programs. While some analyses are available, these initial efforts often lack consistent application of a clear framework for analysis. As a result, studies are difficult to compare and lack generalizable results. To address this gap in the literature, we utilized Ostrom's Institutional Analysis and Development (IAD) Framework to structure an analysis of PES programs based in the United States and Latin America. The IAD Framework defines institutions as "...the prescriptions that humans use to organize all forms of repetitive and structured interactions..." (Ostrom 2005, p. 3). The IAD Framework has been used extensively for analysis of institutions for the management of common pool resources. Many PES programs fall into this category of institutions. Ecosystem services are a common pool resource – it is difficult to exclude individuals from using an ecosystem service, e.g. a stream for discharge of excess nutrients impacting the provisioning ecosystem service of clean water, but use by individuals does impact others ability to use the resource. Specifically, we used the IAD Framework's institutional grammar to classify PES program rules by type according to their aim. The focus of our study is the rules-in-use by each program – the prescriptions used to govern interaction between actors – and how these rules compare across programs. We will present a new classification system for payment for ecosystem services programs based on the rules utilized by individual programs and apply the classification system to categorize PES programs. While there are examples in the literature of PES classification systems, there is currently no classification based on the rules-in-use by PES programs. Our definition of PES - voluntary transactions, both market and non-market, between buyers and sellers, of defined ecosystem services, with or without strict conditionality – limits the range of PES institutions included in our study. This work improves our understanding of the wide diversity of institutions used to implement PES on the ground and allows for systematic evaluations of the effectiveness of different institutional structures. Consistent classification of programs by rules allows comparison of similarly structured programs across different biophysical settings and with different community attributes and contributes to increased understanding of the conditions related to success and failure of PES schemes.

Keywords: Payments For Ecosystem Services, Ecosystem Services, IAD Framework, Institutions, Rules-In-Use

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Can Indigenous Transborder Migrants Affect Environmental Governance In Their Communities of Origin? Evidence from Mexico

Rural out-migration profoundly affects Mexican indigenous communities and this includes management of their traditional territories. The Purépechan ethnic group has lived for at least eight centuries in rural settlements in the highlands of Michoacán, where they own a high percentage of the state's forests. For several decades, Michoacán has retained one of the highest rates of migration from Mexico to the United States, leading to the formation of trans-border communities that connect migrants with their home (or sending) villages.

While out-migration can drive environmental change in sending regions through agricultural abandonment and forest transitions, much less is known about the degree to which transborder indigenous migrants are participating in and influencing environmental governance in their communities of origin. This paper addresses that knowledge gap through a case study of the Purépecha of San Pedro Ocumicho, located in the central Mexican state of Michoacán, and its trans-border community in the Coachella Valley, California. We aim to identify the key factors that act as determinants of migrant participation and investment in communal territorial use and governance. Ethnographic fieldwork was conducted with Purépecha in San Pedro Ocumicho and its transborder community located in the Coachella Valley, California, and involved a mix of participant observation and in-depth semi-structured interviews.

Our results describe the governance structure and migration dynamics of Ocumicho, followed by an analysis of Ocumichenses living in the Coachella Valley and their relationship to and ability to influence the hometown's territorial governance issues: forest management and agricultural land use. Our findings show that migration in Ocumicho has been one of the main causes for environmentally unfriendly land-based practices such as land rental and the liquidation of assets through topsoil sales. Furthermore, the continued physical absence of migrants weakens the community's ability to patrol and govern their extensive forest commons. Migrants living in California, while maintaining strong connections with their hometown, are precluded from participating in or influencing decision-making with regards to territorial governance, with changes in migration dynamics and insufficient social organization in Ocumicho combining to undermine transborder migrant involvement in community decision-making and governance. This contrasts with examinations of transborder communities in Oaxaca, which are comparatively better organized.

We also discuss some initial thoughts on the variations and potential models that home communities are using (or not) to integrate migrants and return migrants into governance structures and other aspects related to environmental and territorial management. Previous findings in Oaxaca show how institutional adaptations allow migrants to participate in communal decision-making. In the case of migrants from Ocumicho, investment in hometown environmental governance is severely handicapped by low levels of social organization and weak institutional arrangements at the hometown level, which inhibit the institutional adaptations needed to involve them fully in hometown governance and investment. This case study supports the call for a better typology of transborder communities. Future work on the role of trans-border communities in natural resource management should consider several factors that affect the role of migrants in their communities of origin.

Keywords: Migration, Mexico, Indigenous People, Forest Management, Transborder Communities

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Attitudes Towards Wildlife Co-Management in The Kivalliq Region Of Nunavut: Is Dissatisfaction a Problem of Co-Management Implementation or Polar Bear Management?

Research has shown that trust is essential to the functioning of co-management. This is especially true in the Territory of Nunavut where wildlife is an integral part of the lifestyle and culture of Nunavummiut (the people inhabiting Nunavut). In Nunavut, wildlife is managed by a co-management board situated in between federal, territorial, regional, and community governments and organizations. This research explores Inuit attitudes and trust in managing wildlife as part of a co-management system in the Kivalliq Region of Nunavut, Canada. Interviews were conducted in the communities of Chesterfield Inlet, Whale Cove, and Baker Lake. Even now with the 1993 settlement of the Nunavut Land Claims Agreement (NLCA) and the implementation of a public government in 1999, there is evidence that beneficiaries of the NLCA are dissatisfied with wildlife management decisions and do not trust the governing process of co-management. Specifically, participants in this study indicated dissatisfaction with regulations and outcomes of current polar bear co-management. It has been predicted that conflicts specific to polar bear management and decision-making could lead to regulations being ignored or even defied and endanger the entire system of wildlife co-management. Results from this research indicate that dissatisfaction over polar bear co-management is compartmentalized towards polar bear management and does not necessarily apply to the broader system of wildlife co-management. Therefore, in the Kivalliq Region, predicted impacts of dissatisfaction over polar bear co-management may apply directly to the polar bear co-management system but likely not the wildlife co-management system generally. This study provides a forum where Inuit trust in the wildlife co-management system is documented and I hope it will contribute to an increased understanding of Inuit goals in wildlife management and to the discourses on co-management in Nunavut.

Keywords: Wildlife Co-management, Nunavut, Kivalliq Region, Trust, Polar Bears, Hunters and Trappers Organisations, Nunavut Wildlife Management Board, Interview Methodology

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Groundwater common pool resources in Yucatan, Mexico: Understanding commonisation processes - and anticipating decommonisation – in the cenotes of the Mayan area

Because the absence of rivers, the Maya was one of the few early civilizations to use a groundwater supply extensively (Back & Lesser 1997). However, it is well known that all groundwater exploitation made by societies results in some decline in the quality of aquifer water (Wada et al. 2010). In this paper we present the analysis of groundwater common pool resources in the Mayan area of Yucatan, Mexico. Due to the karstic and highly permeable soil of Yucatan, it is easy to find groundwater systems, which forms caves plenty of fresh water. In

the area there are thousands of these caves, called cenotes (from the Maya word ts'onot that means sinkhole), in which societies extract water for several uses (Worthington 1993). Because the cenotes were the source of water that supported a considerable population, particular emphasis is given to the interactions of communities and institutions related to the use and management of those resources, at present. We define common pool groundwater resources based on two attributes according to Ostrom (2009): the difficulty of excluding beneficiaries and the subtractability of us. We then adapt this definition to the local context of the Mayan area and present characteristics of groundwater resources located there in regard to their ecological and institutional significance and as an early recognition of a possible process of decommodification. Hence, even though numerous studies have improved our understanding of common pool resources in Yucatan, we are still looking for improving research accomplishments on the comprehension of commonisation -or decommodification- processes in a groundwater-based Mayan society: 1) It should become clear what are the processes and dynamics of change in the large groundwater system and 2) a suitable framework should be developed in order to support research regarding groundwater resources by considering the diversity of human behaviour of Mayan society. Being myself an indigenous-scholar, and by using the orientation of transdisciplinary approaches to pursue a case study of groundwater resources development and management, emphasis is given to the strategies, which people can follow in seeking to solve a common problem through communitarian actions that cannot be solved by individual private actions.

Keywords: Water, Biodiversity, Mining, Threat

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The implications of local forest conditions and dependence on forests in the design of PES programs

Do communities depending economically on their forests behave in a different way than communities that depend on forests less when a PES is implemented? Do communities with better forest conditions cooperate more to manage those forest under a PES? What is the relation between local ecological knowledge and forest management? In this paper we answer these and other questions related to forest conditions, forest dependence and ecological knowledge when a PES scheme has been in place? To do so we use forest data from 16 IFRI communities in Uganda together with data from economic experiments recreating the use of a forest where a PES is implemented in the same communities.

Keywords: Forest Condition, Economic Experiments, IFRI, and Forest Dependence

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'I'm not going to tell you that because then you'll go up there': Traditional Land Use Mapping and Cartographic Colonialism in 21st Century Athabasca Bitumen Extraction Conflicts

Traditional Land Use (TLU) mapping has become a benchmark standard of proof for Indigenous communities to demonstrate use and occupancy of their traditional lands and waters. This paper contends that TLU mapping is a problematic practice that forces Indigenous peoples to subject themselves to western systems of geographic knowledge that can be culturally inappropriate and linked to a broader history of cartographic colonization. By mobilizing concepts from social theory, cultural geography and the history of cartography we examine a variety of archival sources and materials from our work as research consultants with Fort McMurray Métis Local 1935, to trace the use of maps in the development of the oil sands industry. We argue that resource maps are fundamental tools of industrial colonization that portray the Athabasca region exclusively as a resource extraction zone. In the past two decades, TLU mapping has become an invaluable way for Indigenous communities to contest this portrayal of their traditional lands and to negotiate or fight with industry and government for economic benefits and environmental protection. However, the process of TLU mapping subjugates indigenous geographic knowledge in several ways. First, in TLU mapping indigenous peoples translate their geographic knowledge into a western medium that freezes, codifies and simplifies a deep, complex and changing relationship with the land. TLU mapping forces land users to reveal knowledge of their environment to an unlimited number of outsiders, an act that compromises the places and ecosystems they reveal and is disrespectful to the land itself. TLU mapping presents a situation where if land use information is revealed over vast areas beyond the project site, it lowers the importance of land use within the project site. We conclude with principles to move TLU mapping towards a more culturally appropriate and less problematic way for Indigenous communities to assert use and occupancy of spaces identified for resource extraction.

Keywords: Indigenous, Mapping, Oil Sands, Traditional Land Use

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Equity challenges in governing global commons: the example of the global benefit sharing fund of the International Treaty on plant genetic resources

This paper focuses on the equity challenges posed by the institutions governing commons at the global scale. Global commons raise governance challenges of equity related to access to the resource that are often less of a concern in local or national contexts. At the global level there is often significant variation in national and regional capacity to access resources which fundamentally impacts the allocation of the benefits derived from the use of the resources. In this paper we build on prior research to develop a framework to separate the equity of access from the equity of redistribution. The framework distinguishes two types of access that are relevant for resource commons. The first type of access considers resources as final goods. The second type of access considers resources as intermediate goods that require research capacity, knowledge and associated technologies to understand and benefit from their use. The framework also distinguishes between redistribution of monetary and non-monetary benefits, the latter targeting development of human and technical capacities. We ask: What are the theoretically derived institutional design principles that effectively address both equity dimensions? How can the institutional design principles be applied in a case based analysis? What new institutional mechanisms does the analysis suggest and what propositions can be developed for further research?

Informed by this framework, the paper then examines in detail one specific global commons – the Multilateral System (MLS) of the International Treaty on Plant Genetic Resources for Food and Agriculture – that has been established to facilitate the international exchange of plant genetic resources and associated knowledge for research, training and innovation. The MLS pools at the global level genetic material coming from Contracting Parties (i.e. State governments) and the genbanks they control, international and regional institutions, and natural and legal persons. It was established in a context of rising tensions about intellectual property rights and perceived inequities concerning who bears the cost of conservation and who benefits most from their use. While members of the multilateral system have developed norms in support of the common stewardship of these resources, the complexity of the equity dimension has so far imperfectly been taken into consideration, bearing the risk of jeopardizing the success of this global commons.

Through the lens of the framework, the case reveals possible institutional mechanisms and arrangements that take into consideration the complexities of access and redistribution within a global commons. The paper establishes evidence for the differentiation of the two components of equity of access and the two components of equity of redistribution, it addresses the generalizability of the findings to community or national contexts and it sets out several propositions for further empirical testing.

Keywords: Equity; Global Commons; International Political Economy; Access And Benefit Sharing; Plant Genetic Resources

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The Emergence of Community Science: Closing the Governance Gap Through Transformative Learning

Many countries attempting to shift resource and environmental management practices towards ecosystem-based management are experiencing a governance gap between intended management at the government level and the actual outcome on the ground. In Canada, recent changes in the federal Fisheries Act and significant cutbacks in federal government science and monitoring programs have widened this governance gap, specifically in the absence of local level ecological monitoring and ecosystem assessment. In response to this gap, community groups are mobilizing to monitor changes in local ecosystem processes in an effort to reduce the decline of ecosystem services and sustain their level of human well-being.

In this paper we focus on the emergence of community science as a key dimension of the collaborative or social learning required to reduce this governance gap, and to shift away from unsustainable social-ecological pathways. In contrast to citizen science, community science is led by the community and has a social nature. We examine this process in a case study of a lobster fishing community in Port Mouton Bay, Nova Scotia, in which innovative monitoring practices are being developed and scientific knowledge is co-created as a community-wide response to the threat to their ecosystem services. Here, one of the most significant elements of the community science process is its emergence from the place-based relationship between the community's experiential ecological knowledge and the community's knowledge holders in oceanography. Social learning processes of iterative observation and reflection, local knowledge - science interaction, and asking clarifying scientific questions are embedded in the day-to-day experience of Port Mouton Bay's community science.

This case allows us to better understand how differences in underlying values and interplay among institutions perpetuate the governance gap -- the mismatch between the intended goal of environmental policy and the actual outcomes that result when implemented at the local community level. Given this context, we also illustrate how and why new forms of community-driven science are emerging in response to a lack of governance.

We first outline the main concepts used to frame the analysis: the ideas of governance fit or gap, social learning, and community science. Second, we outline the issues around the governance gap in the case of Port Mouton Bay. Third, we discuss the emergence of community science as a strategy in response to the governance gap and the role of social learning as a pathway forward. Fourth, we reflect on the experience of actors in the Port Mouton case, including the barriers and opportunities associated with community science. We conclude with some discussion of the need to reflect more critically on community science and its role in governance of coastal settings.

Keywords: Governance, Ecosystem Stewardship, Social Learning, Community Science, Local Ecological Knowledge, Finfish Aquaculture, Social-Ecological Systems

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Beyond formal groups: Neighbouring acts and watershed protection in Appalachia

This paper explores how watershed organizations in Appalachia have persisted in addressing water quality issues in areas with a history of coal mining. We identified two watershed groups that have taken responsibility for restoring local creeks that were previously highly degraded and sporadically managed. These watershed groups are cases of self-organized commons governance in resource-rich, financially poor Appalachian communities. We conducted two surveys—one of all watershed group volunteers and another of watershed residents who are not group members. Through surveys, participant observation, and consultation with key informants, we found that neighbours—group members and non-group-members—supported the group’s function in informal ways. Past research has shown that local commons governance institutions benefit from being nested in supportive external structures. We found that the persistence and success of community watershed organizations also depended on informal participation of local residents. Our findings affirm past research suggesting the necessity of looking beyond formal, organized groups to understand the resources, expertise, and information needed to address complex water pollution at the watershed level. We augment the concept of nestedness in commons governance to include that of a formal organization as a neighbour that exchanges informal neighbouring acts with local residents.

Keywords: Watershed Groups, Nestedness, Neighbouring, Informal Participation, Appalachia

Vulnerability and Protection of Drinking Water Sources: A Case Study of the January 2014 Chemical Spill in West Virginia

Many drinking water supplies worldwide rely on surface water sources that are highly vulnerable to chemical and other contamination. On January 9, 2014, over 10,000 gallons of crude MCHM (4-Methylcyclohexanemethanol) – a chemical used in the coal cleaning process – leaked from a storage facility into the Elk River in West Virginia. Only a mile and a half downstream, the chemical entered the regional drinking water supply system serving over 300,000 people in nine counties. The governor of West Virginia declared a “state of emergency” and advised residents not to use the water for drinking, bathing, or cooking. Restaurants and schools were closed. The US Center for Disease Control issued an emergency advisory level for MCHM. Yet, much uncertainty about the safety of the water remained for months following the spill. This presentation will focus first on the institutional failures that led to uncertainty and unsafe drinking water following the chemical spill in West Virginia. Next, I will discuss the West Virginia state legislation the passed shortly after the spill, which included new requirements for the protection of drinking water sources. And, finally, I will conclude with lessons learned from the West Virginia case for drinking water provision elsewhere. Commons governance is critical to protect drinking water sources, especially as human populations continue to grow and become more urbanized.

Keywords: Drinking water, West Virginia, chemical spill, institutional failure, vulnerability, risk, source water protection

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Two pilot films for a documentary on commons issues; The series will introduce viewers to the vitality of commons issues in today's world, dispelling the popular impression that common property management is either outdated or doomed to failure. The series, focusing on commons issues in the developing and developed worlds, and in resources from groundwater to climate, will examine both challenges to and characteristics of successful common pool resource management. We seek IASC member comments to improve the series design!! The first of the two pilot films focuses on a longstanding cattle drive in the Western U.S., which mingles the herds of individual ranch operations and puts them on summer mountain pastures shared by all the ranches and owned by the federal government. Dealing with everything from increasing grizzly bear attacks to fundamental shifts in public attitudes to cattle grazing, the ranchers find that their twice-yearly trips to and from the mountains reinforce their connection to the land and their own cultural traditions, but they wonder if the next generation will shoulder the burden of governing the herds and grazing lands.!! The second pilot film focuses on small fishermen in Turkey's Sea of Marmara by Istanbul. With fish stocks declining and heavy international commercial fishing persisting, the small fishermen face the challenge of working together to articulate their knowledge of the fish and fishing grounds, and taking for the first time a role in managing the resource on which they depend.

Conceptual conflict and interference with community management: Impact of imposing land-law concepts on water management

Community management of water may include many effective dispute resolution processes but ultimately allow recourse to courts. The legal traditions on which courts draw, however, often developed independently and in ignorance of community resource management traditions. The result can be court decisions which significantly affect the trajectory of community management – and its potential to respond to challenges and accommodate new needs. The presentation examines a 20th century situation in the U.S. Rocky Mountains in which court fidelity to land-law concepts invalidated a significant tenet of community water management, contributing to subsequent problems of rigidity in the community management system which may threaten its sustainability.

Keywords: Pilot Film, Documentary, Commons Concepts, Grazing, Fisheries

Obstacles and routes to river basin co-management: The case of two tribes and a state government, U.S.

In the late 20th century two Native American tribes, the Eastern Shoshone and the Northern Arapaho, won a court award to much of the water flowing in the Wind River in Wyoming, part

of the Missouri River system. But a few years later the same court limited the tribes' use of that water in a way that makes much of the original award merely "paper" water rights with little practical application. As a result the tribes have not been able to implement their expressed goals for managing the river for spiritual, aesthetic and recreational uses, in addition to long-standing irrigation uses. The state and federal governments have continued to manage the river primarily for irrigation use. Co-management of the river by the tribes, the state, and the federal government, serving a broad array of goals, appears likely to provide the most benefits and sustainability for the river basin. Among the any obstacles to co-management, however, are disproportional bargaining power, a cross-scale cultural divide and a lack of trust among the potential partners. The presentation will explore steps being considered by the actors which might allow slow, long-term building towards eventual co-management.

Keywords: co-management, water governance, cultural divide, Native American tribes, sustainability

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A Celtic system of 'native title'? Crofting commons and the colonization of the Highlands and Islands

Covering the Highlands and Islands of Scotland, the crofting system of land tenure was constituted by the UK government in 1886. (Flyn and MacCuish 1990)

The 1886 Crofting Act followed a long period of civil unrest and agitation now widely known as "the crofters' war". This 'war' was a response to many decades of the expulsion and marginalization of the native population from their traditional lands. While these expulsions had the force of law, they were very much against the customary land holding expectations of the area's people. (Hunter 1976)

The architects of these tenurial changes made it clear they wished to individualise land holding patterns throughout the area. (Blackadder 1800) However, due to the nature of the area's terrain and the resistance of the native population, hundreds of thousands of acres of the Highlands and Islands remain under a system in which land is mostly privately owned (though with increasing levels of community ownership) but where crofters in common have secure and inalienable rights of use and governance. (Crofters Commission 1902. Crofters Commission 2011)

However, the situation is far from straightforward. Government reforms of the system have often proceeded on the basis of a system of individual rights. This has led to prolonged periods of antagonism over legislation in which the system has been described as 'unusual' and 'anomalous'. One senior government official is alleged to have called it a "damned nuisance, while a prominent crofting lawyer went so far as to call it "the law of a different land". (Wilson 2007. Flyn 2006)

This presentation takes this final observation seriously. It details how the language and practices of colonization were repeatedly invoked in the Highlands and Islands in the centuries before crofting law was established in the area and suggests that in today's extensive system of

crofters' common grazings there exists – to draw on the terminology of the Mabo case in Australia - system of Celtic 'native title'.

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Keywords: Crofting, Colonisation, Tenure System, Celtic, Native Title

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Desolation Row: Sustainability for the Oft-forgotten

Sustainability policy and practice at the community, region, and national scales has made only modest progress at integrating social justice into sustainable development. Efforts to advance sustainability by governments, NGOs, and the private sector have oft-forgotten the needs of specific classes of persons—in particular the underclass, natural hazards victims, the oppressed, refugees, and the poorest of the poor. As a locus of desolation, these classes of persons may require distinctive and targeted approaches to sustainability. As a fault line in development practices, this issue is both rising in urgency and open to analysis. In this paper, we examine the implications of explicitly considering these categories of persons in sustainability practice at multiple scales and in multiple sectors. We apply a theoretical model of human ecosystems (which considers the four pillars framework as a core paradigm), and contrast this approach from other common sustainability perspectives. For each category of persons, we: briefly review the available literature, provide specific examples from North America, Africa, and Asia,

and propose potential remedies to expand the scope of sustainability policy and practice. Attention to the oft-forgotten can significantly advance more comprehensive and just forms of sustainability.

Keywords: Sustainability, Underclass, Victims, Oppressed, Refugees, Poor

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The impacts of species introduction on indigenous fisheries development in the Bolivian Amazon

Bolivian Amazon fisheries are in remarkable transition, driven by increased access, increasing demand, and environmental change. This presentation examines the effects of the introduction of a commercially valuable fish species on the evolution of an indigenous fisheries system in part of Bolivia's Northern Amazon region. Until recently, northern Amazonian fisheries in Bolivia were relatively low intensity, focused in rivers on small number of native species for urban-based commercial fishing fleet, and in oxbow floodplain lakes on a high diversity of native species for subsistence/small scale commercial utilization by rural indigenous communities. In the seventies, one of the world's biggest scaled fish species, *Arapaima aff. gigas* (paiche or paichi), was introduced from Peru and has since invaded a significant portion of the Northern Amazon. The paiche now represents up to 80% of commercial catches, contrasting with its relatively overexploited status and low catch in locations where it is native (Brazil, Peru, and Guyana). Occupying primarily floodplain lakes, many of which are located within indigenous territories (TCOs), it has provided new economic opportunities and stimulated new access conflicts.

Fisheries data were collected in the TCO TIM (multi-ethnic territory) II in the Northern Bolivian Amazon during the high and low-water seasons of 2011 and 2012. Paiche represented more than 50% of the catch (by weight), followed by piranhas and curimatid characid species and whisker catfish. Indigenous groups have traditional access rights to natural resources in this territory, and a vested interest in their sustainable use, but face significant challenges in establishing management plans and development priorities. Local perspectives of fishermen described the community-specific evolution of fisheries, including the emerging paiche fishery. Results to date suggest that the new paiche resource, despite increased access conflicts, has strengthened incipient community-based management of indigenous fisheries, particularly in historical rubber-tapping communities. Commercial fisheries of native species have been reduced, though ecosystem impacts of the introduced paiche remain unclear. Different from many other stories of species introduction globally, sustainability of the paiche fishery and equitable distribution of its benefits look promising, but are still evolving.

Keywords: Indigenous Fisheries; Bolivian Amazon; Introduced Species; Arapaima Aff.Gigas; Social-Ecological Systems

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Experimenting with Commons: Management of Green Semi-Public Urban Spaces

There is a global trend going on, of people willing to work for their own happiness without waiting for god or the governments to serve it fresh on a plate. That may represent a drive for people to reclaim what belongs to them, all together, the streets in which they live. And second, a new sense or desire to build a community. We have gone so far in individualism that we have forgotten our true human nature to live in community. New generations of today sense that and they build and do things accordingly. We can say that the willingness of people to cooperate within a group in order to reach common benefits is a trend describing today's society.

Empirical evidence (Poklebová, 2013) has outlined that the effectiveness of public space management proportionally depends on the degree of community involvement. Semi-public spaces as shared resources represent a subcategory of public spaces and are characterized by a very specific combination of private and common property regimes, resulting into a social dilemma. Particular forms of semi-public spaces are overlooked but substantial providers of green infrastructure in the city, and contribute to the local urban microclimate. Users have stronger relations and demands towards these spaces. However, they face similar problems of resource degradation, overuse, free riders or conflicts between actors. Decision-making is confronted by the clash of individual and collective interests. This shows that the ability of actors to cooperate within smaller groups in order to reach common climate benefits has to be supported by new tools. Institutional arrangements are in this context crucial for collective action. The main objective of the paper is to demonstrate if and how behavioural approaches based on experimental techniques could substantially contribute to the governance of the natural and urban commons and to the design of effective management strategies under the given complexity, multiple actors and decision-making levels. We are focusing on sustainable management models of shared semi-public spaces, applying CPR principles, using experimental approaches to examine how incentives and institutions affect decisions. We consider experiments as a reliable way to test these new ideas for effective self-governance across the scale. An experimental model will be developed, in which members of the community as users of the shared space represent actors, and semi-public space represents the action arena. Relationships between actors, awareness and responsibilities towards the space and local microclimate are key variables. The experiment should primarily examine the contribution of an individual (actor) to something, which is collective (shared space and micro-climate). Ostrom's (1990) eight design principles will create the internal framework of the management

model, while the effect of externalities will test its robustness in terms of urban environment. The experimental approach explores the behavior of local actors in simulated situations, when they share a common resource, from which they obtain individual and collective benefits. The role of rule creation and communication is examined from the perspective how it affects the decisions of actors and the quality of the resource. To understand the motivations of actors in these simulated situations under certain changing rules should provide a complex view on the design of management models.

Keywords: Urban Commons, Urban Micro-Climate, Semi-Public Spaces, Common-Property Regime, Behavioral Experiments

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Participatory Forest Management in Tanzania: Lessons for REDD

This paper looks at the current experience with Participatory Forest Management (PFM) in Tanzania and its relevance for establishing a national REDD program. REDD can help in reducing greenhouse emissions through sustainable management of tropical forests. Since large areas of tropical forests are under some form of customary or communal tenure, decentralized forest management is seen as a means to channel REDD activities in developing countries. Mainland Tanzania has one of the most progressive decentralized PFM policies in Africa. Two main approaches are Joint Forest Management (JFM) on government forests, and Community Forest Management (CFM) on village forests. Altogether more than 3.6 million hectares of forests are under some form of PFM. Tanzania is also one of the nine pilot countries under the United Nations REDD program. Given that PFM is a potential vehicle for implementing REDD in Tanzania, lessons from existing PFM regimes become hugely relevant. We use the Actors, Power, and Accountability framework to assess forest governance in three PFM villages in the Uluguru Mountains region; one under CFM regime, one under JFM, and one where both CFM and JFM are being practiced. Methods include focus groups with key stakeholders (village forest committees, forest users), and interviews with forest officials. We find that in spite of favorable policies, implementation of PFM has been fraught with challenges, with strong implications for REDD in Tanzania. Main findings include: (1) unclear demarcation of village forests into CFM and non-CFM areas. When combined with strict restrictions on forest use and unclear forest tenure in many parts of the country, this can result in loss of access to large tracts of village forests for local communities under REDD. (2) Corruption and elite capture of CFM regimes by management committees implying rent seeking and a non-transparent institutional structure at the village level. This means that formation of village REDD committees will not be enough; their functioning would need to be monitored as well. (3) Reluctance of forest officials to share benefits of JFM with villagers, implying inequitable

sharing of potential carbon payments under REDD. (4) Displacement of the livelihoods of the poorest households (herders, charcoal makers). As forest access and use will be restricted under REDD, the poor may face even more hardships unless they are properly compensated. Our study shows that addressing these issues at the program formulation stage itself will be necessary for promoting equitable and sustainable REDD structures in Tanzania.

Keywords: Collective action, Participatory forest management, REDD, Governance, Tanzania

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Marine reserves are no panacea: institutional scale and cooperative management for reserve efficacy under multi-scale governance

The complex governance of marine resources exemplifies how ecological objectives of ecosystems protection and target and non-target species protection come into conflict with social, economic, and political objectives of maximum employment yield, economic efficiency, and conflict avoidance, respectively. Marine protected areas, specifically marine reserves where all extractive uses are prohibited, are now widely-used to promote sustainable fisheries and the protection of marine biodiversity. However, they are no panacea. Marine reserves have met various levels of success, and it is not yet clear what are the governance structures allowing their success. Their establishment often fails to explicitly consider the institutional structure and the social, economic, and political context of the area in which the reserve is established. Also, the resource users' response to reserve establishment or the incentives that drive their fishing behavior is not always considered. Furthermore, harvest practices often do not adhere to the formal laws established, especially in developing countries with high levels of poverty and low enforcement capacity. As a consequence, marine reserves become "paper parks" that fail to provide ecological and social benefits. This work describes the lessons learned from marine reserve systems in the Gulf of California (GoC), Mexico, and the weaknesses that are conducive to the "paper park" syndrome. Through structured interviews in three local communities concerned with three marine reserves in the GoC, we find strong differences in perceptions between the resource users (small-scale and industrial fishermen) and public infrastructure providers (government conservation and fisheries management agencies, NGOs, and academia) with respect to the use of marine reserves for conservation of biodiversity and management of fisheries. Widespread misconceptions exist among the key actor groups on what reserves can accomplish, how reserves work, what are the potential benefits of reserves,

and compliance levels with reserve regulations. These differences in perceptions seem to be driven by a lack of communication between the resource users and the public infrastructure providers, which combined with low trust levels has led to negative relationships and a lack of cooperation between actor groups. As a consequence, there is a strong disconnect between the resource users' practices and the level of support for reserve regulations anticipated by the public infrastructure providers. This weakness negatively affects the general objective of a marine reserve: to influence how the resource users interact with the resource itself, which doesn't contribute to multi-scale governance. With this work, we conclude that institutional scale (i.e. the representation and participation of local, regional, national, and international institutions) and cooperative management (i.e. the incorporation of knowledge, skills, and perspectives of a diverse group of key actors into management with deliberation and accountability) are two important attributes that require substantial attention to achieve successful marine reserve systems, which can contribute to multi-scale governance of small-scale fisheries.

Keywords: Marine Reserves, Fisheries, Gulf of California, Multi-scale Governance, Paper-park

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“Usi civici”(civic uses): the Italian side of the Commons

The Commons represents a topical subject, hugely important for the future: in these last two decades it has become an object of interest for all modern social sciences, and for the public opinion.

The current international debate has fallen on a fertile ground also in Italy. In Italy this debate has focused both on the legal definition of the commons and on their historical experience through the centuries.

The present study aims at drawing the attention on the specific reality of the Italian system of common lands, underlying the awareness and the importance of these resources that still represent one third of the national territory. The social and cultural context, the environmental issue, a system of communities based on solidarity and cooperation are the heterogeneous elements of collective utilization of these natural resources: woods, pastures, forests.

So, what does this concept really mean and represent today? How and why did the Italian Legislator decide to unify under a single legal framework – the law n. 1766/1927 and the Regio Decreto n. 332/1928 - the different types of commons , emerged through time as a consequence of historical and social evolution?

At this point it is necessary to clarify what can be defined as *usi civici*. They represent perpetual rights (*ius lignandi, pascendi, serendi, etc.*) of a specific community, on collective, public or private lands. These rights can be exercised *uti singulus et uti civis*. In the 20th century the expression *usi civici* has been the object of a process of vulgarization. Doctrine and jurisprudence misused it, applying it to all the situations of common ownership: chaos was the result. The confusion was created by legal doctrine, although it existed already in historical written sources, which report many different meanings of the term, as *bona communitativa* and *communitas*.

The basis of all forms of collective belongings has always been the community, settled in a given territory and having its own self-organization. Not everybody in fact has the right of access these properties: in pre-modern Italy lands, woods, pastures, and also the *fructus* offered by nature, were in most cases conceived as common goods, but they belonged and could be enjoyed only by the people who were part of that specific community.

The development of the Italian municipal towns (*Comuni*) did not affect the existing communities, but crept into a pre-existing natural and direct relationship between human beings and land.

Thus, history presents a multiplicity of evolving situations of these collective rights, in which it is nevertheless possible to identify some constant elements: indivisibility, unavailability and *imprescriptibility*.

To any settlement of self-organized people - however called: *amministrazioni separate dei beni di uso civico, comunanze, partecipanze, regole, università agrarie, etc.* - corresponds a specific collective form of utilization. For this reason, to subsume such variety of situations and rights under one single legal model - as the 1927 laws quoted above did - appears too narrow and even counterproductive. Ever since the various forms of collective belongings resist to the laws' fingers. The 1927 laws did not recognize the persistence of different realities, and pretended to rule all of them under the legal categories of the *Regno di Napoli*, one of the regional states existing before the unification of the country in 1870.

A reflection of the Italian legislator would therefore be highly welcomed. In the last few years – after 2009 - many promising projects have been started, aimed at introducing and recognising a new category of goods in the Italian Constitution, defined as “*beni collettivi*” (common goods).

The debate has given new lymph to this field of study, bringing out a renovated conscience for the importance of “common goods”. The present crises of the capitalistic system shows the need to go back to the origins and to establish a new relationship between human beings and natural resources.

Keywords: Usi civici, Beni collettivi, Legal History, Commons, Community, Italy

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Gendered complex outcomes in the Kandeu Irrigation schemes sustainable intensification option in Malawi

Formal cadastral boundaries are perceived as an incentive for individuals to invest in land. De soto and his supporters have emphasized the key role of well-defined cadastral boundaries as an incentive for land based investments. This study looks at how gender and tenurial niches overlap as decisions on irrigated agriculture are undertaken within the context of fuzzy and shifting land tenure boundaries, which, however, have enabled investment in agriculture. The same piece of land is used by different users in the irrigation season and the land owners will then have access to the land during the rainy season. Whilst a nominal rental fee is paid to the land owner, the irrigators will also destroy the irrigation bedding and build mounds which the land owner will use to plant crops in the rainy season. Such shifting tenurial arrangements have seen both the landowners and the irrigators investing in irrigation and use rights of land changing over seasons which is akin to what Fortmann terms tenurial niches which varies with seasons, but are well engrained within the social practices. Whilst such arrangements defy solid cadastral boundaries, they are central to livelihoods of women within the matrilineal societies accessing land for irrigation. Such nuances are not captured by the perception of irrigation as a technology only geared towards sustainable intensification but in practice it produces gendered and complex outcomes.

Keywords: Gender, Tenurial Niches, Irrigation, Outcomes, Malawi

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'Blood is thicker than water": Economic implications of food gifting within kinship networks

There has been a lot of discussion regarding the exact meaning of the word 'reciprocity' in gift-giving. In a influential article, Marshall Sahlins developed a typology of reciprocity in gifting relationship based on whether there is or not a counter obligation of the receiver. In a relationship characterized by balanced reciprocity, the giver of the gift strongly expects the receiver to reciprocate in the (near) future with a gift whose value is close to her initial gift. In other words, any gift received gives rise to a clear debt-like obligation from the receiver. While there is some vague obligation to reciprocate in a generalized reciprocity setting, the strength of this obligation is weak and, unlike that in balanced reciprocity. In other words, reciprocation may or may not come and if it comes it may not match the initial gift value. In sahlins'

generalized reciprocity, giving is unconditional and failure to reciprocate will not put an end to gifting.

In this work, following Platteau (1997), we hypothesize that in rural Tan-zanian villages small food gifts take place in a context of generalized reciprocity. We develop a formal model of generalized reciprocity in a dyadic relationship where the giver and the receiver may have (or not) altruistic ties. In our model we assume that rural villagers produce their food by exerting effort in cultivation (e.g. weeding) but also by acquiring productive assets (e.g. seeder, plow). After harvest, some of the villagers may receive food gifts as a result of adverse shocks such as bad harvest or accident and food gifts act as insurance devices.

Our formal model makes several basic predictions. First, when the altruistic strength of the tie between two villagers increases, gifts are more likely to happen. Second, those who do not make gift should perform higher levels of cultivation effort and invest more in productive assets. Finally, the relationship between altruism and those economic variable is non monotonic; for instance effort will first start to decrease when the altruism level is increased but will then increase again when this level become very strong.

To empirically investigate these theoretical relationships, we have collected data from 550 households located in four different Tanzanian villages. For each household, we documented their effort in cultivation and their investment in productive assets. We also recorded each their giving and receiving instances and the exact tie between the receiver and the giver. Consistent with the theory, we find that when gifting is performed between villagers with closer family ties, effort in cultivation tends to be lower. Similarly, when family gifting ties are stronger, villagers will invest more in consumptive assets (e.g. TV, radio, couch) and less in productive assets (e.g. water tanks, seeders, fertilizers). We then discuss the development implications of our findings.

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Can commons insights help improve small producer aquaculture management?

Farmed fish has exploded in the past two decades, with several Southeast Asian countries emerging as leading global exporters of seafood products. This study investigates the potential for commons management for households practicing shrimp farming in marine- coastal villages of Vietnam. Data is drawn from a baseline survey of 599 fishing households, and contrasted with an analysis of existing policies, including shrimp certification standards, territorial use rights, and best management practices.

Vietnam has had extensive experience with various forms of group formation within the fisheries sector, from Vanchai group formation pre-1975, to highly centralized planning regulations post-1975, to recent work on adaptive co-management or community-based management including fishers and fish farmers, and cooperatives and farmer 'clusters' for extensive and intensive fish farmers. These insights, along with how rural people respond to the legacy of collectivization, need to be kept in mind when thinking about the potential of commons management vis-à-vis small producer shrimp farmers who are Vietnam has often integrated into regional and international value chains.

Keywords: Commons, Resource Governance, Fisheries, Small Producers, Vietnam

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Path Dependence And The Economics Of Recovering Environmental Water For Resilience In Australia's Murray-darling Basin

Pressures on the Earth's water resources have escalated to the point that water use was recently identified as one of the nine planetary boundaries defining humanity's 'safe operating space'. Many of the planet's economically important river basins are closing or already closed (i.e., where water extractions compromise ecological sustainability).

Meanwhile, there is a strengthening consensus that climate change requires abandoning the assumptions of stability and predictability still underpinning most approaches to water resources governance, and shifting instead towards resilience-oriented approaches that acknowledge the increasing reality of instability and surprise in this domain.

Australia's Murray-Darling Basin (MDB) is one river basin facing these challenges of the Anthropocene. Over the last decade more than \$A12 billion has been committed by the Australian Government to recover water licenses from the irrigation sector and other extractive water users in order to restore 'environmental flows' to ecologically sustainable levels. However, economists have widely criticised the process of water recovery as having been excessively costly and a poor example for less wealthy nations facing similar challenges to follow.

In particular, many economists have argued that the Australian Government's water recovery programs have been economically inefficient because of excessive reliance on investments in water-saving infrastructure when market purchases of water licenses would have been less costly. Meanwhile, a few policy analysts and economists have recognised the added costs of infrastructure investments to be the 'political price' the

Government was willing to pay to overcome entrenched opposition to water recovery efforts from those perceiving themselves to have vested interests in the status quo.

In this paper it is argued that this political price is a legitimate cost to be accounted for (qualitatively at least) when assessing the cost effectiveness of alternative approaches to environmental water recovery, and that we need to understand the dynamics driving the political transaction costs constituting this price so they can be navigated less expensively in future water recovery efforts (that will be required inter alia because climate change impacts were unaccounted for in current water recovery targets). Further, it is argued that path dependence is central to these dynamics, and accounting for these dynamics appropriately can help reconcile economic analysis with resilience-based perspectives on the governance of common-pool resources.

The author's research on path dependence in water policy reforms and its consequences for cost effectiveness in recovering environmental water is presented in this paper. How this cost effectiveness might be enhanced by navigating path dependence more astutely is explored. The paper emphasises not only the need to consider transaction costs as well as transformation (i.e.,

production and abatement) costs when assessing the cost effectiveness of water recovery programs, but also the importance of accounting for those types of transformation and transaction costs to which mechanistic economic evaluation is blind.

Keywords: Resilience, Path Dependence, Water Resources Governance, Transaction Costs, Political Economy

Polycentricity and adaptive governance

Adaptive governance is often now proposed by scholars of social-ecological systems (SES) as essential for sustainability as we proceed into the complexity, instability and surprise of the Anthropocene era. These calls commonly identify polycentricity as a key attribute of adaptive governance. The advantages of well-functioning polycentric governance arrangements for the adaptability and transformability of boundedly-rational humans faced with complex collective action problems are well documented in the commons and resilience literatures. Views among scholars on the distinctions between polycentric and other types of governance remain somewhat inconsistent. For instance, some regard polycentric governance as encompassing any governance arrangement within which organisational units are substantively autonomous from one other, while others impose the further condition that multi-centred governance arrangements be well-coordinated before they can be defined as polycentric. Inconsistency exists also in identifying the attributes of well-functioning polycentric governance, with some scholars focusing only or primarily on collaboration among units as a means of coordinating their behaviour, and others emphasising also the role that competitive rivalry plays in promoting coordination as well as efficiency and innovation. Such inconsistencies threaten to erode the value of the polycentricity concept for advancing scholarship on adaptive governance. One aim in this paper is to suggest ways forward in interpreting the polycentricity concept that may help to reconcile the differing understandings that currently exist. A further obstacle to advancing adaptive governance via polycentricity resides in political, bureaucratic and other cultural constraints on governments ceasing their attempts to control governance outcomes despite their stated intentions to devolve significant governance rights and responsibilities to community-led or other parties (i.e., to elsewhere within polycentric governance arrangements). Governance scholars influenced by resilience thinking argue that since polycentric governance arrangements are complex adaptive systems, any attempts to control them will yield significant unintended consequences, including diminished robustness of the focal SES. The principle of subsidiarity has been proposed by some commons and resilience scholars as an ‘antidote’ to the path-dependent cultural dynamics continuing to drive government attempts to exercise control over polycentric governance arrangements. However, interpretation of this principle is often subverted by these same dynamics. A second aim in this paper is to consider how subsidiarity should appropriately be interpreted in such settings, and propose institutional innovations that might enable such an interpretation to be applied in practice. The arguments in this paper are informed and illustrated by the author’s research on governance of: irrigation salinity management in Australia’s Murray-Darling Basin (MDB); regionalised natural resources management (NRM) in Australia; NRM in the MDB drylands zone; value chains for premium beef produced in south-east Cambodia; and integrated water resources management in the MDB.

Keywords: Polycentricity and Adaptive Governance

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The commons defense against mining in rural regions in Mexico

In this paper I analyze peasant's resistance actions against their common resources' (water, land, mountains) depriving by mining companies. This dispossession is consequence of new capital accumulation ways that generate deprecation and destruction. There is an increasing and diverse response against this in rural Mexico. The paper shows how these contesting movements are happening in three different Mexican regions: Puebla Sierra Norte, Oaxaca Sierra Juárez and Chiapas Sierra Madre. Through collective actions, people in these regions have tried to revert dispossession and improve economic profits distribution, as a way to defend their common resources.

Keywords: Mining, Commons, Resistance

Maize seeds in Mexico as common: culture, food and resistance

This paper analyzes seeds owned and improved by maize producers as a common. Saving and planting this seed allows these producers to reproduce their way of living and ensuring their food supplies. Besides, saving different maize seeds' varieties is an important part of their culture, as they are used for diverse kinds of food. The paper shows recent field research with Central Mexico's producers, describing their conditions and seed management. The research is framed in Mexico's food dependence problems, as a maize importer from de USA, and new threats to maize production, such as free trade and transgenic maize.

Keywords: Seeds, maize, commons

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Three Case Studies of the Commons: Success and Failure

This research looks at three small Ontario examples of common lands. In each case a group of people own property that either is common in its entirety or is a combination of private land and common land. The case study is designed to identify what makes a commons sustainable. It looks at the objectives and design of the common lands.

In the first case the common land is over 300 acres around a lake. All participants in the common are assigned a specific lot but the property is owned in common. Participants pay a fee to join the group. This group has been successfully in existence since 1966 with more people wanting to join the common but only a limited number of families permitted by the group charter. The second case involves 28 landowners that own 52 acres in back of their properties in common. The common lands provide the landowners with privacy and tranquility not offered if they only owned their individual property. The group of individuals that share the lands in common also agree to specific restrictive covenants that run with their properties in order to protect the common lands. The third case is a subdivision that included extensive

common lands. The subdivision was developed in the early 1980s. All participants paid an annual fee to cover the expenses of maintain the common lands. This third group of landowners encounter problems with the operation of the accompanying association that oversaw the common lands in the late 1990s when some landowners altered their properties in ways that were contrary to the association rules. By 2002 there were many issues and financial problems arising within the subdivision. By 2010 the association was disbanded and the common lands were put up for sale to developers to build. The common lands that had provided many recreational and privacy benefits to the homeowners in the subdivision were developed changing forever the nature of the community.

Keywords: Case study, Recreation, Success, Failure, Property

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Can Experimental Games Strengthen Collective Groundwater Management? Learning from Field Experiments in India

Groundwater is one of the most challenging resources to manage, in part because of the fugitive nature of the resource and the lack of visibility and understanding of how user behavior affects the availability for others. In many hard rock aquifers of India, groundwater tables are falling due to over extraction. Government regulation of well spacing has not been effective; some form of collective action to manage groundwater is needed. However, unlike surface irrigation, there is no tradition of collective groundwater management, and there is not a widespread understanding of the interconnectedness of individual farmers' water uses and the aquifer.

This paper presents evidence of whether experimental games can be used not only to measure collective action, but to strengthen collective action for managing shared groundwater resources in Andhra Pradesh, India. We examine whether the experimental exercise changes participants' mental models about the interactions between resource dynamics, group goals, and private interests.

A collective action game that simulates crop choice and groundwater use has been implemented in 2013 and 2014 in 20 communities where Foundation for Ecological Security or a partner NGO have been working on groundwater management. Community debriefing sessions after the games allow for discussion of the results, to see whether this contributes to the emergence of understanding of interconnections and rules to govern groundwater use. Behavioral and attitudinal variables regarding water use and mechanisms for regulating and responding to changes and uncertainty in social and ecological conditions are monitored at the household and community levels, and compared with control communities where no such experiments have been conducted, to observe whether the games contribute to greater

understanding of the interrelationships among groundwater users, and to the emergence of rules regulating groundwater use. Quantitative data from surveys and field experiments are analyzed econometrically, complemented by qualitative analysis of key informant interviews and discussion at the community workshops.

During the first round of games, there was no significant difference between women's and men's simulated crop choice, even though women are more affected by groundwater depletion because of their primary responsibility for domestic water. Subsequent qualitative analysis revealed that women did not conceptualize the links between groundwater irrigation and domestic water wells. The second round of games explicitly includes domestic water, and information about water tables, to see whether these factors affect how men and women perceive groundwater interactions and play the game.

Feedback from the communities and partner NGOs indicates that the experimental games provide a more engaging strategy for stimulating community discussions of groundwater management. While not a panacea, the games provide an additional tool for improving understanding of resource dynamics and strengthening collective action.

Keywords: Groundwater, Experimental games, Collective action, Crop Water Budgeting, Andhra Pradesh, India

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Understanding legitimacy in multi-actor collaborative governance for water

Multi-actor collaborative governance is increasingly being used as a way to make decisions and implement solutions in situations where collective action is needed to address common problems. Theories on governing common pool resources generally recognize the benefits of multi-actor community initiatives; these include the development of public trust and legitimacy. Legitimacy is important because it justifies authority and makes the decision-making process more efficient. As a governance attribute, legitimacy relates to the perceived credibility or validity of an organization or decision. Given the many different users of water (e.g., industry, agriculture, First Nations, municipalities), multiple perspectives on the legitimacy of collaborative governance for water should be expected. In light of the growing importance of collaborative approaches, a better understanding of how different actors involved in, or impacted by, multi-actor collaborative governance processes perceive their legitimacy is essential. In particular, the factors that are most influential to forming the legitimacy perceptions of different water sectors remain unclear.

Drawing on multi-case study research from across five watershed-based collaborative governance initiatives in British Columbia, Canada, we identify the similarities and differences of legitimacy perspectives held by key actors involved in collaborative governance for water.

Perspectives of legitimacy differ significantly among industry, government, and First Nations. To illustrate, a collaborative initiative's legitimacy from the perspective of industry representatives is often based on its ability to satisfy the communication or corporate social responsibility mandate of a company. Legitimacy perceptions from Provincial or Federal Government representatives are based predominantly on accountability (whether members are elected) and the achievement of results. In contrast, First Nations perceptions of legitimacy tend to be based on the relevance of the collaboration's goals to local First Nations needs, the status of people involved, compatibility with First Nations title and rights claims, and the extent to which First Nations' perspectives are genuinely valued.

Multi-actor collaborative governance processes have emerged as critical to successful governance of the commons. Thus, increased understanding of the different ways involved actors judge legitimacy can assist collaborative initiatives in strategizing how to gain acceptance or support from the communities they affect. Furthermore, identifying the range of legitimacy perspectives on collaboration governance for water can help determine whether or not specific collaborative water governance initiatives can foster and maintain the popular support needed for their existence.

Keywords: Collaboration, Governance, Legitimacy, Water, Collective Action

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New struggles for the commons

For decades Mexican rural communities suffer from increasing deterioration. In spite of community ownership of lands, "development" policies have weakened their control over commons. Logging concessions on community forests (1950-1980) were a clear case. Agricultural policies favored industrial export agriculture at the expense of family agriculture. For many abandonment of communities became a forced survival strategy. This trend was strengthened by the implementation of NAFTA and the legal changes that enable privatization of collective lands.

Outmigration was officially treated as a panacea: a source of employment, of remittances to address poor families needs, even migrants philanthropy favoring communities of origin is regarded as a base for development of public infrastructure the government should provide. New approaches to migration are less optimistic: it deepens communities' vulnerability: 30% of Zacatecas population, where massive outmigration started a century ago, are chronically hungry. In Chiapas the households experiencing hunger for longer periods are those mostly dependent on remittances. Research evidences that outmigration weakens communities' governance and capacities to manage commons, (Merino, Pasquier, Martínez, Robson) a "fertile land" for new initiatives of appropriation of land commons by international corporations.

I analyze two cases: "Pánuco", Zacatecas where the corporation "Pernales" tries to establish an eolic energy park, using international funds of the "clean development mechanism". Pernales

pushes for ninety years leasing contracts, proposing to parcel common lands, paying eight dollars yearly/per ejidatario (with rights to about ten hectares each) arguing theirs are wastelands and the “sustainable development” option they offer. Pinales creates internal division, weakening local organization already hit by migration. There is no accessible information about environmental impacts, investment and estimated profits, and there is any regulatory base of eolic plants in the country. Pinales is confronted by returned migrants from the US, seeking new local economic options and the revitalization of communities, Some ejidatarios from Panuco in the US claim decision making rights over this land commons.

Twenty five years ago Capulalpam, Oaxaca fought and recovered control over previously concessioned forests. This community has developed a sustainable forest management system, and diverse community owned and managed enterprises, whose production has been certified as sustainable. Outside migrants played a key role in this process. The strong traditional organization was a solid base for the development of community economy, reinforced by the experience of shared initiatives. In spite of these gains for the last seven years Capulalpam faces the concession of a gold and silver mine, in the heart of the community conservation area of well preserved cloud forests, where water sources emerge, feeding Capulalpam and, one of the main rivers in Mexico, the Papaloapam.

Based on the governmental ownership of the under soil and the definition of mining as priority for Mexico, the federal government increased has increased the lands under mining concessions by 30%. Previous mining in Capulalpam is related with the extinction of 13 water sources, polluting water and soils with heavy metals.

Continuous resistance movement in Capulalpam and its allied communities in the Sierra have stopped the mine fights to change the Nation´s mining law.

Keywords: Forestry, Community Conservation, Migration, Mining, Sustainability

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The role of social networks in mediating fish resources availability, access, utilization and stability in a community from the Brazilian Amazon

Social networks are a significant way by which people obtain food from common natural resources. The literature on food security and social network analysis has mostly focused on egocentric network data or proxy variables for social networks to explain how social relations contribute to the different dimensions of food security. Whole network approaches have the potential to add to these former studies by revealing how individual social ties aggregate into

complex structures that create opportunities or constraints to the sharing and distribution of food resources. We use a whole network approach to investigate the role of network structure in contributing to the four dimensions of food security: food availability, access, utilization and stability. We present a case study of a riparian community from the Brazilian Amazon that is dependent on fish as a key element of food security. We mapped the community strong-tie network among 97% of the village population over 14 years old (n=336) by integrating reciprocated friendship and occupational ties as well as close kinship relationships. Most of the villagers (98%) are connected to one another in a single cluster. We explore how different structural properties of the community network contribute to the understanding of (i) the availability of fish as a community resource, (ii) community access to fish as a dietary resource, (iii) the utilization of fish for consumption in a way that allows the villagers to maximize nutrition while at the same time minimizing toxic risks associated with mercury exposure and (iv) the stability of the fish resources in local ecosystems as a result of cooperative behaviors and community-based management. We discuss the contribution of whole-network approaches to the study of the links between community-based common natural resource management and food security in the context of recent regional environmental and social changes in the Amazon region.

Keywords: Food security; Amazon; social networks; strong ties; fish consumption

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Keeping the next generation on the water: Opportunities and barriers to continuing aboriginal engagement with the ocean in northern BC

Aboriginal coastal communities must have access to their traditional livelihoods in order to ensure long-term sustainability of their food, income, cultural identity and community health. Yet, the history of assimilationist laws and legislation imposed by Canada on Aboriginal people have resulted in numerous societal problems including high unemployment, particularly amongst youth, and a generation of youth that have limited knowledge of traditional economic and cultural practices. Regaining control over resources and returning to practices informed by traditional management is one important way in which communities have been able to counteract loss of traditional culture and identity, and the numerous related societal problems. In Canada and in British Columbia, the direction of court decisions and government policies suggest that Aboriginal people who develop their capacities as marine resource managers will be able to play an increasingly larger role in fisheries management decisions, and currently, resource monitoring and stewardship roles are seen as promising entry points for Aboriginal youth to gain knowledge of their territory, fisheries, and ocean conditions.

This paper will present the preliminary results of research into monitoring and stewardship training programs offered on the north coast of British Columbia. The paper has two components. In the first, I will identify barriers ocean-related employment that aboriginal youth face. In this section, I will focus on how the combined economic and policy pressures leading to the reduction of the salmon fishing fleet and the incoming industrial boom are impacting opportunities for the younger generation to get involved in both the fishing industry and other ocean-related careers. In the second section, I will explore current opportunities for Aboriginal

youth and young adults to be trained as fisheries monitors and/or guardians of their traditional territories. While some of these opportunities have existed for a few decades (i.e., the DFO Guardian Training), others are only now being tested (Coastal Stewardship Network Stewardship Technician Training and Ecotrust Observer and Monitoring Training), and still others (environmental technician jobs) are very recent responses to proposed Liquefied Natural Gas and other industrial developments. This paper examines these different options to determine how monitoring training programs can be designed to best help further the diverse goals of coastal communities and create more diverse employment opportunities for youth.

Keywords: Youth, Aboriginal, Monitoring, Stewardship, Fisheries

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Assessing the Symbolic and Economic Value of Stream-Flow in the Salmon River Basin, Idaho

The newly popular term “Ecosystem Services” (ES) invites a new conception of natural capital that examines a more complete portfolio of environmental benefits for humans as affected by humans. This approach to natural resource value recognizes aspects of human well-being that are inadequately measured by methods of economic or ecological assessment. Culturally situated and symbolically constructed values require specific types of inquiry. Fortunately, empirically-supported theories such as Symbolic Interactionism (SI), and critical theories, such as Political Ecology (PE), can provide further insight into ES when applied to economic analysis. For my research both the theories of PE and SI were utilized to inform research methods that combined semi-structured interviews and economic analysis. A common pool resource of stream-flow was examined from a cultural as well as economic perspective. In order to analyze the narratives garnered from the interviews I also incorporated the theory of Bioregional Imagination (BI), which examines individual and community perceptions about their bioregion and reciprocally about their community and themselves. Value cannot exist without value-holders; by incorporating BI informed narrative analysis into PE and SI based ES research we can contextualize economic valuation. This is important because values are the impetus for any examination of decisions in the context of scarce resources. This research explores the connections between those constructs within the bioregion of the Salmon River Basin (SRB), Idaho by querying the ES value of a regional common pool resource of stream flow for the bioregional residents. In the summer of 2014 I conducted over 100 semi-structured interviews with stakeholders in the SRB exploring a link between the economic and cultural value of stream flow, based on these interviews. These interviews adhered to predetermined questions ranging from open-ended questions about living in the region to specific questions about changes in stream-flow. Qualitative analysis affirms the importance of

stream flow in bioregional narratives with high instances of phrases such as “life blood of the region” to describe the Salmon River, revealing a strong bioregional connection to the Salmon River. The 70 hours of interviews have also been transcribed and coded and analyzed to test quantitatively for statistically significant reference to stream flow as well as unprompted river related references. In comparison to interview responses, my initial analysis of the economic base contribution of stream flow and tourist (stream flow) related activities and industries in the SRB reveals an interesting divergence in the economic importance of stream flow as compared to interview testimony regarding the common pool resource of stream flow. However, since the economic analysis is based on national data, true regional economic linkages need to be calibrated based on interview responses. I am also incorporating climate based projected changes in stream flow into this economic analysis to determine the economic consequence of potential stream flow reductions and comparing results to interview responses about potential stream flow changes to examine the resilience of the bioregion to climate change.

Keywords: Cultural Ecosystem Services, Bioregion, Bioregional Imagination, Political Ecology, Symbolic Interactionism, Economics, Climate Change

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Promoting Agro-biodiversity and Food Security in India: Challenges in designing a pro-poor intervention

Though the Green Revolution has played a large role in producing food for increasing populations, the mass production of calories has come with costs. For example, finger millets, which have largely been replaced during the Green Revolution, are generally more nutritious than high-yielding varieties of cereals such as rice, maize, and wheat. As with many traditional grains, and relative to modern crops, finger millets are better adapted to local climatic conditions, require fewer chemical inputs, are more tolerant to environmental shocks, and are predicted to be more robust to climate change. Accordingly, the promotion of traditional grains, such as finger millet, has been identified as an intervention which could improve the food security of households in India. Despite its potential benefits, the production and consumption of finger millet has declined in India. The consumption of ragi has declined in favour of subsidized green revolution grains, such as rice and wheat. These subsidies have driven down the prices for ragi, and as a result the production of ragi has been crowded out by the presence of more profitable cash crops. Finger millet consumption has also been associated with costs on women's time; finger millet must be ground into flour before being consumed, and the traditional method of manually grinding is both labor and time intensive and culturally defined as a female task. Accordingly, scholars have advocated the introduction of innovations in processing finger millet for small and large-scale entrepreneurs. These innovations can potentially encourage finger millet consumption by reducing the drudgery associated with flour production, however there is little empirical evidence regarding how technological advances in processing will be received in rural communities. Basic questions for informing policymakers regarding the introduction of processing centers remain unanswered. We examine an intervention that introduced small-scale flourmills in rural India. This technology was introduced into rural Tamil Nadu as part of a strategy aimed at reversing the decline in finger

millet consumption. One goal of this intervention was that it primarily benefit poorer households. The primary objective of our research is to investigate whether this intervention benefits the poorest households in the community. Specifically, we are interested in whether there is high demand for this technology amongst poorer households, and whether the intervention is implemented such that the poorest households primarily benefit from this technology. This study is a first attempt to investigate economic choices regarding the consumption of traditional grains, in the presence of an introduced technology, using a unique set of primary data collected from rural India. New technologies that reduce the drudgery associated with processing finger millet have the potential to improve food security, but the current lack of information on the profile of adopters of the mills creates challenges for improving the implementation of this intervention by NGOs and entrepreneurs. Our investigation suggests that the implementation strategy may have created undesirable incentives that led to the placement of the milling technology in close proximity to wealthy households.

Keywords: Technology Adoption, Food Security, Rural India, Millet, Household Welfare

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Consultation and Contestation in the Albertan Bituminous Sands

In the last ten years, the extraction of bitumen in Alberta increased exponentially from the early days of the industry. Over 750 square kilometres of land has been cleared or disturbed by surface mining, in addition to the impacts of in situ extraction. This has led to conflict over land use as well as concerns over health, the environment, and indigenous rights. In the same time period, the United Nations Declaration on the Rights of Indigenous Peoples finally came into existence after 25 years, alongside the development in law of the Crown's duty to consult over extractive projects in Canada.

This paper will examine the differences between consultation and free, prior, and informed consent (FPIC) as demonstrated in practice and newly revised policies in Alberta. How can the language of consultation serve to undermine indigenous self-determination? I will more specifically investigate how various stakeholders, including governments, First Nations, and companies, use these terms strategically in their negotiations. For example, many First Nations leaders and communities in the impacted territories, Treaty areas 6 and 8, have asserted their right to FPIC in opposition to the federal and provincial governments' definitions of consultation.

Consultation will be considered in the context of land use and governance of the commons. These negotiations and disputes are partly over the impacts of extraction on ecosystems and how those impacts will be monitored and managed. I will focus on in situ extraction, which represents the main type of extraction going forward and is subject to clashing claims over its land disturbance. The focus on in situ serves to both narrow the scope of the study and draw attention to regions that have been subject to less research than the mined areas

Keywords: Indigenous Rights, Consultation, Extractive Industries, Land Use

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Cooperation groups and collective action in forestry, through lenses of post-socialist situation: Croatia and Serbia as cases of South East Europe

During the socialist period the ideology of state was that everyone should enjoy the natural resources. With this the forests within South Eastern European region have been considered as a "social good" and in big part subjected to nationalization. This strong alteration in the socio-economic and political context has significantly influenced the level of collective activity and the degree of cooperation in forestry. Since more than two decades the nationalized land is subjected to restitution. However the situation is still ongoing and rather complex. Understanding what types of collective actions can be found on the ground and what is degree of cooperation in forestry today would provide insights of the effects of socialism on the forest management. This is especially considered since there is little known about the situation within this region. In that context, the main goal of the paper is to explore what is the actual situation of organized groups' collective actions and the extent of cooperation is employed in forest management within two case-study countries, Croatia and Serbia. The aim is to understand how the collective activities have evolved through time in parallel with the changes in forest ownership. The research methodology encompasses secondary data analysis combined with primary data collection through interviews to key informants based on a snowball sampling. Findings show that, as a consequence of the socialist period followed by the restitution process, disputes over the ownership rights are still ongoing in both countries. The results show a significant number of existing cooperation groups in forestry within the analyzed region: long-existing cooperation groups have been identified but also newly established ones within both case study areas. However, the collective action has experienced significant changes in type and in degree of implementation through time and today the collective activities in place are very limited in both countries.

Keywords: Cooperation Groups In Forestry, Collective Action, Post-Socialist Period

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Impact of Water Logging on Food Security and Livelihood Strategy of South-West Coastal Region People of Bangladesh

This paper intends to explore the impact of Coastal embankment project on Baghdanga-Monaharnagar Village, located in Keshobpur of Jessore at south-west coastal region of Bangladesh. The project was undertaken by the East Pakistan government and funded by USAID to increase rice production in 1960. As a part of the project, East Pakistan Water and Power Development Authority (EPWAPDA) implanted 39 polders in aforementioned region.

However, the heavy loads of silt carried by the tides settled on the riverbeds, which gradually rose above the level of the lands within the polders, and that closed the sluice gates. This process of river silting and land subsidence caused drainage congestion, which caused permanent water logging in many parts of that region. Government and Non-Government organizations implemented several project to solve the problem, but they failed. The drainage congestion, therefore, has been effecting over their food production after 1990, as many parts of cultivable lands are logged by water. This water logging has been impacting on Baghdanga-Monohornagar village's economy, politics and other social practices. Beside these problems, this man made waterlogging also waved the natural environment system. However, the local people have developed new ways and tactics to survive with the emerged situation. Based on primary data, this paper intends to explain in which context the coastal embankment development project was implemented in Khulna- Jessore region; how this project has brought changes in the cultural, economic, political, and environmental systems. Alongside, this paper focus upon the new ways and tactics of local people which are being practiced for their survival with the adverse situation.

Keywords: Water Logging, Development, Social and Environmental Change, Food Security and Livelihood Strategy

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Can Vermicomposting aid in ameliorating Soil Health Status in the Eastern Ghat Mountain Range, India?

The 'Green Revolution' in India during the second half of the twentieth century enhanced production and productivity of food grains by many folds with the introduction of improved agronomic practices that included the application of inorganic fertilisers in agriculture. Subsequently imbalanced use of inorganic fertilisers with decreasing application of organic fertilisers leading to poor soil health status demanded adoption of sustainable soil health management practices. To overcome this obstacle, application of organic fertilisers sourced from diversified biological sources was realised.

The Koraput tract of the Eastern Ghat mountain range with an average altitude of 870 meters above the mean sea level is an agrobiodiversity hotspot in east India. Washing off of nutrient rich top soil and leaching action of minerals during heavy rain diminished soil fertility. Decreasing grazing land area, restrictions on livestock grazing in reserve forest area, inclusion of common land under cash crop plantation and agriculture and seasonal migration for higher income posed as constraints for rearing of native livestock. Gradual replacement of low yielding native cattle herds with relatively fewer number of high yielding crossbred cattle and use of dry cow dung cakes as fuel in the wake of decreasing availability of fire wood from nearby forests further restricted the availability of cow dung manure for agricultural land. Declining organic manure availability and imbalanced application of inorganic fertilisers by

farmers well above the recommended levels to retain agricultural productivity ignored sustainability in agriculture.

A 42 months duration experiment was undertaken by the M S Swaminathan Research Foundation, India focusing on revival of soil health with introduction of sustainable agronomic interventions with vermicomposting as one of the research initiatives. Vermicompost pits were established in participatory mode with farmers and the harvested worm castings were applied in little fertile upland. The findings from twenty experimental plots under finger millet cultivation for two years revealed increased water holding capacity and soil porosity with gradual decline in soil bulk density leading to higher root growth and earlier emergence of seedlings. The analysis of findings from baseline and endline soil health indicators showed a steady rise in soil pH and total organic carbon content in soil over time. The heterotrophic microbial population increased two fold which is supportive for a healthy soil status. There was marginal increase in the soil macro nutrient content (Phosphorus and Potassium) in spite of a good crop yield and non-application of inorganic fertilizer. The carbon to nitrogen ratio improved which is essential for crop biomass growth.

The gradual improvement in soil health was promising to address the issues associated with declining soil health. This initiative is a vital step towards promotion and practice of sustainable agriculture. This finding from field trials in hilly terrains of Eastern India has global relevance for replication in similar agro-climatic zones for amelioration of soil health and promotion of sustainable agriculture.

Keywords: Soil Health, Sustainable Agriculture, Vermicompost, Soil Nutrients

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Conditions for Collaborative Environmental Governance in Post-industrial Society

Even though highly industrial and post-industrial countries consume vast quantities of natural resources, they face under-use of domestic natural resources in an era of global trade, because they can import the resources that they consume more cheaply than from domestic sources. Japan opened its timber market to imports in the 1960s because forests planted after World War II were not yet ready for harvest; it is still more expensive today to harvest Japanese forests than to import from Asia and North America. Japan continued to open its other resource markets, and since the 1980s utilization of domestically-sourced natural resources has decreased rapidly. Agricultural communities have abandoned their communal resources (forests, grasslands, ponds, rivers, fishing grounds), and demographic change (high education and urbanization among young people, a declining birthrate, longer life expectancy) 211 leads to dramatic depopulation in rural areas. Rural communities are inhabited largely by the elderly, the government closes more schools in rural areas, and remaining families move to cities just to ensure education for their children. The result is abandonment not only of natural resources and cultivated lands, but even of artificial resources such as houses. Thus traditional uses and benefits, and even traditional user-commoners are literally disappearing.

Of course, these natural resource systems, even those that have been manicured over centuries and lost much biodiversity, still generate vital ecological services in the form of clean water,

clean air, and genetic wealth. Oddly enough, abandonment of these resource systems means that the hidden ecological benefits they always delivered are now being recognized and appreciated more keenly. These resources also generate new benefits in the form of recreation or the potential for environmental restoration that are increasingly valuable to urbanites who hunger for peace, quiet, greenery, and minimal cement. Thus these systems generate new use values and new communities of beneficiaries who have no traditional use rights to these benefits. To resolve these disjunctures, mobilize caretakers for these resources so that they can continue generating their new use values, and re-align the burdens of maintenance with the enjoyment of benefits, we see many new activities and movements to support the traditional commons or to create new commons. These collaborations go beyond the original community to draw in new beneficiaries, new users, and new contributors to maintenance of the resource. Examples include:

- 1) Fish-breeding forests (creating forests upstream to improve fisheries downstream)
- 2) Forest volunteer movement
- 3) Utilization of abandoned houses
- 4) Restoration of rivers by various actors

Difficulties arise 212 some landowners along a riverside refuse to cooperate with preservation, forest owners may reject forest volunteers as trespassers even if they are restoring forests abandoned by the owner 212 but successful cases are impressive. This paper provides an overview of institutional innovations to solve problems of underuse and evaluates the conditions for successful collaborative governance of new commons.

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A Modified Actor-Power-Accountability Framework (MAPAF) for analyzing commons governance: Case study from Ethiopia

This study posits a Modified Actor-Power-Accountability Framework (MAPAF) that makes four major improvements on the Actor-Power-Accountability Framework (APAF) developed by Agrawal and Ribot (1999). These improvements emphasize nature of devolved property rights, linking outputs of property right regime change with its local level social and environmental outcomes, inclusion of contextual factors and addition of feedback from the output and the outcome to the policy reform. The MAPAF was then employed to analyze outputs and outcomes from two major decentralized forest policies to govern forest commons in Ethiopia, i.e., delegation and devolution. The Gare Arera Peasant Association (PA) and adjacent forest Chilimo were selected as the devolution case study, and the Tutu PA located on the periphery of Jibat Forest was selected for the delegation case study. Data was collected using document review, semi-structured questionnaire interview, key informant interview and household survey. The result demonstrated the following strengths of the framework. First, by incorporating vital bundles of property rights into APAF, MAPAF creates a common ground

for exploring and comparing the extent of democratization achieved by different commons governance regimes. Second, the inclusion of social and environmental outcomes in MAPAF makes it possible to link the output of a given commons governance regime with local level outcomes. The addition of contextual factors enhances MAPAF's explanatory power by providing room for investigating exogenous factors other than empowerment of local people that contribute to the outcomes from commons governance. Finally the addition feedback enhance the applicability of the framework for Social- Ecological systems such as forest commons the needs continuous self-correction for their sustainability.

Keywords: Commons, MAPAF, Property right, Decision making power, Accountability, Social outcome, Environmental outcome, Ethiopia

A Social-Ecological Systems approach to explain disparity in outcome from community-based natural resource management (CBNRM): Case studies in Chilimo Forest, Ethiopia

In this study, a Social- Ecological System (SES) theory is employed to analytically characterize forest commons and explain social and environmental outcomes from it. A SES analytical framework modified from Ostrom (2007) in which resources system and unit, governance, attributes of users, local and exogenous contexts are interacted to produce outcome is developed and utilized in the research. Two cases, a successful and a failed forest commons, were selected from Chilimo participatory forest management (PFM) project, a pioneering and influential community based forest management project in Ethiopia. Data was collected using document review, semi-structured questionnaire interview, key informant interview and household survey. After categorizing households in the two case study sites into four wealth categories using simple wealth ranking method, 30% of the households were randomly selected from each wealth classes for the semi structure interview and household survey. The result revealed that interaction of historic context of local- forest interaction, patronage network between local leaders and external actors, current socio-economic heterogeneity of members and associated differential dependency on the forest as well as existence of collective decision-making arrangements on use rights and benefit-sharing that support members to whom those benefits are salient to be potent in determining disparity in social and environmental outcome form the two cases. Institutionalizing PFM in government forest policy, improving the capacity to implement PFM, creating incentive for government actors at different level involved in facilitating implementation of PFM to minimize/avoid rent seeking and working towards improving trust between government and local people are recommended to improve current conditions.

Keywords: Forest Commons, Social-Ecological Systems approach, Collective Decision Making, Forest Dependency, Benefit sharing, Ethiopia

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Land use and gender implications of labor allocation in the Upper Mantaro Watershed, Peru

Levels of atmospheric carbon dioxide are expected to rise through human activities and the alteration of natural carbon sinks from land-use changes. Agricultural communities in

developing nations are the most affected by climate change as they struggle with new resource management challenges that threaten livelihoods and food security. As the role of carbon sinks in mitigating climate change has become more widely recognized, the conservation of carbon-rich ecosystems is gaining greater policy attention, most recently under the UN Framework on Climate Change.

Land-use change policies impact household level welfare by changing employment opportunities. They can also change overall carbon emissions in an economy since different livelihood activities are characterized by different carbon intensities. Thus, any examination of land-use policy effects needs to focus on both of these outcomes. Moreover, since livelihoods are often quite clearly gender differentiated, understanding women's role in income generation in a household and the barriers they face in transitioning to more carbon friendly activities is essential for aligning environmental and poverty alleviation goals.

The objective of this study is to examine the determinants of employment in an Andean communities in Peru where considerable policy attention under the Nationally-Appropriate Mitigation Activities (NAMAs) is being focused on reversing land use trends to reduce emissions by 2020. The communities around Lake Junín in Peru have customary land tenure systems where the community owns the land and grants farmers either exclusive or shared access to plots of land. The existing institutions impact farmers' access to productive assets, essential for their livelihoods. In addition, nearby mines promote migration and employment opportunities to men in the community. Recent market expansion of Maca, a crop that is considered an aphrodisiac with considerable demand, is creating pressure for land use changes and reducing the available land for grazing livestock, the main livelihood in the community, which is mainly carried out by women. Our focus will be on examining the role played by women and their empowerment on employment activities in this community as it undergoes a period of changing costs and market incentives.

To do so we will use data we are collecting through household and individual surveys regarding employment, assets and carbon intensity of activities. We will also use the Women in Agriculture Empowerment Index to measure empowerment across the communities. The carbon accounting for the employment activities will be completed using secondary data of emissions reports such as the UNFCC National Reports of Peru. Our econometric approach will explicitly account for endogeneity of the women's empowerment in employment by specifying a separate equation for women's empowerment and estimating the empowerment parameters simultaneously with the employment outcome parameters.

Our results will help the government of Peru to design a program to reverse the current land use changes as part of their NAMAs. An understanding of the economy will allow policy makers to avoid unintended consequences, such as elite capturing of benefits, from the NAMA and to understand why some groups might be stuck in some high intensity carbon activities.

Keywords: Women Empowerment, Employment, Livelihoods, Land Tenure, Gender

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Does perception on ecosystem services quality differ among stakeholders in a rural social-ecological system? A case study from Brazil (POSTER)

Ecosystem services are provided by nature to human societies, being generated by complex cycles which operate at different scales. These services are essential for human life and are therefore directly related to human well-being. They are classified into four categories, according to the Millennium Ecosystem Assessment: supporting, provisioning, regulating, and cultural services. Worryingly, an estimated 2/3 of the world's ecosystem services are declining. In such scenario, we are interested in assessing the perception of resource users in relation to the quality of three ecosystem services in a rural area of São Luís do Paraitinga, São Paulo state, Brazil. We are interested in one service from each category (except supporting because their provision in rural areas tends to be minimally satisfactory). Fieldwork is taking place in a social-ecological system delimited by the Chapéu River catchment, an area of 20,620 hectares located in the rural part of the municipality, right next to an important Atlantic Tropical Forest reserve (Serra do Mar State Park). The catchment includes 9 rural neighborhoods and its landscape is a mosaic of different land uses, including areas of native and recovered vegetation, pastures, eucalyptus plantations and small scale agriculture. This catchment is part of the larger Paraíba do Sul watershed, which comprises 180 cities in three states, and around 15 million people depend on its water - directly or for electric power generation. We analyze secondary data collected by a local NGO in order to characterize social and economic aspects of all rural properties in the catchment. Based on consultation of local specialists and people from the community, we identify three ecosystem services to be further investigated, which are meaningful for local well-being. Using semi-structured interviews and key-probes we aim to investigate if there are differences in the perception of ecosystem services among: a) landowners and users of two different kinds of rural properties (milk and dairy production vs. tourism-oriented property), and b) direct and indirect resource users, such as farmers, protected area managers, public administration staff and researchers. As cattle raising has been declining for decades due to soil exhaustion, land users who depend on such activity may have an opposite opinion in relation to those who rely on tourism (which is considered as a promising economic alternative). The same may happen regarding direct and indirect resource users. Such inconsistencies (if any) are a pathway to a broader understanding of the relations among the components of the social-ecological system, as this research is the first part of a larger project investigating resilience-based management. Bearing in mind that some management practices may increase sustainability and resilience of desirable resource systems, in the larger project we aim to understand the feedbacks (existing, missing, or non-recognized) in the social-ecological system that sustain the quality of the ecosystem services studied. Eventually, we aim to explore resource management practices that help maintain or increase such ecosystem services in the study area.

Keywords: Ecosystem Services, Social-Ecological System, Wellbeing, Altered Area, Participatory Research Methods

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The Structural Analysis of the Role Played by Social Capital in Communal Forestry Management in Low Areas, Lao PDR

The Lao government permits villagers to exercise the use-right of “Communal Forestry”, from which villagers can appropriately take some materials (e.g. fire wood, food, timber and so on), so that they can adequately manage the forest. In previous studies, such forest management is mentioned in terms of how residents of the local communities participate in the management of “Community Forestry” or “Common Property Regime”. This problem is related with a management of “Common-Pool Resources”. This study tackles the problem that can happen after residents of the local communities participate in forest management based on the study of “Common-Pool Resources”, which is the problem of so-called a free rider. Previous studies mention that “Social Capital” plays a role to refrain the emergence of a free rider. But most previous studies have yet to show that such a problem can be analyzed quantitatively. The present study succeed in collecting questionnaires from 357 households in Lao three villages, in Sangthong District of Vientiane Capital, and analyzed data through a Structural Equation Modeling. Statistical analysis demonstrates that in the village which has a relatively long history, “Social Capital” plays a role to restrain the emergence of a free rider; on the other hand, in villages established relatively lately or containing heterogeneous attributions (e.g. different ethnics or immigrant from other areas), “Social Capital” doesn’t work. This present study can conclude that local people don’t always manage “Communal Forestry” well due to the presence of a free rider, but if they create and maintain “Social Capital” for a long time, they can do.

Keywords: Communal Forestry, Free Rider, Social Capital, Common-Pool Resources

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Exploring the role of collaboration in the Mackenzie River Basin, Canada

Collaboration is often characterized as ideal for situations in which uncertainty, complexity and a diversity of interests exist. By pooling resources, sharing knowledge, and working together, state and non-state actors learn together and develop creative solutions to jointly shared problems. While collaboration often has positive social benefits for individuals, less is known about how collaboration informs broader policy contexts in which they are embedded. We explore the role of collaboration in governance for water in the Mackenzie River Basin, a large social-ecological system that drains approximately 20% of Canada’s land mass. Governance in this basin is complex; three provinces, three territories, the federal government and numerous indigenous governments have responsibilities for water. The Mackenzie River Basin is considered to be one of the largest relatively intact ecosystems in North America. However, it is also a site of increasing resource development within upstream jurisdictions, including hydroelectric dams and oil sands mining, which are key pressures on the basin’s ecological integrity. In addition to provincial, territorial, federal and indigenous governments, industry actors and non-governmental organizations are also interested and involved in various aspects

of governance for water in the watershed. State and non-state actors have collaborated to provide policy recommendations for cumulative water withdrawals for oil sands mining and in the design and implementation of community-based and regional ecosystem monitoring programs. We explore the role of collaboration in governance for water in the Mackenzie River Basin by situating these collaborative efforts in the basin's political and economic context. Using political discourse analysis, interviews, and extensive document review, we demonstrate that collaborative groups have limited influence on key decisions about how development proceeds within the basin. This is problematic because development is a significant pressure on governance in the basin and informs many of the concerns of participants in collaborative processes. We argue that understanding the factors that constrain or enable positive contributions to social and ecological sustainability in the basin requires expanding the scope of consideration beyond the internal dynamics of collaborative groups to their relationships with state institutions and broader policy decisions. Key relationships include if and how collaboration informs policy decisions, where collaboration exists in relation to other governance processes and if and how it informs and/or is informed by the broader political and economic context in the basin.

Keywords: Governance, Transboundary Water, Water Policy, Collaboration, Power

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Local Energy Systems: A New Commons?

Energy systems serve multiple societal functions. Most directly, they are expected to provide sufficient, reliable and affordable energy for all: an essential condition for economic production and social well-being in modern societies. Beyond this, today's energy systems are expected to minimise negative impacts on the environment, generate new sources of income for "prosumers", offer development opportunities for "energy regions" and reduce dependency on "external" energy sources, as well as stimulating innovation in energy technologies. The multiple purposes which energy systems today fulfil are not always mutually compatible and can pull in different directions, resulting in conflict and resistance to energy transition policies. Recent conflicts over the siting of high voltage power lines, the impacts of energy crops on biodiversity and disturbances from wind turbines illustrate how many of these conflicts find expression at the local level.

This paper explores how the concept of the "commons" can raise our understanding of what (multiple) public interests energy systems serve, what implications these have for ways of governing them and how this knowledge can help address some of the conflicts encountered with local energy transitions. Revealing the "commons" behind the wide variety of energy sources, energy infrastructures and energy landscapes – the paper argues – can tell us a lot about how energy systems are constituted, what purposes they serve, what impacts they can have, how they are used collectively and how they are (or might be) regulated.

To this end, the paper reviews emerging research on energy as commons, drawing on works inspired by public goods theory, case studies of collective action and social movements involved in (re-)acquiring ownership over energy sub-systems (e.g. Byrne et al. 2009; Lambing

2012; Lohr 2012; Wolsink 2012). In a second step the paper critiques this research for largely overlooking the spatial dimensions of energy systems, seeking inspiration from recent literature on urban energy policy and transitions, energy and spatial planning and energy geographies. From this analysis the paper develops a framework for researching the socio-spatial and socio-technical dimensions of energy as commons. This framework comprises four foci for research: a) the co-existence of multiple energy commons, physically and institutionally, b) the importance of spatial-temporal contexts and dynamics, c) energy commons as social and political constructs and d) the overlapping and divergent spatial dimensions to energy systems.

Keywords: Energy, Commons, Infrastructure, Landscape, Spatiality

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Institutions that Moderate Heterogeneity for Collective Action: Case Studies from India and the United States

In developed and developing countries, collaborative partnerships have emerged to address water quality and quantity. The U.S. Federal government spends over \$200 million annually each year to address nonpoint source water pollution through the Clean Water Act Section 319, while states spend millions more (Hardy and Koontz, 2007). In India, over \$550 million is invested annually in water projects by the Indian government as well as international donors (Kerr 2006). A key rationale for these approaches is the notion that “community” is better than “centralized” governance. However, the reality is that communities are not homogeneous entities. Communities are divided across class, caste, race, gender, resources, interests, and values. Scholars of collective action and common pool resource management have identified heterogeneity as variously helping or hindering success. These inconsistent results stem from a lack of specificity regarding the dimension of heterogeneity, and the context. In this paper, I identify conditions and incentives for heterogeneous communities for developing effective natural resource management policies. In particular, I focus on which institutional mechanisms best enable heterogeneous communities undertake successful collective action. The first phase of this research was conducted in Montgomery, West Virginia with 25 interviews. In Montgomery, I find that formal rules, a shared motivation for cleaning up the acid mine drainage, and a common past of being a part of the coalmining era enable the community to overlook differences in race. For the second phase of this research, I am currently conducting fieldwork in Tamil Nadu, India.

Keywords: Institutions, water management, case studies, heterogeneity, collective action

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Securing communal land rights in TFCAs for sustainable livelihoods

A transfrontier conservation area is defined in the Southern African Development Community (SADC) as a part or components of larger eco region that straddles the border between two or more countries, encompassing one or more protected areas as well as multiple-resource areas. In a number of the established TFCAs in the region these multiple resource areas include communal land. The inclusion of communal land in these eco-regions is indicative of an understanding of humans as an important biological component and therefore that, they are crucial to the ultimate goal of biodiversity conservation. In the context of TFCAs, therefore, biodiversity conservation is linked with life support systems and human development thus exploring natural resource conservation and ecosystem management simultaneously with human development. With the latter in mind, a number of TFCA establishing agreements identify tourism, particularly eco-tourism as the main driver of its biodiversity conservation, poverty alleviation and socio-economic development in the region. This would mean that in the furtherance of biodiversity conservation in TFCAs, tourism is regarded as a sustainable alternative livelihood for the local communities whose lives are impacted by the establishment of these TFCAs. However it has been seen that state parties to TFCAs tend to adopt an outsider's socio-economic interest in conservation and tourism that alienates local communities leaving the latter without formal recognition of their role and rights. With a specific focus on communal land rights, this paper seeks to analyse the ways in which local communities within the TFCAs can have their rights secured from a sustainable livelihoods perspective. To this end, the paper will be a legal analysis of the SADC legal framework on TFCAs and the extent to which it provides for communal land rights. For illustrative purposes the paper will further examine the status of communal land rights in the domestic legislation of the Greater Limpopo TFCA (GLTFCA) which includes South Africa, Mozambique and Zimbabwe. Conclusions and recommendations on the ways in which community land rights can be secured for sustainable livelihoods will be drawn from the lessons learned in the study of the GLTFCA.

Keywords: Sustainable Livelihoods, Communal Land Rights, TFCAs

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Payment for Ecosystem Services in the Commons: Who participates?

In recent years, Payment for Ecosystem Services (PES) programs have been implemented throughout the Global South. Although there are numerous variations of PES agreements, a critical component of most PES programs is that the sellers must voluntarily decide to enter the program. Many of the millions of low-income households that could be participating in future PES programs live on communal land that is managed via collective decision-making processes. Few studies, however, have examined the decision-making process for communities holding common-property titles. Given the voluntary nature of most PES initiatives, it is important to understand how communal participation is decided and the factors that influence whether a community chooses to participate in a PES program.

This study examines collective decision-making processes in the Ecuadorian payment for conservation program, Socio Bosque. We use qualitative and quantitative analysis to empirically test how institutional and socio-economic factors influence a community's decision to participate in the Ecuadorian payment program. Data include a survey of leaders in 67 communities. We interviewed representatives from 44 of the 47 communities that were participating in PSB as of February 2013. The 23 non-participant communities were communities that: (i) held collective title to lands in the regions that PSB was targeting (ii) were eligible to participate in PSB, and (iii) had heard of PSB. Results find that community organization and ethnicity impact the likelihood that a community will decide to participate in the program. Furthermore, results show that communities at early stages of the program had low dependence on land resources and were influenced by NGOs to enter the program. These findings suggest (1) barriers to participation are beyond previous analyzed factors such as land title and poverty levels, and (2) communities in recent years are participating despite having high dependency in land resources, showing evidence of aditionality in the program.

Keywords: Payment for Ecosystem Services, Common-Pool Resources, Decision Making, Latin America, Páramos

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Ensuring a delicate balancing act of food security and livelihood improvement in communal areas – evidence from Zimbabwe

The last two decades have seen many organisations and approaches used to ensure food security among poor small scale farmers in developing countries. Such interventions have been generously supported by national and international governments and the donor community. (Notable examples include USAID's multi-million dollar Feed the Future initiative and the Bill and Melinda Gates Foundation work in Sub Saharan Africa, the EU and DFID to name just a few.) With more than 500 million family farms managing the majority of the world's agricultural land and producing most of the world's food (Food and Agricultural Organization, 2014), the logic has been that if peasants are food secure, they will be able to jut out of the poverty trap and improve their welfare in significant ways. While such a double dividend outcome would be plausible, evidence from Zimbabwe is not pleasing. Using empirical evidence from a five year US\$32m USAID funded agricultural project I argue that efforts to commercialize communal agriculture do not necessarily result in improved livelihoods and welfare. Unintended consequences of commercialization of communal agriculture include energy sapping conflicts over land ownership, moral decadency and delinquency livelihoods. Another key finding of this work is that smallholder farmers need more than just financial resources to improve their agricultural enterprises. Access to markets, provision of technical support by extension providers, value addition as well as business training in investment are a priority to successful commercialization of small scale farmers. In conclusion, I argue that there is no direct link between food security and livelihoods improvement. To improve livelihoods and welfare we need to assume a *bricolage* approach (*after* Scoones (2009) and Cleaver (2012)).

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Keywords: Food Security, Livelihoods, Smallholder Agriculture, Markets, Finance

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Dinner table politics: a multi-scalar access analysis of a rattan value chain starting in the forest commons of Central Sulawesi, Indonesia and ending in your kitchen

Access, exclusion and power are concepts that can be studied at many levels and scales. They are central to understanding who has the ability to benefit, to what extent, and on whose terms. This presentation focusses on multi-scalar issues of access to the benefits of rattan and rattan furniture among forest-based collectors, traders, processors and retailers. Rattan is a vine collected from the forest and used primarily in the furniture and basket industries. The presentation provides an analysis starting from the commons: in this case, the forests of (and surrounding) Lore Lindu National Park and leads to the sale of furniture in international markets. Data are based on interviews with industry actors and forest-based collectors in addition to a survey of rattan furniture traders globally. The research addresses the extent to which each actor benefits, how they position themselves to benefit, and how access to benefits at one level production affects the access to benefits at another, with specific focus on the users of the commons. The findings show that central mechanisms of access change depending on the phase of production within the value chain. Some mechanisms of access are more dependent on others at different levels in the value chain. Depending on the actor and phase of production in the value chain, some mechanisms of access tend to facilitate or compromise others. Actors with customary rights claims over the forests experience a more diverse array of benefits than other forest-based actors owing to access control over the forest, but are equally vulnerable to market and trade policy changes. They extend usage rights to other village actors in order to reinforce their claims over the forest, which is compromised by decreasing global markets for rattan furniture over the past ten years, thereby reducing the interest of other actors to use the forest. Additional pull factors from commodities that provide more immediate cash benefits, like cocoa, motivate rattan collectors to take up non-forest based livelihood activities, which means not only that the forests are put at risk as they are converted to plantation land, but customary land use claims could be compromised if the forests are destroyed or not continually maintained. This research contributes to political economy and political ecology research by analysing some of the 'how' questions around differential benefits within trade networks and the ways in which some actors are better positioned to capture rent from natural resource products than others, and specifically how positionality is affected by the access of others within a value chain.

Keywords: Access, Exclusion, Indonesia, Rattan, Value Chain

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Killing us without blood: in search of recognition justice in Bukit Baka Bukit Raya National Park, Indonesia

This paper explores the procedures and outcomes of the appropriation of the Bukit Baka portion of Bukit Baka Bukit Raya National Park (TNBBBR) on the border of West and Central Kalimantan by elucidating issues of environmental justice in the commons. Since the establishment of the nature reserve in 1981, there has been a mix of opaque and exclusionary planning by park authorities while tensions with customary users were often dormant. Conflict between customary users and park authorities arose when access rights to the forest commons were restricted through enforcement of park boundaries. Although the villagers decry the lack of any benefit from the park, compensation has been offered and it is they themselves who refuse to accept such benefits.

Five villages that border Bukit Baka Bukit Raya National Park in Melawi, West Kalimantan are rekindling their protest over the park boundaries and the appropriation of their lands by the park. The park was established as a nature reserve in 1981 without participation of customary users. Customary user contestations are muted by a democratic void in which they are without recognition in the governance structures of the park. Therefore, communities have sought indigenous peoples' rights NGOs to represent them and advance their customary claims over land. These NGOs prove more salient to the needs of the villages because they focus less on distributive justice through benefit sharing and more on recognition justice through the advancement of land claims. This paper explores the struggles for recognition over the commons in the national park and finds that peoples' resistance to the State, including offers of distributive benefits, is rooted in the notion that their consent constitutes acceptance of State authority over customary land.

Keywords: Environmental Justice, Conservation, Recognition, Authority, Multi-level Governance

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Common Struggles; Common Legacy: Black Migration From Georgia to Nova Scotia (1812-1865)

This presentation examines the common legacy of black migration between the southern state of Georgia and the maritime province of Nova Scotia. Whether African Americans arrived in

in the colonies of New France and British North America as freed Black Loyalists following the lost War of 1812 or as escaping slaves via the Underground Railroad, black immigrants, though arguably 'free', endured continued hardships and racism in this promised land. In 2012, I led a group of 11 Savannah State University students on a one-month study abroad course to explore the history of black migration from Georgia to Nova Scotia by drawing direct historical and biographical connections between Savannah and Halifax. The premise for the course was for my HBCU (Historically Black College and University) students to gain a better understanding of Black freedom in Canada. While much of our experience and studies embraced this assumption, other fact-finding experiences unraveled the revisionist myths of Canada as slave-free and less - racist nation than its southern neighbor. Over the course of the summer, my students would come to understand that slavery had, in fact, existed in the colonies of what is now known as Canada for over 200 years. While my students understood this unpleasant historical fact, few Canadians are aware of this silenced history. As one of our guest lecturers at Dalhousie University, Dr. Afua Cooper puts it, slavery is "Canada's best kept secret, locked within the National closet." While social and cultural historians are keen to draw distinctions and differences between the U.S. and Canada, few historians are interested in drawing out the similarities, especially when those unpleasant or muted similarities, such as slavery and racism, are exposed. This presentation will, therefore, explore the common and continued suffering of Blacks in Nova Scotia and Georgia from the War of 1812 to the end of the Underground Railroad in 1865 that myself and my students discovered during our Study Abroad experiences in Nova Scotia.

Keywords: Migration, Slavery, Racism, War, Underground Railroad, Canada/U.S.

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Collective action in urban social-ecological systems

Kohler and Wissen (2003) observe that urban centers "represent to a large extent the global and local focal points of social movements". Over the years multiple scholars have qualitatively and quantitatively studied such urban collective action scenarios in order to understand the dynamics of such self-organizing behavior. Ostrom (2007; 2009) proposes a framework of variables which "are posited to affect the likelihood of users engaging in collective action to self-organize" in a social-ecological system. Ostrom (2007) observes that "interactions and outcomes depend on the specific combination of several variables". Young et al (2006) note that scholars studying human-environment interaction in such complex social-ecological systems "often encounter analytic and methodological problems that are difficult to solve using familiar scientific procedures" as the "dangers of ending up with spurious relationships are especially serious in research on human-environment interactions". In their search for "rigorous modes of analysis usable even in small-N situations" in view of the fact that "(s)tatistical inference never establishes causal connections in any definitive sense", they find promise in the use of Qualitative Comparative Analysis (QCA) methods to study human environment interactions.

In this paper I seek to identify the causal combination of variables which affect outcomes in urban collective action situations around ecological or environmental resources. I do this by applying the QCA methodology. Specifically, the research question I seek to answer is – “what causal combination of variables affects outcomes, in urban collective action scenarios around ecological and environmental social-ecological systems?” The source of data is published case studies on collective action in urban social-ecological systems. I seek to identify a framework of variables which can be used to test properties in such systems. I analyze how QCA tools can be used for testing such properties and then describe in detail the methodology used for analyzing data in this study. I also define the independent and outcome variables as used in this study. I then discuss findings and conclude this paper by highlighting the relevance of this project.

Keywords: Governance, QCA, Meta-Analysis, Meta-Synthesis, Urban, Collective Action, Social-Ecological System

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Institutional arrangements to support cross-scale and cross- thematic integration for natural resource governance at the landscape level in the Amazon

Deforestation in the Amazon basin is a multi-scale problem, with drivers and consequences observed at local, regional and global scales. If deforestation within the basin “exceeds about 40%, a ‘tipping point’ might be passed (...) and a shift in the forest–savannah boundary or large-scale dieback of rainforest,” (Davidson et al. 2012). Such risks demand integration of management at multiple scales, since actions happening anywhere in the Amazon basin could affect the integrity and resilience of the ecosystem as a whole. They also point to need for integration between themes, since different interests have an impact on the environment. Indeed, “the main reason why environmental problems appear may relate fundamentally to the fact that present institutions separate decision making among agents using the same or interdependent environmental resources,”(Hagedorn 2008 and Vatn 2008, 2009b, as cited in Vatn and Vedeld, 2012).

Ideally, natural resource governance and management should be integrated at the landscape scale, which is “the level at which many ecosystem processes operate and at which interactions among environment and development objectives are often mediated,”(O’Neill et al.1997, as cited in Milder et al., 2012). However, many challenges remain to identify the “most adequate spatial and temporal scales” (boundaries) at which institutions should operate. For instance, in the Amazon, defining the landscape boundaries for natural resource management is highly complex because ecosystems overlap across multiple domains. Moreover “jurisdictional boundaries are the product of political, economic and cultural factors, often sidelining ecological considerations,” (Young, 2002b).

Institutions need to co-evolve with development pressures. Development is a dynamic process in which demands for resources and institutional arrangements to utilize them change on a constant basis. Therefore, institutional design should respond to this dynamic nature, but also, should help to structure changing landscapes. Institutions “evolve incrementally, connecting

the past with the present and the future; history in consequence is largely a story of institutional evolution,” (North, 1991, p. 97).

But which institutional arrangements can support cross-scale (horizontal and vertical) and cross-thematic integration for natural resource governance at the landscape level in the Amazon? This is the focus of my research within the ASSETS project, in the context of the shifting forest-agricultural frontier in the Peruvian Amazon (Pucallpa), linking the local, regional and national levels. It also aims to gain a better understanding of the ecosystem dynamics, the spatial scales to consider for a landscape approach that can guide institutional design and to analyze the institutional matrix linked to agriculture and forestry at multiple spatial scales.

The analytical framework used for this research includes the “Fit, Interplay and Scale triad” (Young et al., 2008, and Young, 2002a) and the “Functional Fit” which “relates to the congruence of resource use mechanisms or institutional attributes on the one hand and ecosystem functionality,” (Herrfahrdt-Pähle, E. 2014). The research goal is to support the design of governance systems for natural resource management that help overcome conflicts amongst resource users at the landscape level and reconcile conservation and economic development interests, to sustain the resilience of ecosystems, as well as to support the opportunities for collective action.

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Keywords: Cross-scale natural resource governance, Forest-Agriculture Interface, the Problem of Fit, Landscape, Institutional Arrangement

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Resistance to Land Grabs and Displacement in Cambodia: The Limits of Collective Action

In rural Cambodia indiscriminate, illegitimate and often violent land grabs in the form of Economic Land Concessions (ELCs) have triggered myriad local responses by peasants facing evictions from private and communal lands. Drawing on fieldwork in two provinces, this chapter looks at the various forms of collective resistance to government-sanctioned dispossession and displacement and discusses their effectiveness in bringing about socio-political and institutional change. We find that Cambodian peasants have responded to dispossession and displacement by employing a myriad of resistance strategies, ranging from road blockades, open confrontations with security guards and military personnel, demonstration marches and petitions to various forms of advocacy resistance and everyday politics. Their selection from a range of resistance strategies does not follow a clear pattern, but appears to respond to the varying levels and strategies of oppression deployed by government representatives, concessionaires and members of the armed forces. This has created a particular dialectic between domination and resistance, reminiscent of Polanyi's 'double-movement'. In the case of Cambodia this takes the form of a continuous oscillation between forced commodification of natural resources by domestic and foreign elites on the one hand and the combination of overt and covert resistance strategies by the rural peasantry on the other. Yet we also find that these local resistance movements have been mostly desperate, sporadic and atomistic vis-à-vis the powerful coalition of government authorities, concessionaires and the military. Cambodian peasants lack organization and collective action across village boundaries as a result of decades of conflict and unrest, and their voices have been ignored by the home governments of the investors, who continue to regard the country as a promising new haven of investment, trade and tourism, where displacement and dispossession of the poor is deemed unavoidable collateral damage for the foreseeable future. Unless the rural peasantry in Cambodia finds a common and much stronger voice and gets support from national and international advocacy groups beyond mere lip service, powerful elite interests will continue to prevail over local people's rights.

Keywords: Resistance Movements, Collective Action, Land Grabbing, Communal Land Rights, Cambodia

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Understanding local food security through community self-assessment of resilience

Over the last few years, resilience has quickly gained prominence in the fields of humanitarian assistance and international development, so much so that many organizations (e.g. USAID

and DFID) now speak of resilience as a central organizing principle. Resilience is offered as a potential bridge between the two fields – with ‘building resilience’ as a unifying objective. Unfortunately, in many instances resilience appears to be adopted non-critically, with little clarity on either its meaning or its history as a central concept in the field of ecology and the study of social-ecological systems. At worst, business as usual is recast as building resilience. More often, resilience is characterized as a static system property and narrowly defined as a form of ‘engineering resilience’ or bouncing back from shock and stresses. Central organizing concepts to the study of resilience, such as Holling’s adaptive cycle and the dynamic nature of resilience to changes over time are seldom integrated. Writing from the perspective of practitioners working internationally to improve local food security through humanitarian assistance and agricultural development, this presentation will first wade through the definitional debate to offer a robust definition of resilience as a dynamic process, grounded in a complex adaptive systems perspective, that integrates the triple elements of coping, adapting, and transforming in response to changes in food security. Building on this definition, we will propose a framework for community self-assessment of resilience to changes in local food security. The presentation will conclude with a discussion of the application of this framework both for the initial stages of project planning and design, and for evaluation of completed projects to interrogate a measure of ‘success’ equated with genuine resilience building, drawing on case examples from food security projects in east Africa.

Keywords: Resilience, Food Security, Community-Based Self-Assessment, Africa, Rural Development

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Fracking with the Commons? How linking hydraulic fracturing debates to the Yukon’s Peel River watershed land- use plans reveals overlapping public and private resource governance

“Don’t frack with the Peel,” read one protest sign in a sea of others held by mitten-clad hands at a protest in Whitehorse in the winter of 2014. This was not an isolated voice: the language of “fracking”—hydraulic fracturing—has played an ongoing role in the public theatre of protest over a contested land use planning process for the Yukon’s Peel River watershed. It is referred to in signs, letters, speeches, and bumper stickers by those protesting the government’s decisions. In some ways, this focus on hydraulic fracturing in the Yukon’s Peel watershed is puzzling: shale gas reserves in the Peel are small relative to other deposits in the Yukon; shale appears to be of marginal interest even to oil and gas companies with claims in the watershed; and the location of the shale deposits (in the far northwest of the watershed) would make their exploitation particularly challenging, and likely economically unfeasible in the near future. So why has an apparently marginal resource in the Peel been a focal point for activism over the watershed? And what significance does this hold for our understanding of shifting dynamics of resource governance?

Fracking, we argue, is used strategically in the Peel debate for three main reasons: political opportunity (provides the Peel campaign with increased visibility); amplification potential (links local debates to global efforts and allies); and image politics (vivid language and visual representations attract media attention). We suggest that the widespread uptake of anti-fracking language in these land use debates illuminates growing tensions over public and private resource governance. In particular, we see friction between the perception by the Yukon public of the wilderness as a commonly-held trust, the constitutionally-entrenched rights of certain First Nations to governance input on their traditional territories (a restricted commons), and the history of the Yukon's privileging of privately-held resource rights.

These debates over the Peel reveal that the commons—even where legally bounded— remain contested and subject to reinterpretation. The commons, we find, are not static, but subject to ongoing contestation over what they are, what they should be used for, and who should make these decisions.

Keywords: Hydraulic Fracturing; Peel Watershed; Yukon; Property Rights; Activism and Contestation

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Climate change and forestry: Common pool regimes as panacea or Pandora's Box?

Forests, in many instances, comprise common pool resources, whose effective management may well be contingent on a number of preconditions (Ostrom 1990; 2005). In developing countries, in particular, self-organising governance mechanisms are often well-established to deliver forest ecosystem services. However, research carried out under the FP7 project REDD-ALERT suggests of numerous conflicts identified between sustainable development and climate policy outcomes of forestry projects' implementation, especially with respect to Clean Development Mechanisms (CDM) and Reducing Emissions from Deforestation and Forest Degradation (REDD) projects. Climate change mitigation is the main focus of CDM and REDD. However, additional benefits (especially of livelihoods and biodiversity) are understandably considered to be either 'important' or 'very important by local people. Climate change mitigation forestry projects are linked to community based forestry that has a long tradition in 'host' countries. Involvement of the local communities, including indigenous peoples residing in the project areas, is seen as a key factor in ensuring the acceptability, viability and financial profitability of CDM and REDD. These projects can benefit the communities by supplementing and diversifying their income opportunities and by increasing the access to multiple forest goods and services. However, without adequate safeguards, some CDM and REDD projects can have negative effects, and a further problem is how to disburse the benefits to local people in a transparent and equitable way. Observations from Africa back up our concern brought from South and South-East Asia and South America, highlighting the necessity to respond to a range of yet unsolved questions regarding the establishment of social, economic, cultural and environmental sustainability, especially of CDM. The numerous

challenges identified include land eligibility and tenure rights problems. Furthermore, “the potential for manipulation to achieve financial gain, while showing little regard for environmental or social consequences” has become evident when carbon markets have developed via trading offsets (Spash, 2010). In developed countries, the assumption of enhanced forest management through increased community engagement and governance requires scrutiny. It is needed in the light of Bruggers’ (1986) observation that ‘too endogenous’, self-reliant community level development, which ignores external effects and global economic processes, can be highly damaging for the regional economy and society (i.e. at a higher than local levels of governance). The development of new ways of exploring community management through the institutionalist theories of Ostrom indicates that, in the UK, forests are unlikely to have the salience on livelihoods that they have in developing countries and that their acquisition and management by local communities may represent a form of local rent capture at tax payers’ expense (Slee, 2013). The transition countries’ experience with communal type forestry (in a form of woodlands in collective farms, i.e. ‘kolhoz’) which existed in the former Soviet Union along with the state-controlled forestry proven to be unsustainable. In many transition countries of Central and Eastern Europe, the state-controlled forestry has often been replaced by small scale private ownership under restitution and other policies, with their own problems of delivering multipurpose/multifunctional forestry. We argue that the success of community based forestry under common pool resource regimes is case and context specific, and need for multi-level forest governance is evident to create scope for balancing local and wider public (e.g. climate change mitigation) and private goods in multifunctional forests.

Keywords: Forest, Climate, Developing countries, Developed countries, Transitional economies

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Achieving Climate Cooperation Among Farmers

Global climate change is undoubtedly one of the greatest collective action environmental problems facing our world. Nevertheless, international treaties to mitigate emissions continue to be largely ineffective, and global emissions are rising. Simultaneously, climate change adaptations are becoming increasingly necessary to adapt socio-environmental systems to already occurring and future potential changes. Strategies are needed that enable communities to effectively manage their emissions and adapt to the potential changes regions face. Such is particularly true for agriculture, which is both a contributor to global climate change (approximately 14% of global emissions or nearly ¼ of global emissions when considering associated land-use change) and also a potential victim to its impacts across the globe. Ensuring continued food production into the future will involve shifting agricultural production strategies across diverse landscapes and regions in addition to changes in distribution. Farmers are therefore an important group of individuals and collective community to study to understand how agriculture can shift its current practices to those which are increasingly “climate smart”. The individual nature of farming makes climate change mitigation and adaptation a challenging proposition, and an appropriate context in which to apply Ostrom’s design principles and polycentric governance approaches to understand effective management of common pool resources. Ostrom’s work clearly suggests the ways in which

policies and initiatives to manage commons can be designed to ensure success and community buy-in. Using data from farmer interviews (n=48) and surveys (n=652) in New Zealand and California I discuss how local versus global perceptions of climate change and its risks influence adaptation and mitigation behaviors differently based on cooperative versus personal costs and benefits. I also highlight how farmer's perceptions of top-down regulations and unequal perceived costs are a hindrance to climate change mitigation. Farmers demonstrate from their perceptions of previous environmental policy experiences, that Ostrom's principles have not been largely applied within agricultural communities and environmental regulation formation in the past. As a result, many farmers are wary to support future environmental policies including climate change policies, and their policy perceptions also influence their perceptions of other environmental issues including climate change belief. I suggest strategies that may encourage farmers to adopt mitigation and adaptation practices and support climate change policies and ways in which polycentric policies can be best implemented in light of empirical evidence.

Keywords: farmers, agricultural decision-making, climate change policy, adoption

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Analysing multi-level governance of mangrove forests in East Africa: an application of Ostrom's SES framework

Arrangements for, and performance of, governance affect the use and condition of natural resources. In many natural resource situations, governance arrangements are complex, involving multiple actors, rules, interactions, structures and levels, and may be quite fragmented, lacking coordination and coherence. This is often the case for mangrove forests, where multiple services derived from the forests result in several parts of government having an interest in their management, as well as a range of other actors. Such government and non-government actors include those concerned with forestry, planning, coastal zone management, tourism, fisheries and climate change. The diversity of actors, levels and spaces in which they operate present challenges for effective and sustainable mangrove governance.

The Social-Ecological System framework (Ostrom, 2009) is used to guide the analysis of the governance arrangements of mangrove forests at several sites in Kenya and Zanzibar, to investigate the nature of the arrangements in relation to the condition and use of the natural resources. The paper sets out an analysis of the governance landscape and the background to differences identified between the arrangements and performance of locations. In so doing, it contributes to the further development of the SES framework, focusing on the 'governance systems' attributes.

The overall aim of the research from which this paper derives is to explore the potential for adoption of Payment for Ecosystem Services schemes in different locations. The nature and structures of governance have implications for the potential for PES and these are identified and analysed, drawing on literature on governance and PES.

Keywords: SES Framework, Multi-Level Governance, Mangroves, East Africa, PES

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As part of the growing concern to analyze larger-scale commons, scholars have paid increasing attention to cross-scale linkages among community, local, and national levels. Since the number of stakeholders in larger-scale resources management situations is huge, we are more likely to emphasize the challenge of achieving stakeholder consensus in relation to management decisions, rather than the next step, which is mobilizing direct involvement and cooperation from stakeholders in the decisions they have agreed to. Whereas previous literature on common pool resources (CPR) has revealed in detail the conditions of successful cooperative arrangements in small communities, it is less clear what principles we can adopt for building consensus at the level of cross-scale linkages. The public participation literature has offered guiding principles for interaction between local residents and government agencies; however, it has not given adequate attention to diverse local community settings, leaving us too often with leading to general prescriptions that do not fit a given local realm.

This study builds a framework for the analysis of these cross-scale interactions by combining these two streams of literature²³¹ on CPRs and on public participation²³¹ and applying them to the study of larger watershed planning in Japan, with special focus on large-scale public infrastructure developments such as the construction of dams. About 17 years ago, Japan's national government introduced a new participatory planning process for comprehensive management planning to deal with severe criticism of the dominance and power of government agencies in contrast to the absence of voices of local residents in planning for the management of rivers. We can view these planning efforts as a typical instance of cross-scale interactions. Rivers in Japan, and then we empirically examined hypothetical relationships derived from the framework, such as those between degree of consensus and physical and social attributes of watersheds, between watershed contexts and stakeholder representation, and patterns of interaction among stakeholders. Based on those examinations, we will present some design principles for cross-scale interactions to manage larger-scale commons.

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Common-Pool Resource Awareness in Recreational Fishing and the Formation Process: A Structural Equation Modeling Approach Based on a Questionnaire Survey of Japanese Recreational Fishermen

Fish for recreational fishing can be one of the most familiar common-pool resources for general citizens. Some Japanese recreational fishermen have a high level of common-pool resource awareness (management), but others do not. In this paper, we hypothesize that the level of common-pool resource awareness is influenced by morals and manners built through the use of the most common resources, such as kitchens, bathrooms, and living rooms, as well as hospitality for others, in a family, the minimum unit of community. In order to test this hypothesis, we conduct an empirical analysis based on an internet survey. The data used in this research were obtained in September 2014 by a questionnaire survey conducted through the internet targeting general citizens all over Japan. Making the characteristics of gender and age group (10-year age groups) of samples proportional to the Japanese population, 1,200 persons were extracted by a stratified sampling method from approximately 1,700,000 monitors registered in the list of an internet survey company. Among all those sampled, 517 respondents who had experienced recreational fishing were selected for the survey. They were asked to respond to five items about common-pool resource awareness (e.g., whether or not they pay special care not to fish more than necessary), five items about mindfulness of good manners in daily life, and nine items about the housework-assisting activities they did when they were young. A factor analysis and structural equation modeling (SEM) were performed to examine the results of the survey. The results of the factor analysis show that common-pool resource awareness, mindfulness of good manners, and assisting with housework activities form latent variables. The results of the SEM, which was performed according to the results of the factor analysis, were statistically significant in that the more respondents assisted family members with housework, the higher the level of mindfulness of good manners they have. In addition, it was found that common-pool resource awareness becomes higher corresponding to the level of mindfulness of good manners. This study suggests that developing mindfulness of good manners by involving children with housework-assisting activities in a family can be considered an important factor for the success of (common-pool) resource management in open-access situations or similar situations, such as recreational fishing.

Keywords: Recreational Fishing, Common-Pool Resource Awareness, Structural Equation Modeling Approach, Questionnaire Survey, Japan

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Depopulated rural community and its resource management

In mountain area of Japan, depopulation and aging is causing social issues like desolation of fields and forests (Ohno, 2005, Odagiri, 2006) and difficulty to inherit traditional performing arts (Hoshino, 2009). Because the population of Japan itself started to decrease, increasing the rural population is difficult (Tokuno, 2010). It is needed to consider how we can manage resources in depopulated mountain areas by means other than increasing the number of the residents. The research site of this study is a village in Japan which experienced out-migration in 1960s-1970s. The number of resident household become zero 40 years ago, but its self-governmental association is still active in 2014. This study explains what activity they continue

and discuss the possibility for out-migrants to manage the resources of depopulated mountain areas. A village is located mountain area and people made a living of agriculture and forestry. The households number had been around 15, and it started to decrease from 1963 and became zero on 1973 (Sakaguchi, 1989). Children education is one of accelerators of outmigration.

In 2014, the self-governmental association of the village continues its communal labors, spring and autumn tutelary god festival, Buddhism festival and annual meeting. The member of the association is not individual but household. The main actors are out-migrants that spent their childhood in the village and migrated to neighboring town in their school-age. In the case that their parent cannot attend, second-generation of out-migrant attends the activities. The households are members of self-governmental association of both A village and each place they immigrated. In the immigrated place, sometimes they don't attend tutelary god festivals and Buddhism festivals despite joining communal labors. The out-migrants also continue to manage their community and private forest in A village. The wood price has got much cheaper, but they have a feeling that "My parents planted these trees for next generation, so I don't want to kill these trees. I want to pass the forest to the next generation." The Buddhist temple that shared by A village's households is important for their ancestor worship. Though visiting their ancestors' grave has been a big reason for them to visit A village, the out-migrants started to move their ancestors' graves recent years.

In this case even the number of residents becomes zero the community doesn't cease to exist immediately. Self-governmental association is needed for maintaining their forest and continuing their festivals and ancestor worship. Common resources gave out-migrants opportunities to get and work together. Those resources are not easy to move from the place and out-migrants continue to manage them by going to the village sometimes. It needs continuous research to discuss the possibility of resource management by second-generation of out-migrants.

Keywords: Depopulation, Out-migrants, Japan

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Indigenous Knowledge on Non-Timber Forest Products (NTFPs) in Fringe Communities of Oluwa Forest Reserve, Ondo State, Nigeria.

The present study analyses indigenous knowledge of Non-Timber Forest Products (NTFPs) and utilization of 15 species of both plant and animal origins in day-to-day life of fringe communities of Oluwa Forest Reserve in Ondo State, Nigeria. These include miraculous tree (*Moringa oleifera*), Colanut (*Cola nitida*), Bush mango (*Irvingia gabonensis*), Bitter cola (*Garcinia cola*) and a host of others. The communities have a good association with plants and their potential role they use for different purposes; treatment of various ailments, economic and other values, and worship in different religions and customs. The traditional knowledge on the utilization of these NTFPs is widely accepted by these indigenous people. The major problems communities identified to be associated with Non-Timber Forest Products (NTFPs) in the study area were over-harvesting (50%), poor storage and processing facilities (25%), lack of training (17%), and transportation (8%). It was revealed that conservation and sustainable

use of plant species by fringe communities would be highly advantageous for socio-economic growth, in conservation of rare and endangered plant species and the indigenous knowledge for the future generations.

Keywords: Indigenous Knowledge, Ntfps, Utilization, Conservation, Nigeria

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Applying the Social Ecological Systems framework (SES) to a Mexican water governance case: Bringing the politics back in

Understanding water governance requires an in-depth examination of the socio-political, ecological, and human dimensions of the problems that governing this scarce resource presents. The Social-Ecological Systems (SES) framework developed by Elinor Ostrom and subsequently refined by Ostrom and her collaborators provides an interesting model to frame commons governance problems, as it focuses on the ecological, the social and the human aspects of resource management. In this paper, I examine the case of water policy in Mexico and use a case study in the region of Aguascalientes, in central Mexico. While last century Aguascalientes was actually a region rich in water resources (as its name indicates, “hot waters”), the past 50 years have shown an increasing level of drought and heightened pressure on water resources because of growing population and expansive urbanization. In the paper I explore the case of Aguascalientes as a metropolitan zone and examine whether the SES framework can help us understand the challenges facing this metropolitan zone and design proper policy options to solve water governance problems at multiple scales. While the SES framework is a holistic conceptual model, I argue that we need to reemphasize the political dimension of commons governance, and thus I posit a modified version of SES that highlights power, conflict and institutional dimensions of water governance, all of these political elements that are necessary within an integrated analysis of commons.

Keywords: Mexico, Water, Governance, Commons, SES

Evaluating polycentricity in water governance? Towards a life cycle measuring framework

Despite being a concept coined by Vincent Ostrom in the early 1960s, polycentricity has emerged in the last decade pretty much like another panacea, overarching paradigm (much like integrated water resources management has been for the past 30 years). Elinor Ostrom and Vincent Ostrom’s work has nonetheless helped advance our understanding of polycentric systems for resource governance, yet a gap still remains: is polycentricity a concept that can be measured? Should it be measured and can we reach a consensus on which dimensions should be used for this measurement? In this paper, I combine the literature on polycentricity with the issue area of water governance and build a qualitative and quantitative framework through

which I then examine sub-national, comparative case studies of water governance in Mexico. I argue that the life cycle framework presented in this paper needs to be tested with other cases across nations to refine whether the dimensions of polycentricity offered in this paper actually increase our analytical power to better understand commons governance.

Keywords: polycentricity, measurement, framework, theory, Ostrom, governance

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Practice and Advocacy for Community Forestry in Canada

The recent downturn in the Canadian forest sector led to widespread negative socio-economic impacts in forest-based communities. The resulting crisis, in combination with an evolving legal context that increasingly supports Aboriginal and treaty rights in relation to traditional lands, has triggered a fundamental rethinking of relationships linking forest-based communities, governments and industry to create a sustainable future. In response, various actors throughout the country are promoting community forests within Canada's forest commons (i.e. public lands). Advocates see this approach as being most effective to build resilience in forest communities and ecosystems by activating forest resource development opportunities, local benefits, and social responsibilities.

This presentation will be one of four in a panel, including academics and practitioners, who will address the bridging of practice, research and advocacy among academics and civil society to advance community forestry. Panelists will present on a range of topics covered in a book currently in preparation. An additional focus will be the new national network—Community Forests Canada—that emerged from a 2013 conference as a means to support existing and proposed community forestry initiatives, policy engagement and research.

The presentation will focus on the roles and responsibilities of community and non-governmental practitioners in building knowledge that supports developing, operating and proposed community forests. It will also speak to the opportunities and challenges in the not-for-profit sector in advocating for community forestry in differing jurisdictional contexts, from provinces that have enacted legislation to support community forestry, to those in the midst of forest tenure reforms that working to be more receptive to community involvement in forest management, and lastly those that firmly resist the development of policies to support community forests.

Keywords: Community Forests, Practice, Advocacy, Canada

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Multi-actor approaches for knowledge sharing and governance of transboundary water resources

Decision and policy outcomes for transboundary (shared) water resources are often based on state-centric approaches. These approaches often fail to comprehensively address non-linear, complex resource management challenges because they remain disconnected from regional or local realities. Addressing these multi-scale realities for transboundary water management hinges on establishing shared understanding and knowledge to foster more collaborative efforts between state and non-state actors at the national and sub-national (regional/local) level where resource management outcomes have the greatest impact.

The paper presents challenges, opportunities and conditions for multi-actor governance of shared water resources by examining the role of institutional knowledge brokers for facilitating collaboration. A multi-case study approach nested within the overall Ganges-Brahmaputra-Meghna (GBM) Basin between India and Bangladesh provides the empirical context to examine the prospects for establishing shared knowledge as a mechanism for fostering multi-actor collaboration within a multi-scale transboundary water context. The analysis is based on findings that emerged from semi-structured interviews, document analysis and participant observation.

Traditional power asymmetries within and between state and non-state actors in India and Bangladesh continue to pose challenges for initiating collaborative efforts. Restricted access to information, pervading mistrust between state and non-state actors and the perceived legitimacy of non-state actors within governance approaches are the key hindrances in fostering collaborative efforts for shared water resources within the GBM basin for India and Bangladesh. In an attempt to circumvent these barriers to cooperation, findings from the study demonstrate the prospect of and potential for institutional knowledge brokers as bridging institutions to promote cross-scale and cross-border collaborations through policy dialogues and joint research efforts. These cross-linkages of knowledge between multiple actors have led to a greater understanding of the expertise that exists outside of bureaucratic structures, which must be included as a necessary input for providing more informed and comprehensive transboundary water management policy decisions and outcomes. Moreover, establishing shared knowledge attempts to move beyond normative understanding about shared water resources in terms of resource use and allocation. Instead, this approach reframes transboundary water management in the context of contemporary challenges (such as climate change, water security and livelihoods) in the region from a sub-national perspective.

Keywords: Collaboration, Transboundary Water Management, Bridging Organizations, Multi-level Governance, Knowledge Sharing

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Forest Governance as Neoliberal Strategy: A Comparative Case Study of the Model Forest Program in Canada

This study contends with the often chaotic and confounding implications of neoliberalism as it applies to environmental governance in the Canadian forest sector. On one hand neoliberal governance strategies can enhance collaborative and partnership approaches to forest management that empower local stakeholders and communities. On the other hand, these same strategies can also entrench market discipline and optimize mechanisms for economic development at the expense of broader public interests. We explore these contrasting perspectives through comparative case study analysis of initiatives in two Canadian Model Forests (Resources North and the Manitoba Model Forest). Our results reveal several trends. First, we observe that limited capacity was built for collaborative management at the regional or local level because of strong federally mandated “action at a distance.” Second, we note a migration in the intention of initiatives from supporting public interests to supporting private interests in forest policy initiatives such as in the development of indicators for monitoring sustainable forest management. We conclude with thoughts about environmental governance within a neoliberal state and possibilities for new institutional design that can enhance capacity for local governance institutions to emerge.

Keywords: Environmental Governance, Public Land, Forestry, Neoliberalism, Sustainability

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An updated social-ecological system framework for lobster fisheries: Case implementation and a sustainability assessment in Southern California

Fisheries exemplify the immense complexity of interactions in social-ecological systems (SESs). This complexity has created management challenges and raises concerns for the sustainability of our marine natural resource systems. The purpose of this article is two- fold, first, to contribute to the knowledge of lobster fisheries as complex social- ecological systems as well as the Southern California Spiny Lobster Fishery (SCSLF) case study in particular. Secondly, to demonstrate a methodological approach for assessing component interactions in SESs that can be used to assess the sustainability of management approaches. We have systematically reviewed the literature on research trends in lobster fisheries and their SES characteristics. With this data, along with interviews and first-hand experience, we updated and extensively defined the social- ecological system framework for use in lobster fisheries. Subsequently we use the SCSLF as a case example for how to implement the updated framework. With this classification we analyze the Lobster Advisory Committee (LAC), the stakeholder-comprised management group of the SCSLF, as a social-ecological action situation with the Institutional Analysis and Development framework. This analysis provides a sustainability assessment of how the LAC manages the SCSLF. Our results provide coherency and common metrics for

more effective empirical utilization of the SES framework in lobster fisheries, which currently has mostly theoretical application. More generally, research in lobster fisheries is focused on a few areas, limiting holistic SES knowledge. Lobster fisheries have many different characteristics and management approaches, none of which can be effectively generalized or transferred, including co- management, without contextual SES considerations. The LAC and the SCSLF contain multiple SES components that have been associated with sustainable outcomes elsewhere, however the fishery still faces many obstacles such as how to adapt to future challenges.

Keywords: Social-Ecological Systems, Lobster Fisheries, SES Framework Methodologies, and Sustainability Assessment

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Institutionalisation of Plant Genetic Resources and intellectual commons: A case study of Central Rice Research Institute, India

Institutionalisation of Plant Genetic Resources (PGRs) in form of seeds through ex situ genebanks was the result of genetic erosion. However, this practice reduced seeds into informational packages stored in the ex situ genebanks. In the ex situ genebanks seed remain locked, frozen and static in time. This neglects the social relation seeds have with the environment, farming community and ecology. However, during this process seeds are transformed into informational goods beneficial for research. This creates an intellectual commons. Thus, we analysed an ex situ genebank in India or the Global South to understand this process of transformation. We used political ecology framework along with typology of intellectual commons and concepts from science and technology studies to understand the complex phenomena. It is through the practices of the ex situ genebank that we describe the socio-cultural transition of seeds from fields into the genebank. The institutionalisation of PGRs is explained taking the case of a public rice genebank located at Central Rice Research Institute (CRRI), India. Through our analysis we found that the institutional structure and practices of the genebank creates an informational commons producing scientific data useful for the plant breeders, scientists and researchers. But, the scientific culture of conserving seeds in the genebank increases the cultural difference among different stakeholders in terms of 'who can' and 'who cannot' access the resources. Thus, we conclude that once resources are banked in the genebanks they become proxy of the seeds and mostly serve as intellectual commons. This produces a rich informational commons but fails to re-produce the diversity in the fields. This also affects the social relation seeds have with different stakeholders ultimately affecting their access and use. Thus, through this paper we argue that institutionalisation of PGRs produces positive exclusive intellectual commons but in the process creates cultural difference

among different stakeholders leading to underutilisation of the resources. In order to overcome these problems with ex situ genebanks we propose Community Seed Banks (CSB) and use of Seed Automated Telly Machines (ATMs) as possible solutions. The analysis will add to the debates on institutional conservation of PGRs (here seeds) and on PGRs as intellectual commons.

Keywords: Plant Genetic Resources (Pgrs), Intellectual Commons, Social Relation, Ex Situ Genebank

Marginalized community, New Commons and Autonomy: A case study of Deccan Development Society in India

Different scholars analysed common pool resources as institutions to be governed and managed effectively. But, the relation between the governance of common pool resources and marginalized community that depend on them has been little researched. In this paper we add to this area by analysing commons through the struggle of a marginalized community defending its food system in India. For this the community seed bank of the Deccan Development Society (DDS) managed by a marginalized community was studied through political ecology framework. The main objective of the study was to analyse the social, cultural and economic relation between the resources conserved at the community seed bank and the marginalised community. For this we studied the practices followed by the marginalized community to conserve and manage the community seed bank. The findings of the study reflect that commons constructed through the cultural practices and experiences of a marginalized community re-constructs a common space. Here 'space' is not used as a geographical indicator rather the common space in this paper represents the worldview of the marginalized community created through the experiences of difference. We argue through the paper that this common space becomes a means of defending the culture and practices of the community which reflects more than just a shared resource or a resource system. Thus, commons here function more than an institution and creates common space contributing to the autonomy of the users over the resource. In addition to this, the collective activity in this case evolved as a consequence of the under-utilisation of the resource contrary to the findings of most of the studies on common pool resource systems. However, studying the power relation within the community members remains out of the scope of the paper.

Keywords: Commons, new commons, community seed bank, culture, marginalized community

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Enhancing food security through fostering forest-farm interface: Insights from Nepal's community forestry

This paper examines the paradox of Nepal's successful community forestry on one hand and increasing food insecurity on the other. Despite three decades of Community Forestry (CF) development in Nepal, studies report that CF's actual contributions to food security remain far less than the potential. Questions have emerged whether, how and to what extent CF can contribute to food security of the rural poor. Given the presence of over 18,000 community forest users groups (CFUGs) and over 1.6 million hectares of forest under CF across the country, its potential contribution to food security has become a national policy question. Yet

little evidence and analysis exists. In this context, this paper defines and characterizes the dimensions of the forest-food conundrum, and explores potential directions of policy decisions for transforming forest-farm interface to enhance CF contribution to food security.

Drawing on the evidence from textual analysis of key policy documents and ethnographic accounts of 24 CF group in Nepalese hills, this paper evaluates how policy regime and institutional dynamics involving key local social groups and individuals shape the link between CF management and food security in practice. The evidence demonstrates that current policy regime: a) has promoted a narrow view of forest that often prohibits community groups to access, manage and use forestland that could directly contribute to food production with minimal ecological disturbance; b) is less-responsive to local level practical innovations and the potential to recognize, upscale and promote those innovations widely; c) is profoundly contradictory between intention and practice on the question of benefitting from emerging market opportunities for forest and ecosystems services. The paper demonstrates the need for a fundamental revision in Nepal's forest policy orientation and institutional set up to better align CF management with food security. Several opportunities for change in the policy and institutions identified: c) revisiting the market related regulations and enforcement mechanisms to create paid employment at the village level, a) promoting field experimentation and innovation in ecologically sustainable and food-maximising forest-agriculture production system, and b) instituting mechanisms to identify and respond issues and innovations in the changing contexts.

Keywords: Community Forestry, Food Security, Policy, Local Institutional Dynamics, Nepal

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Impacts of institutional changes and MPA management to indigenous peoples' livelihoods and food security in Southern Brazil

Despite their relevance for biodiversity conservation, marine protected areas (MPAs) cause social impacts, such as loss of livelihood diversity. We evaluated how institutional changes related to fisheries and MPA management affected the livelihoods and food security of isolated and traditional fishing communities (the Caíçaras) in Parana, Southern Brazil. This study was conducted in collaboration with a fishing community (Almeida Island Village, Paranagua Bay) and the Brazilian Protected Area management agency (ICMBio), in order to support the development of strategies to alleviate the conflicts between the two. Data were collected between March and October 2014 through semi-structured surveys with 80 households (95% of total households), and three participatory workshops. Fishing is the main source of income and protein for all households. The swamp ghost crab (*Ucides cordatus*), captured with

handcrafted traps, is the main target species. The harvest season lasts only for four months (austral summer) but represents the major source of revenue for the community. All the catch is sold alive to local middlemen who transport the crabs to nearby cities. Other fishing resources (variety of fish species, mangrove oysters - *Crassostrea* spp., and mussels - *Mytella* sp.) are captured along the year but, given dwindling catches, they are mostly a source of food, sometimes sold to other households within the community. Almost all of the household members work in the fishery (e.g. preparing and repairing fishing gear, capturing and/or processing). Fishing grounds have been reduced since the creation of three MPAs in the 1980s and the expansion of port industries. All mangrove areas, where most of the fishing occurs, have become no-take zones. Fishers also consider the crab closed season and the fishing gear restrictions as a misfit with the local ecosystem dynamics. Compliance of these rules is low; fishers take the risk of being caught by surveillance agencies. Crab fishing assures financial capital for the whole year, also allowing investments in house renovations, fishing gear and boat repairing. Centralized institutional changes restricting fishing activities have caused the abandonment of traditional practices and a high dependency on social programs and government subsidies. The loss of livelihood diversity in isolated and fishery-dependent communities can accelerate food insecurity and poverty traps, while also creating a long-term loss of ecological knowledge about mangroves. Our partnership with fishing communities and ICMBio provides some lessons to strengthen the science-practice-policy interface of fisheries and MPA management, taking into consideration the livelihoods of traditional peoples and their interconnection with the ecosystem dynamics.

Keywords: Fisheries, Swamp Ghost Crab, Livelihoods, Marine Protected Areas, Participation

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Cooperation Facing Liberalism, Crisis and War: One Hundred Years of Portuguese Cooperative Experiences (1834-1934)

This article highlights how pre-modern social capital shaped cooperative experiences during the Portuguese liberal period. Based on a comprehensive review of cooperative societies' foundation acts and statutes, it illustrates pre-modern networks, norms and codes of conduct resilience. It also explores the exceptional First World War and post-war period, to show how, despite the structural changes to the State and civil society relationships, pre-modern values were present. It argues that one can observe significant similarities between the 'motors', 'conditions' and 'motives' fostering both craft guilds and commons' emergence (DE MOOR, 2008) and nineteenth century cooperative movement. However, by analysing this new wave of institutions for collective action, social capital inheritances seem to have played a new determinant role.

Keywords: Cooperatives, Social Capital, Institutions for collective action, Long term

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Commons and climate justice

This paper brings together examples from the global South and North of traditional and new forms of commons which help to meet local subsistence needs and develop communities' social, political and economic resilience in the face of climate change. Commons governance represents a dynamic and emergent means of risk-reduction which addresses the shortcomings of both market and state oriented governance and may become increasingly relevant as climate change threatens human subsistence worldwide. Drawing on the literatures of ecological economics, political ecology, and ecofeminism as well as the work of Elinor Ostrom to situate these ideas, this paper sets out a framework for comparing communities' climate resilience from an equity standpoint, in terms of their commons-readiness. Some of the indicators involved in this framework include each community's openness/boundaries, historical experiences and aptitudes with commons, social networks and social learning, political and economic interdependence, income distribution, and cultural factors. Climate justice—improving the local and global equity of climate change impacts the procedures—advances in parallel with commons development; this paper also discusses scale issues related to local, regional, watershed-based, international and global commons and climate justice.

Keywords: Community Resilience, Community Development, Climate Risk Reduction, Participatory Governance, Social Learning

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For the Common Good: Water Users' Associations, Collective Action and the problem of “success” for Non-State Water Provisions

The Chinese water commons are currently under pressure. Along with many other water-stressed countries, China is facing a diminishing availability of irrigation and drinking water. As a way to tackle the problem, China introduced in 2002 a new framework for water management. This shift in governance produced the adoption of a set of principles – largely inspired by Elinor Ostrom's work on common pool resource management – emphasizing the need for increased participation of users in water management. One consequence of this is the introduction in the countryside of the so called Water Users' Associations (WUA), farmers-run associations supervising water management at the village level. This with the belief that devolving rights locally would avert the overconsumption of water and produce fair and sustainable practices of water management in the rural countryside.

Based on 16 months of anthropological fieldwork among members of different WUAs operating in Yancong Township – a drought-prone area located in Yunnan Province – this ethnographic study suggests that the way in which collective action is imagined in rural China affects the extent to which “WUAs in the book” could be replicated in “action”. In particular this paper discusses how alternative and culturally specific benchmarks for evaluating organizational success as well as a local culture informing style and content of farmers participation conspire to reshape these organizations from within. Surprisingly however, the adaptation of WUA to local notions of power and efficacy does not end up undermining the fair and enduring management of water in Yancong. Rather, it is thanks to local practices of water sharing and stewardship that pre-dates the implementation of WUAs, if water is managed

fairly and durably. This paper concludes by suggesting that the operationalization of “Ostrom-inspired” organizational solutions to the Chinese water problem might end up overlooking, when not undercutting, the important contribution that ordinary Chinese villagers have long been giving to sustainability in their country.

Keywords: China, Water Users's Association, Sustainability, Water Management, Collective Action, Common-pool Resource Management

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Finding adaptive and sustainable linkages: What can social-ecological network analysis show us about institutional fit?

This presentation demonstrates and critically examines the application of social-ecological network (SEN) analysis to understanding problems of institutional fit. SEN analysis is a growing field of study with recent applications to the investigation of institutional fit. In this regard, researchers have used the presence and abundance of idealized SEN building blocks or motifs within real-world, empirical SENs to demonstrate how the idealized motifs can lead to improved environmental conservation outcomes. While this is a sound approach, I will expand the application of SENs in two main ways. Firstly, I will broaden the type of idealized SEN motifs used to examine fit. The existing applications use motifs aimed at understanding fit solely as improved environmental conservation outcomes. I will show how alternative configurations may be necessary to understand fit more as a social-ecological issue that should also consider human wellbeing and access to ecosystem services. Secondly, I will show how SEN analysis can be used within a broader framework of participatory action research to move beyond thinking of fit as an end point to a more adaptive view of fit that acknowledges the wickedness of the problems currently facing social-ecological systems. These new applications will be demonstrated through cases studies from the Lesser Antilles region of the Caribbean.

Keywords: Institutional fit; Social-ecological networks; Governance; Ecosystem services; Human

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Socio-Eco-Informatics: Enhancing Predictive Capability of Social Ecological Systems Research (POSTER)

Socio-ecological System (SES) research studies the interaction between the environment, users, and the governance of environment resources. Data produced during a research study can be both long-tail (e.g., highly heterogeneous) and longitudinal in nature. For example, the IFRI (International Forestry Resources and Institutions) database contains studies carried out over a period of 20 years. Given the complexity of a SES system, case studies that are accumulated over time and from different sites (e.g. site visit cases) are highly valuable in the understanding

of new SES system behavior for instance. We, as a group of informatics researchers collaborating with personnel from The Workshop in Political Theory and Policy Analysis at Indiana University, are developing informatics approaches to facilitating SES scholars' research. Our focus in this study is on representation and mining of a set of SES cases originally from the IFRI database. Researchers often develop their research protocol and data representation style locally, and thus the SES cases we consider do not share a common representation style. This creates difficulty for researchers wishing to aggregate cases for larger analysis. An ontology can link the cases by creating relationships between the local representation to the general SES framework (Ostrom 2009), and in doing so, can tie a specific case to a conceptual backbone from which an ontology is constructed. We have developed an ontology template using the RDF/OWL language with a basic vocabulary for describing SES cases. Given a specific SES case, e.g. a forest site, researchers can describe it by referring to the template. The SES cases are then connected via concepts in the SES framework, for example, those discussed in Ostrom (2009). To alleviate user frustration in using the highly technical RDF/OWL language, we have developed a prototype system to enable scholars to draw a SES instance as a graph in the open source concept map tool, CMap, which is then converted to RDF/OWL. We are also studying methods for graph mining of the IFRI site visits. To first construct the SES graph model, we developed a tool that can automatically import any SES compatible dataset into the SES framework inside a Neo4j graph database. The process of transforming the SES compatible dataset into the SES graph model leverages our concept of "Logical Object" (Jensen, Plale, Liu, Chen, Leake, & England, 2012) and is fully configurable through user-friendly CSV files. Upon the population of this IFRI graph model, researchers can perform various kinds of useful query explorations. For example, a query can be where and why a certain species has been found disappeared.

With the data in graph form, advanced data mining functionalities are possible, including node clustering (in this context, nodes correspond to site visits) and sub-graph matching. The node clustering identifies two nodes as similar based on their attribute values, and can reveal outliers (if present) that could raise interesting questions. The sub-graph matching is extended from our previous work on provenance graph matching (Chen, Plale, Cheah, Ghoshal, Jensen, & Luo, 2012), and can be used to find any two site visits at the same location but having different visit dates, what has changed, what remains the same, etc.. The functionality has been built into an extension to the Neo4j graph database that can be easily deployed.

Keywords: SES Framework, Ontology, Network Analysis, Graph Matching, Graph Modeling

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Assessing institutional changes in a payments for environmental services context: A case study of instream water transactions in Oregon

Market-based programs are an increasingly common conservation tool. Many conservation programs are being created or redesigned around the principles of providing economic incentives to resource users in exchange for specific conservation behaviors. These programs are popular because they can cost less to administer and encourage voluntary participation. This approach is used around the world, across a wide variety of resources, and in conjunction with a diverse array of resource management regimes. However, success depends on integrating these new market-based institutions with existing institutional structures. The implementation of new market-based programs may be particularly onerous, costly, or incongruous in contexts where resources are managed as common property regimes. This research uses a case study approach of environmental water transactions programs in the state of Oregon to explore the evolving relationship between market-based conservation mechanisms and Irrigation Districts (IDs), which enforce local common property institutions for water use. The Columbia Basin Water Transaction Program (CBWTP), which funds environmental water transactions that pay farmers to reduce agricultural water use and put water back instream to protect salmon spawning habitat and riparian ecosystems, illustrates the variety of challenges associated with implementing market-based conservation program within existing water management institutions. During the past ten years the CBWTP has produced substantial ecological benefits; however, more water is still required to meet ecological goals throughout the Columbia River Basin. Ecological goals have gone unmet because participation has varied widely across and within states. While biophysical factors and state laws may explain some of this variation, notable difference in participation exist between IDs, within states and even within the same watershed. IDs rely on formal rules and informal norms to manage water locally, as a common pool resource. Water transactions may positively affect IDs by encouraging water conservation and helping pay for infrastructure improvements. Simultaneously, some forms of water transactions may negatively affect IDs by reducing membership and increasing costs for remaining members. This research investigates two questions: 1) what, if any, institutional changes have occurred within IDs in response to the development of environmental water transactions? and 2) what is the relationship between institutional changes in an ID and the number of environmental water transactions performed within the district? Semi-structured interviews with ID managers across the state of Oregon were performed to collect qualitative information about institutional changes, while quantitative data on the number, type, and size of environmental water transactions has been collected from Oregon's Water Resources Department. Preliminary findings suggest that institutional changes range from prohibiting transactions to using instream leases as an integral part of water management. This study will improve understanding of the variety of ways that institutional change can influence the success of new, market-based approaches. This research also aims to provide insights on the ways in which market-based programs and local institutions can be integrated to provide mutual benefits.

Keywords: Payment for ecosystem services, Water transactions, Irrigation districts, Instream flows, Institutional change

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The Importance of Coastal Community Well-Being in the Evaluation of Fisheries Policies

Why does well-being matter and who has recognized it as important? What are the barriers to including well-being in Canadian fisheries policy? This paper reviews key literature on well-being, theoretical frameworks useful for considering its role in policy-making, and concludes with an analysis of essential ingredients for policies which grant well-being its rightful place. The paper integrates various approaches which are not usually considered together: (1) the place of well-being in economics and the claims made by resource economists that privatization and marketization of access rights to fish promote the well-being of all participants in the fishery as well as society at large, (2) the place of well-being in ecosystem-based management models which poorly represent social systems or social-ecological relationships, (3) anthropological understanding of well-being, and (4) epidemiological analyses of the relationship of well-being to equality. The paper then presents results from a case study of a British Columbia salmon fishery in which community wellbeing was one component of the research. The case study uses a comprehensive fisheries evaluation framework that is being developed by the Canadian Fisheries Research Network. The framework explicitly incorporates well-being as a key attribute of fisheries management that needs to be evaluated alongside the more common measures such as abundance, landings, and employment. The legal, regulatory and policy basis for considering community well-being in the management of the salmon fishery is first laid out, followed by an assessment of how well the management system is actually performing, using the framework to structure the analysis.

Keywords: Wellbeing, Coastal Communities, Small-Scale Fisheries, Policy Evaluation

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Economics of an Innovation Commons

We develop the concept of an *innovation commons*, which is a species of *knowledge commons* (Ostrom and Hess 2007). An innovation commons occurs when a group of people (users, entrepreneurs, innovators) come together to develop new technologies in the commons. We present a series of case studies of these innovation domains, including open source software (Krogh *et al* 2012), 3D printing (Shane 2000), hackerspaces (Hall and Williams, forthcoming) and sports equipment (Franke and Shah 2003, Lüthje *et al* 2005). The particular puzzle that innovation commons present is that standard economics predicts that they should not exist. The standard argument (Arrow 1962) is that fixed costs and appropriability imply market failure in the economic production of new ideas (i.e. innovation), which is solved with government intervention to create compensating rents by mechanisms including intellectual property rights, R&D tax credits, industry policy, and public science. But commons-based solutions – involving private governance to pool resources and develop ideas – not only clearly exist (Benkler 2004, Gächter *et al* 2010) but also seem to have substantial advantages in efficiency,

robustness, and diffusion. We propose three models that explain the mechanisms by which innovation commons form and why they work.

- (1) A ‘two commons’ model – in which there are two commons at work, one of pooled material resources (the observable commons) and a second commons of pooled entrepreneurial information. The puzzle of the existence of the first is explained by the logic of the second.
- (2) An ‘evolutionary theories of cooperation’ model based on new work in evolutionary selection theory (Nowak 2012, Bowles and Gintis 2013).
- (3) A ‘maintaining openness and blocking coalitions’ model of innovation commons. This builds on Olson’s (1982) model of how rent-seeking coalitions eventually slow technological growth, and that an innovation commons can be an effective bulwark against that kind of technological enclosure.
- (4) We suggest that innovation commons are in effect the ‘zero-th phase’ of all new technologies, prior to the normally considered ‘first phase’ of new entrepreneurially started new firms and market-based new industries. We consider the implications for a broader economics of the commons, as well as for innovation and technology policy.

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Keywords: innovation, technology, knowledge, commons, policy

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Resilience in marine resource governance – a deeper look at institutional change

Institutional arrangements both influence the manner in which humans interact with social-ecological systems, and are influenced through changes in values, culturally accepted behaviour, knowledge and understanding, and behavior of the system itself. This research has taken as its starting point Birkes' (2006) identification of the need to understand commons as 'the management of complex adaptive systems'. In order to undertake such a task one needs to understand the socio-ecological system, the nature of relationships between elements in the system, the forces driving change, and the outcomes. The paper presents an application of Giddens' (1987) notions of the structure of society to gain insights into resilience and institutional change in marine resource governance. Giddens, conceptualised institutional arrangements in terms of three broad forms: structures of signification, legitimation, and domination, suggesting that a social system can tolerate extensive changes in structures of legitimation and domination and still return to an equilibrium, but disturbances that alter the 'structures of signification' can be profound and result in irreversible change or transformation of the system. This structural framework is being linked to a range of other ideas about path dependency (North, 1994), scales and time frames (Carlsson, 2000), paradigm shifts, (Agrawal, 2003) systems change and turning points, (Schiller and Kuhnle, 2008; Gunderson and Holling, 2002) incremental alterations and path dependency (North, 1994), and a 'withering away' of structures (Ostrom, 2007).

Understanding the incremental alterations that occur within institutional arrangements over long time periods, often resulting in fundamental change, some of which may occur at specific 'turning points' or periods of crisis, while other changes involve constant micro-adaptation, is a necessary starting point for developing resilient institutions and adaptive strategies for commons governance. The ideas are applied to the recent institutional changes affecting UK coastal fisheries, building on earlier work to examine the social impacts on fishing communities. The intention is to apply the method to a wider range of case studies and examine the potential for improving understanding of institutional change in order to support adaptation within socio-ecological systems.

Key words: resilience, institutional change, socio-ecological systems, marine resources

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Methodological Issues in the Management Practices of Commons: A Case of Jharkhand in Eastern India

The concept of 'commons' is as old as the natural resources, but its quantitative measurement is of recent origin. In the middle of the twentieth century, the commons as a physical phenomenon started to be used repeatedly by scientists from other disciplines to close the

interdisciplinary gap. As we have moved into the 21st century, more methodological choices have been made in support of the study of commons and its management practices. This is mainly due to growing range of commons and particularly the emergence of ‘new commons’ and ‘digital commons’ that benefit our communities.

The paper analyses methodological issues concerning selection of indicators and construction of composite indices within the framework of measuring ‘commons’. It reviews the existing literature in the area and highlights the key areas of concern from the view point of methodology of aggregation. It discusses the implications and assumptions underlying different techniques currently being used in Jharkhand, a state in eastern India. Jewitt (1996) considers local agricultural and forest management practices in two tribal villages in the Jharkhand region and throws some light on the ‘potential of participatory and populist approaches’ as alternatives to more traditional ‘top down’ forms of development. Sinha (2004) proves that centralized forest management system paid little interest to community welfare through qualitative and quantitative research, structured interviews and case studies methods. Both these case studies question the relevance of existing models of commons degradation to the Jharkhand region, arguing that it is possible to re-establish community based forest management in areas where local people have strong subsistence related and socio cultural links with forest plus an interest in protecting them. However, the important questions which have been examined here are: 1. Why commons emerges, persists and declines at particular points in time and in particular places?, 2. Will better commons management guarantees the incremental entitlement for each actor?, 3. What are the determinants of capacity to manage commons?, and 4. How does institution influence the pattern of social interaction in a given commons regime at different phases?

A set of study indicators is designed to measure three time frames; 1. Reactive-dependence-(crisis: Threat coping). 2. Realization-independence stage-(emerging capabilities), and 3. Awareness- independence-(conceptualization of change). 30 percent of the villages studied retained traditional practice of regulated grazing of village pasture land causing serious fodder scarcity. As a result, commons has had an increasingly distinctive effect on environment. The study reveals that outcomes were unsustainable where there had been no attention to institution development and local participation. This study is designed to serve as an introductory references for future scholarly work.

Keywords: Methodological Issues, Management Practices, Commons, Jharkhand in Eastern India

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Climate Change Impacts and Adaptations by Communities in a Tribal Region of Central Himalaya: A study from Uttarakhand Himalaya, India

Impact of climate change is more pronounced in ecologically fragile mountain areas such as Himalayas where rapid altitudinal change results in high degree of variation in relief, natural vegetation and hydrology within short horizontal distance. The area selected for this study is located in Uttarakhand Himalaya which forms parts of Central Himalayan region of India. It is a mountainous tract with altitudinal range of 450mt to 3000mt and experiences cool-temperate

climate. While forests cover 44% of the area, the cropping area is less than 10 % and another 43% is occupied by Common Pool Resources' area. The tribal population comprises of 56% whereas another marginal community, the Scheduled Castes, make up 34% of total population. The study area is relatively less studied and lags behind in development with low literacy rate (55%), poor health facilities and 70% of population being below poverty line. The climate data from regional meteorological stations show the increase of average temperature by about 0.50C, decrease in rainfall, upward shifting of vegetation line and change in sunshine hours in last 40 years. The vulnerability atlas of Indian agriculture has classified the area as moderately vulnerable and having low adaptation capability. Thus it was chosen for understanding the impending climate change impacts and adaptation strategies. The analysis presented in the paper is based on primary survey conducted in five sample villages situated between altitude 900mt and 2000mt and spread in an area of 60 kms. More than 100 households representing different socio-economic strata were randomly selected for in-depth interviews. The response unambiguously indicates the change in climatic parameters. The respondents reported increase in temperature, decrease and erratic nature of rainfall, long dry spells during monsoons, drastic decrease in snowfall, increased occurrence of fog, increase in crop disease and pests, decreased water discharge in springs etc. during last couple of decades. The impact of climate change was felt most visibly on the farming and animal-husbandry which is primary economic activity of local communities being practiced by 75 % of the population and draws lot of support from CPRs in form of biomass, fodder and grazing. It was mentioned by overwhelming majority of respondents that the climate variation has adversely affected yield of traditional seven grain mixed crops, cereals, pulses, oil seeds and horticultural crops such as apple. As an adaptation strategy, the farming communities are concentrating on cash crops in better managed fields in place of low-yielding scattered land. They are replacing traditional crops with more remunerative vegetable crops (Tomato,

Chillies, Ginger, peas) that can provide better economic returns on intensively cultivated limited cropping area. However with only 10 % of geographical area under cultivation and 85% of it being rain-fed, this strategy is unable to support community needs. This has resulted in increased out-migration which has helped in reduction of population pressure on limited resources and has become a supporting mechanism but only for some households. In addition to above, communities are adapting various other strategies such as change in agricultural calendar, change in crop varieties, reduction of livestock, alternative employment etc.

Keywords: Climate Change, Adaptation Strategies, Tribal Region, Himalaya, India

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Complexities of success in community based natural resource management

The history of scholarship on common pool resources (CPRs) and the implementation of community based natural resource management (CBNRM) across the developing world have one commonality - search for success and failure; its conditions and criteria. Challenging Hardin's Tragedy of Commons, a significant portion of scholarship on common pool resources has been dominated by functionalism, especially neo-institutional theories. Beginning in the 1980's, scholars have devoted significant attention to identifying contributing factors and

characteristics of institutions of collective action. Apparently, the guiding criteria has predominantly been success (or failure) of such institutions. Further, the rise of participatory approaches to development and poverty alleviation in the developing countries gave rise to CBNRM gaining significant attention as a policy of natural resource management in the 1980's. Interestingly, in CBNRM, the search for successful practices, more commonly known as best practices has been a global trend. Arguably, the focus on best practices has been about measuring, standardizing, replicating and institutionalizing successful cases and approaches. Borrowing from the literature, this paper argues that the mix of uncertainties and ambiguities related to search and conceptualizations of success suggests complexity. These complexities operate in both the domain of scholars as well as practitioners of CBNRM. Similar to the developments in social- ecological systems, this paper argues the complexities as multidimensional and dynamic. Furthermore, to deal with this complexity in evaluating success in CBNRM, the paper draws from Houses' (1980) idea of coherence and credibility. Hence, in the first section, the paper presents how the uncertainties and ambiguities in conceptualizations of success suggest complexity. In the second section, the paper presents the idea of coherence and credibility. The final section argues for consideration of coherence and credibility in evaluation of CBNRM as a way to deal with the complexity. The focus in the paper is making a case for greater identification of complexity in evaluation of CBNRM and suggesting inclusion of concepts of coherence and credibility as a way to deal with this complexity. The core argument is that the application of coherence and credibility does not only help in explaining complexity, but also suggests a possible way to deal with it.

Keywords: Common Pool Resources, Community-based Natural Resource Management, Complexity, Coherence, Credibility

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Institutional Design and the Geography of Rural-Urban Water Conflict in the Mumbai Region, India

The literature on Common Pool Resources (CPR) within institutional economics has recently begun to acknowledge the role linkages between different institutions and resources play in the management of the commons. However, two crucial factors that continue to be neglected in the policy part of this literature are the role of geography and laws in influencing institutional design and the eventual outcome of collective action situations. Long run environmental change in the urban-regional context often gives rise to situations where the regulatory frameworks of different resources (land, water, and forests) are closely enmeshed and display institutional path dependence. This presentation uses CPR theory in a single case study focusing on action situations around rural water entitlements in a water district outside the city of Mumbai. It utilizes Elinor Ostrom's Social Ecological Systems framework to examine the problem of interacting institutions and resource linkages created by the increasing dependence of a growing metropolitan city on its hinterland for water.

Keywords: Commons, Water, India, Indigenous People, Geography



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Insights into the black box of Geographical Indications' registration processes

Origin labels, more specifically Geographical Indications (GI), allow organised producers to define quality standards and defend their food products' reputation while highlighting their geographical origin and value to consumers. The registration of Geographical Indications (GIs) under the EU regulation requires collective action, and considerable efforts born by multiple actors. Our research enters the black box of the registration process by analysing five Protected Geographical Indications in Colombia, Italy and Austria. The cross-case comparison is guided by the Institutional Analysis and Development framework and Transaction Cost Theory. The paper quantifies the efforts and identifies the most critical and time demanding phases of the process and the types of private and public actors involved. The institutional frameworks, group size and heterogeneity as well as ex-ante organisational robustness have an impact on

transaction efforts and benefits. Robust pre-existing producer organisations (e.g. coffee associations, olive oil cooperatives) and the support from well-staffed local public authorities are critical factors along the GI registration process. Participatory processes, even if time consuming, can also result in indirect transaction benefits, specifically in terms of trust, social and human capital, and access of small and less-empowered firms to the GI protection opportunities.

Keywords: Protected Geographical Indications, Cross-Case Comparison, Institutional Analysis and Developmental Framework, Empirical Transaction Costs Analysis, Origin Products, European Union

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Territorial rights for coastal communities in Colombia: Opportunities and challenges for the governance of marine protected areas

Recent recognition of territorial rights for inhabitants of islands in the Marine Protected Area (MPA) Corales del Rosario and San Bernardo (CRSB) in the Caribbean of Colombia provides community participation rights for the planning of the MPA and creates new interactions among local communities and decision-makers. Local communities living in the MPA and in closer continental coastal areas have traditionally used the area for fishing activities with cultural and economic value. However, under the government-led governance approach applied to Colombian MPAs, coastal communities are barely taken into account in the MPA planning process, and even less in making decisions and sharing responsibilities. This usually exacerbates social conflicts that lead to lack of conservation compliance, use of destructive fishing practices, and biodiversity loss.

Through qualitative research methods, this study analyses the implications, opportunities, and challenges of communal territorial rights for shifting top-down MPA governance towards more participative and effective approaches.

Preliminary results show the recognition of communal territorial rights brings opportunities to the communities to have a more active role in the MPA governance process and to incorporate community's values, knowledge, and worldviews. In particular, organization development, leadership, and community consensus have been developed during the rights claiming process. However, negotiation skills and trust still need to be built between government and communities to achieve effective governance.

Keywords: Governance, Marine Protected Areas, Territorial rights, Local Communities

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Dealing with community protocol for access and benefit sharing of biological resources as per the Nagoya Protocol in Malaysia

Malaysia has a rich variety of tropical forests, wetlands and marine ecosystems, representing several Global 200 Ecoregions, and is recognized as one of 17 mega-diverse countries in the world. Malaysia's diverse indigenous peoples have developed and used over the years extensive traditional knowledge associated with biological resources. Yet Malaysia's natural resources face challenges from a wide range of pressures that threaten its biodiversity and ecological stability, including the loss of genetic resources and associated traditional knowledge. These biological resources offer huge potential for the development of the national biotechnology industry and to provide sustainable benefits to the country including its indigenous and local communities that still depend on them.

The long term solution that this project will pursue is to enable the potential of Malaysia's rich biodiversity and biological resources to generate economic and social benefits to the nation and key stakeholders including indigenous and local communities, in the form of business, employment, technology transfer and capacity building opportunities, through the discovery and development of new products such as pharmaceuticals, nutraceuticals, agro-chemicals, etc. These new opportunities will strengthen economic arguments and motivation for the conservation and sustainable use of the biological resources – Malaysia's globally significant tropical forests, wetlands and coral reefs - that contain the genetic material and help prevent the loss of associated traditional knowledge due to the loss of biodiversity. This is in line with the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization. Nagoya Protocol is an international agreement which aims at sharing the benefits arising from the utilization of genetic resources in a fair and equitable way, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding, thereby contributing to the conservation of biological diversity and the sustainable use of its components.

This paper will highlight the dynamics of developing the community protocol that meets the demand of the prior informed consent requirement of the NP but at the same time take into account of the national and local socio-politics conditions in Malaysia. It shows the difficulties in dealing with the sort of access and benefit sharing mechanism within a common resources context.

Keywords: Nagoya Protocol, Access and Benefits Sharing, Community protocol, Malaysia, Prior Informed consent

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Do Knowledge and Technologies have any Gendered Impact in Coping with Climate Induced Vulnerability? Experience of South- Western Coastal Communities of Bangladesh

The paper is based on findings of impact evaluation of a project titled “Strengthening Resilience of Climate Change Affected Communities in the South-western Coastal Area of Bangladesh”. The project was implemented in 4 villages of Atulia Union of Shyamnagar Upazila of Satkhira district. The evaluation aimed to tracking the contribution of the project made to change climate vulnerable community towards more resilient in the areas of biodiversity protection and ecosystem management; thereby reducing climate risks and securing alternate employment and income. The evaluation applied qualitative (FGD- Focus Group Discussion, KII- Key Informant Interview), quantitative (Household Survey) methods and participatory tool (VRA- Vulnerability Risk Assessment) for collecting empirical data. The findings of the evaluation indicate that the intervention that includes providing motivation, training and inputs support contributed to people become climate resilient and reduce risks of natural hazards. Additionally, inputs support resulted stopping PL (post larvae) collection and traditional gher farming which reduced their health hazards, increased income and dignity, better role in decision making and also a feeling of contributing in conserving biodiversity. Moreover, women- the disadvantaged group in the family and the community, having no alternative means of livelihood are mostly engaged with harmful and illegal PL collection. Thus, supporting through alternative livelihood options have manifold positive impacts on women (and children as well). They got rid of long stay in water body for PL collection, could have avoided chronic cold, migraine, skin disease and lesions in vaginal organ. Furthermore, they got times for taking care of children, husband and elderly people which are determined by strong gender roles. Notably, they expect to retain their dignity as PL collection is been considered as relegated job. In conclusions, having acknowledged the limitations of the intervention, the paper recommends for scaling up the intervention by relevant agencies as it has proved to be significantly beneficial for women and has potentials for building resilience to cope with climate change vulnerabilities.

Keywords: Livelihood, PL, Resilience, Climate Change

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Community-Based Marine Biodiversity Resources Management in Malaysia

Malaysia’s islands are renowned for their beauty and outstanding biodiversity. Turtles, sharks, rays and reef fish swim in their azure waters, and their sea grass beds harbour the gentle Dugong. The coral diversity here is globally significant, and divers come to marvel at the islands’ 221 species of soft and hard corals— from huge fuchsia sea fans to spiny staghorn corals. For decades, the marine life and swathes of palm-fringed beaches attracted thousands of tourists per year to Tioman Island alone, named among the world’s most beautiful islands by TIME Magazine.

In 1994, the Government of Malaysia established a system of marine parks to protect and manage this outstanding marine biodiversity in the waters surrounding 42 of these islands. But there was trouble in paradise. Careless snorkelers and boat anchors had damaged fragile coral

reefs, and illegal fishing had taken its toll on fish stocks. The Department of Marine Parks Malaysia (DMPM) had a tough job on its hands to enforce park rules and regulations across 42 islands. The onslaught of rapidly growing tourism, increasing pollution and warming seas was steadily decimating marine biodiversity. Whilst local fishing communities saw their catch dwindle, tourism would falter if the island's natural beauty was lost. In 2007, the Malaysian government sought UNDP's support to address these threats and an initiative called conserving marine biodiversity through enhanced marine park management and inclusive island development was started.

Perhaps one of the most important impacts has been the more collaborative and inclusive approach to marine park management. . The project was characterized by a complex bit of diplomacy and 'meeting of minds' and involved expansion of the marine parks system, strengthening of law enforcement capacity, community involvement, educational outreach by community groups, international conservation and development bodies, local businesses and the tourists themselves.

This paper will highlight the pull and push factors that created the dynamics of decommissioning and commonisation of marine biological resources in the marine parks system in Malaysia and elaborate the success in creating an inclusive community based resources management.

Keywords: Commonisation, Decommissioning, Marine Biodiversity, Sustainable Livelihood, Community Based Resources Management

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Decentralization and land use across countries: democracy and jurisdictional complexity

Decision-making around land use is an inherently multilevel and multi-sector process, with national and sub-national policies affecting how local communities, private firms, governments, and NGOs manage and use land. Throughout the developing world, decentralization policies over the past decades have devolved powers from key land use sectors including agriculture, forestry, mining, and conservation to sub-national governments to varying degrees. Using data from legal studies conducted in Peru, Indonesia, Tanzania, Vietnam, and Mexico as part of CIFOR's Global Comparative Study on REDD+, this study analyzes the degree to which decentralization of land use sectors has produced democratic multilevel governance institutions.

Some elements democratic decentralization, such as meaningful transfers of powers to appropriately local levels, and the availability of a budget necessary to fulfill decentralized functions, are assessed by way of the law itself, with likely challenges related to multi-sector coordination flagged. Other issues cannot be addressed through the law alone, and key informant interviews from all five countries are used to assess the extent to which key aspects of democratic decentralization such as downward accountability (Larson 2005) have been achieved across countries. Data was collected from over 500 key informants involved in both

national and sub-national governance in all five countries. In addition, in-depth interviews were conducted with respondents involved in at least 10 specific sites of land use change in each country to understand the history of land use governance. Sites were selected to represent a diversity of land use changes, including conservation initiatives such as REDD+ sites and areas with deforestation for alternative land uses such as oil palm and agriculture.

The results of the analysis confirm findings from previous research that decentralization alone does not guarantee democratic processes in land use governance. In some cases, decentralization without downward accountability can work against the interests of local actors, as has been seen in the oil palm sector in Peru and, perhaps more surprisingly, in the environmental sector in Indonesia. On the other hand, decentralization has been carried out in some cases in a way that has empowered at least some local people, such as villages in Tanzania who have gained rights to land-based benefits and been able to form governance coalitions with districts. These benefits, however, were accompanied by reconfigurations of power, and associated tensions, such as between village farmers and pastoralists not affiliated with villages, and also between district governments and the Tanzania Forest Service. These findings underscore the complexity of jurisdictions and the role of local political realities as key mediators of decentralization outcomes, and suggest that further comparative research into the politics of land use governance is necessary.

Keywords: Democratic Decentralization, Land Use, Multilevel Governance, REDD+, Legitimacy

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Raising orphans: The experience of UNESCO biosphere reserves in Canada

Since the 1970s, Canadians have demonstrated significant international leadership on issues related to environment and sustainability. People such as Fikret Berkes, Ian Burton, George Francis, Gordon Nelson, Henry Regier, Fred Roots, and Ann Whyte, developed UNESCO policy and programs under the Man and Biosphere (MAB) program and/or shaped its implementation in Canada. In particular, these people and countless other Canadians made key contributions to the establishment, implementation and on-going evolution of the biosphere reserve concept, internationally and in this country. Today, Canada boasts 16 biosphere reserves; only four other countries in the world host more. Key Canadian contributions include the insistence that biosphere reserves (a) support natural and social science research on human-nature interactions, (b) become vehicles to better understand biodiversity conservation across representative ecosystems, (c) become model regions for sustainability, and (d) assess and reflect on their accomplishments through periodic review. Yet, despite these efforts, Canadian biosphere reserves have, almost from their inception, been “orphans of the state”. In contrast to many other countries, in Canada, biosphere reserves have not clearly fit within the mandate of a single federal agency; nor have they attracted the commitment of provincial and local levels of government. Consequently, Canadian biosphere reserves lack an institutional home, a sustained funding stream, and widespread recognition and impact in Canada. Based on documentary evidence from UNESCO and University of Waterloo archives, this paper traces key ideas advanced through the creation of biosphere reserves in the 1970s and considers the potential they have for research and practice about sustainability. I reflect on their

contributions to date and consider the implications of their continued neglect by local, provincial and national government agencies.

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A Systems Approach to Projecting Economic Risk Stemming from Climate Change in Ontario's Mississippi Valley Watershed

At the local level, regional groups of municipalities and their surrounding rural areas have a shared and interconnected interest in their water and their economy. These are linked through the water-based ecosystem services upon which regional economies, to a varying degree, depend. As growing populations and other pressures increasingly stress local ecosystems, it is imperative that economic risks associated with these impacts are understood. Monetary valuation of ecosystem services and aggregated value, general equilibrium and partial equilibrium models provide some insight; however, they do not adequately encompass ecological factors such as interconnectivity, non-linearity, irreversibility, and ecological thresholds. Shifting the focus from marginal value or expected returns of total economic value toward outcome scenarios, this paper diverges from typical approaches by explicitly considering and prioritising ecological complexity and local variation of ecological production functions. A novel organising framework has been developed to characterise the complexity of interconnected ecological and economic systems in a comprehensible way. By making explicit the relationships between economics activities and their environmental underpinnings, the framework distills key information from a complex system scenario to reveal competition between users of different ecosystem services for underlying ecological resources. Further, it helps clarify the manner in which economic activities draw on and draw down ecological resources, potentially introducing wider ecological and hence economic risk. The framework is then applied to the case of climate change in Ontario's Mississippi Valley to characterise the vulnerability of individual economic activities to ecological change. The generation of comparable outcome scenarios readily informs broader social and political discourse, providing opportunities for debate around which outcomes are most important, beyond maximisation of aggregate wealth creation. By identifying risks arising from competition for ecological resources and broader environmental changes, this approach provides new information to decision makers, contributing to an improved policy response and enhancing social-ecological resilience.

Keywords: Risk, Resilience, Ecosystem Services, Complexity, Climate Change

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Are institutions enough to promote change? A case study on the relationship of institutions, window of opportunity and socio-ecological change

Institutions matters. However can institutions promote change exclusively based on their own characteristics or social, political, economic and environmental conditions by the time of institutions' implementation also impact on their effectiveness? Institutions are usually

perceived as a window of opportunity for dramatic changes. However, we argue that they are not windows of opportunities themselves but rather an instrument to promote change whose success is deeply linked to the existence of a window of opportunity available at the moment of their implementation. This window of opportunity could be presented as a technological change, a political, economic or environmental conjuncture favouring change, a significant shift on public opinion, increased civil society mobilization, among others. In this article we discuss the scenario's relevance to the performance of a consortium located in the province of São Paulo, Brazil, namely Consórcio Intermunicipal do Rio Jacaré. This instrument of inter-municipal partnership was dedicated to discuss, design and implement policies regarding the management and conservation of the Jacaré Pepira's River. It was created in 1985 by the cities located at the river's margins and had wide support of the state's executive power. Throughout its fifteen years of existence, the Consortium's members approved many projects and developed actions which led to important achievements for the river's conservation, such as the recovery and preservation of the riparian forests of the region. Nevertheless only a few cities took initiatives to implement those projects and by the Consortium's closure in 1999, only five of them were implemented at some level. At the time of the Consortium's implementation, the city members mayors' were all from the same political party and some of those cities were being pressured by civil society's environmental concerns. Our aim is to investigate if these two latter conditions we perceive as windows of opportunities had any influence on the overall performance of the Consortium and if so, what is the extent of this influence. In order to analyse the relation between the Consortium and the windows of opportunities presented, we will: 1) review the literature on democratic institutions on water management and conservation, as well as other public policies on the same subject; 2) promote a wide documental research on consortium, gathering information on the cities that were part of the Consortium and their participation on the institution; and 3) interview former members of the Consortium and other actors directly related to the institution. We find it is imperative to investigate how institutions work and which circumstances favours or obstacles their successful development. Furthermore we hope our findings will deepen the discussion on the subject and help future decision making, considering that in recent democracies efforts are directed to strengthen democratic institutions and given the currently water shortage that São Paulo's state is facing. Keywords: institutions, water management, socio-ecological systems, window of opportunity, consortium

Keywords: institutions, water management, socio-ecological systems

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No Need to Make Sense: The Arts of Domination in Senegal's Forest Projects

Since the 1990s, several 'participatory' forestry projects in Senegal have been launched to sustain charcoal supply to cities while supporting democratic decentralization of forest management. They also sought to alleviate rural poverty by enabling forest villagers sell charcoal in lucrative charcoal markets that had been hitherto monopolized by urban-based merchants. Two decades on, project objectives have not been reached despite project manufactured success stories. The hypothesis that the transfer of management planning and of

charcoal production and marketing opportunities to the local people would foster environmentalism has failed – peasants remain subjects of the state, objects of management aimed at keeping them from profitable activities. Forest agents use management plans to constrain local people’s access to the charcoal production and trade, transforming them into cheap workforce for the urban merchants. This paper describes the ongoing injustice perpetrated by double management standards on the uneven playing field carefully landscaped by Senegal’s forest service. We explain the acts through which the initial objectives of these projects have been transformed into a theatre of the absurd – one in which the ‘beneficiaries’ of the projects enjoy some tasty crumbs of the charcoal pie, the foresters reap project benefits, and urban merchants continue to dominate the sector.

Keywords: Forest Management, Injustice, Environmentalism, Poverty Alleviation, Access, Charcoal, Senegal

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“Friendship” as a way of research: making the common from the in-between of Indigenous-nonIndigenous relationships

Indigenous research methodologies have become more prominent over the past twenty-five years as Indigenous peoples have demanded more control over the research that takes place on their territories. Relationships are important to this approach in terms of the interpretative aspects of qualitative research, representation of Indigenous knowledge, understanding community-based theories and confirming empirical findings, and activist research aimed at social change. Ethical research has therefore been redefined as that which builds trust, presents Indigenous ontologies as legitimate, recognizes community intellectual input, and provides some measure of reciprocity. Our contribution is to more deeply problematize what exactly relationships might look like and to thereby think more explicitly about ethics in terms of power, decolonization and the common. We are worried that romanticism is creeping into this idea of relationships not unlike that found in the practices of researchers who assume a universal viewpoint on Indigeneity. We argue that anti-identitarian alliances and subjectivities—those infused with difference and a sense of becoming as opposed to unity and being—challenge the way people relate to each other and, thus, the distribution of power in society. Insofar as they provide space for experimentation, they further reproduce a socio-cultural type of common from which others involved in social justice projects may draw. Through the provisional, unfinished and differential alliances made in our respective activism and research with Inuit communities in Nunavut, we illustrate “friendship” as a way of conducting more ethical relations with Indigenous peoples.

Keywords: Indigenous, Nonindigenous, Social Change, Community-Based Theory

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Institutional Linkages for Landscape Level Governance: The Case of Mt. Marsabit, Kenya

It is been observed that local level commons “are embedded in a multi-level world” in which resource boundaries and social boundaries rarely coincide. Resources under common property tenure exist side by side with resources under other forms of tenure within larger landscapes. Moreover, different types of land, water, and other resources overlap and interact in space, as do the decision-making processes which correspond to each. This interaction of resources and management in larger spaces is the focus of a growing interest in landscape level approaches, and it has been suggested that polycentric governance arrangements are the most appropriate.

The Governance Assessment Framework for Landscape-Level Ecosystem-Based Management (LLEBM) is a tool which has been developed for institutional diagnosis at landscape level. We used this framework to structure a case study on Mt. Marsabit, Kenya, with our assessment considering the emergent governance system which corresponds to the Mt. Marsabit landscape ecosystem. Our research found that institutional linkages within the governance system, while strong amongst government departments through the district-level committees, only very weakly connected other kinds of important actors to key decision-making processes. The nature of institutional linkages had profound implications when considered in conjunction with key aspects of governance: those parts of the governance system for which legitimacy and accountability were strongest were only very weakly connected to the key coordinating bodies and to the parts of the governance system having the strongest ability to mobilize resources. For landscape approaches in contexts for which authority is distributed across jurisdictions and sectors, and polycentricity is a given, institutional linkages are needed to connect key dimensions of effective governance such as use of knowledge, capacity to generate resources, fit, learning, legitimacy, accountability, and responsiveness. In the case of Mt. Marsabit, these characteristics existed to varying degrees in the different organizations and institutions that constituted the governance system. The weakness of institutional linkages in certain parts of the system, however, meant that the positive attributes of particular components never became attributes of the governance system as a whole. Of the various linkages that help to make a governance system a truly functioning system, it is those which give community level actors a voice at higher levels and where key decisions are being made that are most critical for enabling effective landscape level governance.

Keywords: ecosystem-based management, environmental governance, landscape approaches, landscape-level management, Mt. Marsabit

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Constructing a Commons in Canada’s Hinterland

Kenora is a small city in northwestern Ontario, Canada. No longer a forestry centre of note, moves are afoot to develop a more diversified and sustainable economy driven by local needs and local decision-making. Yet this is a region characterized by conflict, discrimination and misunderstanding among local First Nation, Metis and Euro-Canadian populations. In this paper I introduce the philosophies and visions associated with ‘Common Ground’, a term used to front or inspire several collaborative initiatives in the area. One such initiative concerns the joint management of heritage lands located close to Kenora’s downtown. Of historical significance to local First Nations, and still used as a ceremonial space, these lands have become an important recreational resource for local city residents of all ages and backgrounds. In describing their emergence as a multicultural, multiuse commons, the paper discusses how the philosophies and visions of ‘Common Ground’ are set to play out as formal administration of the site is layered over the social practice of a diverse user community.

Keywords: Commons, Governance, Institutions, Social Practice, First Nations, Treaty Rights, Common Ground, Kenora, Ontario, Canada

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Migration and Comunalidad: Transformations in indigenous governance systems in a biocultural hotspot of Mexico

In Mexico, rural out-migration has left indigenous communities with reduced and aging populations, and a significant burden placed on governance systems traditionally dependent on the voluntary labour of active resident citizens/commoners. Meanwhile, migratory dynamics shift the social boundaries that customarily define these regimes to encompass trans-local organizations and institutional links and, with them, new forms of citizen/commoner profile, membership and voice. Based on qualitative research conducted over the past decade in the northern highlands of Oaxaca, and among migrants living in Oaxaca City, Mexico City, and several US states, we track the emergence of new indigenous governance configurations and discuss the implications for comunalidad – the shared customs, practices, and communalist ideology around which Oaxacan indigeneity and territoriality is based.

Keywords: Comunalidad, migration, transformative change, Oaxaca, Mexico

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Implementing multi-scale governance in fisheries management: lessons learned from Mexican fisheries

Multi-scale governance has been described as effective for fisheries management. It provides the framework for institutions to match ecological and governance scales, which opens the room for collaboration between users and managers and strengthens linkages across vertical and horizontal levels. Multi-scale governance can be applied to single species and multi-specific fisheries as well as to regions or sites where fisheries interact with other activities. Four case studies where multi-scale governance has been applied were selected and analyzed: 1) Small-scale fisheries (SSF) in the San Pedro Nolasco Island, 2) SSF in the Northern coast of Mexico, 3) SSF in the Caribbean, and 4) the Pacific herring industrial fishery. Overlap between SSF, industrial fisheries, and the tourism industry was observed in all case studies. Users and managers at different scales were brought together to collectively characterize and manage the sites and fisheries. In all four case studies, the match between governance and ecological scales occurred to some degree and resulted in the creation of management committees and formal institutional arrangements. Although the committees presented different characteristics, they showed some patterns during the process. Increased local participation, coproduction of knowledge, and social learning were also observed. The groups (committees) were interested on and developed new skills for creating a collective management vision, communicating and negotiating with their peers, crafting and enforcing rules, representing and informing others, and playing an effective role within their groups. Overall, locals and managers demonstrated to have some skills and knowledge to strengthen fisheries management. However, other skills for managing resources collectively were needed and developed during the process. This work presents some insights for the implementation of multi-scale governance, especially for those cases when aligning governance and ecological scales imply multiple fisheries and sectors.

Keywords: Fisheries Management, Multi-scale Governance, Mexico

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Modeling Evolutionary Institutional Change in Social-ecological Systems: A Research Heuristic

A wide range of methods has been successfully employed for evaluating the performance of static alternative institutions. It is much more challenging to study institutions if these are considered to be dynamically changing. Some experimentalists and modelers have recently started to endogenize institutions, i.e., they allow rules to be changed dynamically by experimental subjects or simulated agents. Focusing on social-ecological system analysis, we review the literature in this field. We show that institutions can be understood as hierarchically nested, with some higher-level institutions necessarily remaining exogenous to any empirical model. We propose a pragmatic approach to address the matter. Specifically, we develop a guiding list of nine questions, seeking to assist empirically working scholars. Viable institutional alternatives, institutional status quo, constitutional rules, and costs of institutional change are

among the important variables to be considered in empirical work. The list aims at ensuring transparency in communicating trade-offs faced when designing economic experiments or agent-based models with institutional change in social-ecological systems analysis.

Keywords: Agent-based Modeling; Evolution; Experiments; Institutions; Methods

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An inclusive approach to the management of Australia's Moreton Bay: a commons perspective

Moreton Bay in South East Queensland, Australia, is officially administered as a marine park for conservation purposes and multiple uses, but to the public these waters have personal and social values to which managers seem oblivious. Moreton Bay has been treated by the public as a commons for nearly two centuries, particularly with respect to boating and recreational fishing. The much more recent overlay of formal management from 1993, however, remains grudgingly admitted by some. People value these spaces in multiple ways including through capture and use of their resources, through feelings of affection and care, in aesthetic appreciation and inspiration, for learning and exploration, in spiritual reverence, or for physical and mental challenges. Governments may be the formal managers, but we argue they are not the only managers. Indigenous Traditional Owners continue customary management practices, and seek stronger recognition and respect for their roles as stewards and custodians. Advocacy organisations have played very important roles in campaigning for the establishment of the marine park and its effective management. A large number of voluntary, community-based stewardship organisations look after areas of the coast and contributing rivers, focusing particularly on environmental monitoring and activities to improve water quality. Taking a

commons perspective on this marine area highlights a tension between formal management and residual expectations (in some sectors) of continued access on common pool terms. These voices, alongside conservation campaigning, tend to have more influence in political decision making than other viewpoints among the general public, which often remain untapped. The level of passion attached to the Bay and the activities it affords, and the extent of Indigenous and voluntary stewardship, provide a basis for an inclusive approach to management. This approach would see roles for Indigenous and stewardship groups nested within the formal management framework. An inclusive approach would also treat the public as having passions and capabilities worth engaging, rather than as representing a set of activities to be controlled or conflicts to be moderated.

Keywords: Marine, Protected area, Management, Values

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A Critical Analysis of Multi stakeholders Utilization of Marine and Coastal Resources and Local Socio Political Influences: Dealing with Risks and Uncertainty (A Case of Tin Mining)

Tin mining in Bangka inland, Indonesia is the main source of income of most of the people living in the vicinity. Besides its economic importance, it is also causing Environmental Destruction including, marine pollution, disturbance of natural land setting, and spreading of diseases. Externalities management of Natural Resources through exploration of tin in both land and marine ecological setting bring consequences towards socio ecological and economic change. The development of mining practices, done by both mining companies and in conventional miners affect the livelihood systems of society based on the socio-ecological context of Bangka Island. Offshore mining comes as the main mining spot, rather than land mining that have been decreased vastly. Bangka Island are mostly covered by sea, as a common resource, utilized by fishers and other marine based livelihood strategy compete depleted gradually due to the offshore mining practice, done by local community and also private and government sector. It creates not only a great dependency on tin as a mining commodity which belongs to un renewable resource, but also resource depletion such as depleted fishing ground and also coral reef destruction. Sustaining human life has certain strategies that reflect actions need to meet basic human needs and local sociopolitical condition influence the access and utilization distribution of marine and coastal resources. All the actors competing to valued and utilized the resources and un match interests and power will create unbalance access and power dichotomy between actors, This study in Tanjung Gunung Village, Pangkalan Baru Sub district, Central Bangka District, examines how all stakeholders put their interest and play their role and power to struggle for their interest.

Keywords: Tin Mining, Marine Coastal Resources, Commons, Utilization, Access And Power, Local Sociopolitical Condition

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Policy Paradoxes of Renewable Energy Development Bulgaria

Climate change is a complex global problem which requires a fundamental transformation in the energy sector of nation states around the world. Since 2007, European Union (EU) member states have been working towards a common energy policy with the goal of mitigating the effects of climate change. A common target for the year 2020 is that renewable energy accounts for 20% of the EU's total energy consumption. To meet this goal, each EU member state has agreed to binding, country-specific targets to increase the share of its renewable energy usage. This paper examines the process of achieving these targets in a recent EU member state, Bulgaria.

More specifically, the paper seeks: 1) to investigate the relationship among formal institutions (e.g. EU regulations, national laws) and informal institutions (e.g. regular social behavior, norms) for renewable energy production; and 2) to understand the factors shaping the behaviors and activities of government, industry, and civil society organizations in the renewable energy sector. In organizing our inquiry, we apply the Institutional Analysis and Development (IAD) framework. Data sources include national and supranational (EU) laws and regulations, official documents, news reports, and in-depth interviews with elites representing government, industry, and nongovernment organizations in Bulgaria's energy sector. Early findings indicate several challenges in the implementation process related to lack of consistent policies, protectionism of coal-based energy production, political unpredictability, and an inadequate level of collaborations among administrative units and organizations.

While this case study does not allow extrapolation of findings, it calls attention to the importance of institutional design, political factors, and inconsistencies between formal and informal institutions. Bulgaria is selected as a representative case example of Southeastern Europe. It is a recent member state of the EU, which has been a strong driver of policy change in Southeastern Europe, and Bulgaria's size and resource endowments (biomass, solar, wind) are similar to those of other countries in the region. Given the strong trend for policy diffusion in Southeastern Europe, Bulgaria's implementation of the EU's renewable energy targets can provide lessons for other nations in the region and nations with comparable political history. The proposed paper has broad relevance for climate change mitigation strategies, and more specifically for efforts that support energy security, the green economy, and multi-scale policy implementation.

Keywords: Renewable Energy, European Union, Institutions, IAD

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Rule embeddedness and institutions for private land conservation in the United States

A conservation easement (CE) is a negotiated, legally-binding agreement between a private property owner and a land conservation organization that limits development and protects land for its conservational, historical, and other public values (Gustanski and Squires, 2000). From an institutional perspective, a conservation easement constitutes a set of rules that establish the transfer of development rights associated with private ownership, as well as the range of activities that are required, prohibited, or permitted on the land. Conservation easements, thus, shape both social and ecological outcomes over the long term by directing the behavior of actors in the land conservation arena (landowners, land trusts, communities). Yet, conservation easements have received limited attention in the academic literature, particularly with regard to their interactions with rules across different levels of institutional decision-making. In this paper, we conceptualize CEs as rules within a nested, institutional structure that shapes the decisions and actions of actors in the land conservation arena. The goal of the paper is to examine how CEs as operational-level rules interact with higher-level rules, namely: state and federal conservation incentive programs, the federal tax code, and the LTA Accreditation Program as collective-choice rules; and constitutional clauses/ state constitutions as rules at the constitutional level. We apply this multiple-level system of rules (Ostrom, 1990) and the Institutional Grammar Tool (IGT) to better understand institutional interactions and arrangements in the land conservation field. The document analysis draws on conservation easement texts, state and federal policy documents, and other official sources across three US states (North Carolina, Virginia, and Tennessee). The paper discusses the implications for CEs to persist as an effective institution for land protection and offers insights about how to better incorporate rules within a multi-level governance structure of an evolving social-ecological system.

Keywords: Conservation easements, Land trusts, Nested rule systems, Institutional interactions, Property rights

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Forest Fires, Caribou, and Climate Change: Differing Visions on Governance, Land and Wildlife in the Northwest Territories

During the 2014 fire season in Canada's Northwest Territories, in at least 385 fires, over 3,384,995 hectares of boreal forest was burned, reported to be a result of extremely dry conditions. Fifty-five million dollars was spent in implementing current policy which protects "values at risk" (primarily structures – i.e. cabins) and which monitors most other fires. One of three northern territories with quasi-provincial responsibilities, including fire management, the NWT changed its firefighting policy and fire management practices approximately 25 years ago. Earlier, the emphasis was on fighting fires and the use of experienced cadres of Aboriginal fire fighters and crew bosses who were proud of their skills and felt their contribution to caring for the land was significant. Currently, reliance on technology, university education, a philosophy of letting fires burn and a reduction of "boots on the ground" is emphasized. Former Aboriginal fire fighters feel the health of the land related to fires is no longer shared. They indicate that their rights to land usage and to protect the land has been disregarded, that their

access and responsibility for the land is being ignored and that government-based practice and fire theory is not effective or practical in this sub-arctic forest context.

Given this dynamic, debates on the value of Aboriginal experiential knowledge, often held in the mind, as compared to Western best-practice models enhanced by the use of technology are ongoing. They also occur in light of varying views of the importance of “the land” as opposed to land-use. To northern Aboriginal peoples, “the land” represents intertwined spiritual and pragmatic relationships with activities taking place on the land, including relationships with plants and animals. Fire also represents concern re Western -induced climate change and also come to the fore in regards to government based wildlife management particularly current efforts to restrict both non-Indigenous and Indigenous hunting in light of caribou population decline, a linked social and ecological concern. Traditional views regarding relations with caribou as a shared resource and governmental wildlife management perceptions are quite different. Caribou rely on treeline winter range; they live on caribou moss (lichen), which when burnt requires decades long regrowth cycles. In earlier models, fires were once fought to protect the caribou range. Current mixed messages by the Government of the Northwest Territories to reduce hunting while failing to protect caribou winter habitat, always considered a common resource, has Cree, Dene and Métis peoples and organizations challenging this discourse.

Keywords: forest fires and fire fighting, boreal forest, caribou management, land perception, Aboriginal peoples, Northwest Territories

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A Study on Management Practice of Common Methods of Community for Livelihood Promotion and Agriculture in Jharkhand State of India

This article is an attempt of how community education, learning and training through participatory process could be used to advance agricultural efforts and livelihood initiatives.

This empirical study is carried out in two villages of Jharkhand state in India to examine as how the community level common methods are exploited and made use for agricultural promotion and livelihood as well. It is firmly believed that humans are unexplored treasures and each additional individual born in this world strains world resource by being a consumer; but by being a producer and contributor to the world resources, each individual has enormous possibilities. Now our concern is as on how to convert the human beings into human resources?

More growth of population means it will more overtax the resources which will ultimately result wide spread poverty and hunger (Thomas Malthus 1798). Malthus theory on population

and general prediction about the common man of third world countries could be made reverse by way of converting the human population into human resource through education, training for agriculture. Over population is not a burden rather it may be termed as an opportunity especially for the agriculture and rural development sectors. Education and Training programmes are pro- productive; it develops the abilities and skills of the people and particularly farmers in the agriculture sector. Education and trainings have paramount importance in helping farmers increase the agricultural production and productivity. This paper has tried to show as on how education and human resource are extremely important for agriculture as well rural development sectors as because farmers make best use of micro-irrigation, effective application of fertilizer and seed & others for agricultural growth. This empirical study is carried out in two villages of Jharkhand state in India where most of the farming community gets involved in the training and learning process.

Keywords: Community, Commons Management, Education and Trainings, Participatory Rural Appraisal, Agriculture Production and Livelihood

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How rights of public access affect performance of ecosystem services?

This study focuses on institutional aspects which may determine quantity and quality of ecosystem services and especially investigates empirically rights of public access which allow any people not only land owners to enjoy some benefits from ecosystem to some extent. To overlook institutional situation of various countries, they can be categorized in three types roughly. 1) Full public access situation; not only passing through but also collecting NTFPs (non-timber forest products) or other minor natural resources is allowed to public, 2) Limited public access situation; only passing on foot or by other measure is allowed to public but collecting NTFPs or so is only allowed to land owners, 3) Non public access situation; anything is never allowed to public other than land owners. Then, the ability of each field of ecosystem service, i.e. provisioning services, cultural services and regulating services, is estimated according to public access rights situations above respectively. Under the full public access situation, people can gain high level of both provisioning and cultural services. Under the limited public access situation, people can gain high level of cultural services. Under the non public access situation, people can gain only low level of any ecosystem services. Further, from a case study on NTFPs collecting under the full access situation in Japan, it is shown that full access situation may derive a synergy effect between provisioning services and cultural services. Although open access situation has been often regarded as a vice custom in terms of resource management, but it is thought to be worthwhile to reconsider in terms of enhancing performance of ecosystem services.

Keywords: Rights Of Access, Ecosystem Services, Open Access, NTFPS

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Gender Map of the Solar Energy Sector in Northern Philippines

In the face of increasing energy prices and the challenges presented by climate change, renewable energies have now become one of the most important topics on the political stage (German Energy Agency, 2010). Long before the Renewable Energy Bill was passed in 2008, the Department of Energy (DOE), through its Rural Electrification Program, had already installed solar home systems (SHS) and solar battery charging stations (SBCS) in upland communities in the provinces of Abra and Ilocos Sur in Northern Philippines. The operation and maintenance of solar technology lies on how the men and women in those communities handle this renewable energy, hence a gender map is deemed important.

Utilizing the Gender Analysis Framework of the Asian Development Bank (2002) and guided by the Actor-Based Model of Human Ecology by Orlove (1977) and the “Structure of Constraint” concept by Folbre (1997), the research involved 337 respondents to determine who, between the men and women, are more involved in the various activities affecting their lives as well as who can access and control the resources necessary for their survival.

Social factors, namely: demographic, economic, cultural, and institutional factors were considered in the study. Majority of the respondents belong to nuclear families with an average family size of five and average number of children of three. Majority are Roman Catholics and almost all of them are Tingguians or Itnegs. Most are into farming as their primary occupation. Most own their lands, vehicles, and farm equipment which are mostly registered under the fathers, which exemplifies gender-specific constraints due to patrilineal inheritance practice.

The respondents are knowledgeable about solar energy systems and they have favorable attitude towards them. They aspire for themselves to be healthy and to be rich; for their families to have bigger houses, appliances and vehicle; for their children to go to school; and for their communities to have better roads and bridges and to have more livelihood activities to further increase their income.

Most of the fathers and mothers are active members of non-government organizations, such as farmers’ association and cooperatives for the fathers and Rural Improvement Club or RIC, Timpuyog ti Inna and Women’s Club for the mothers. The service providers for solar-based communities which are the ABRECO, ISECO, and MMSU-AREC were tapped by the DOE and by politicians to put up solar energy systems in Abra and Ilocos Sur.

Reproductive activities such as housekeeping and taking care of children are done by the mothers while community and leisure activities involve both men and women. For the productive activities, men dominate in the pre-operation, operation and maintenance of the solar energy systems.

Resources, such as materials, and labor are mostly availed of and controlled by men while capital and credit are mostly controlled by women. There was no training conducted regarding solar technology.

Respondents find the materials available but unaffordable. Technical assistance is non-existent but the system is simple and its process is comprehensible.

Social factors are related to the men and women's involvement in reproductive, community, leisure, and productive activities as well in their access and control of resources namely capital, materials, labor, and credit.

Keywords: Renewable Energy, Solar Energy, Gender, Gender Map, Community Participation

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Individual forest-use habits and the inclination to harvest in forest-framed public goods games

Local knowledge of ecological processes has shown some evidence of benefitting management outcomes in commonly-owned forests. However, defining, let alone measuring, local ecological knowledge has proven difficult in many circumstances. Here, we present a series of simple questions that measure individuals' frequency and duration of forest visitation and reasons for their visits. We present results from these questions for over 500 rural forest users from several developing countries who participated in one of several forest-oriented common-pool resource games. Forest use patterns differed significantly among countries, but in most cases, total forest visitation time was a significant predictor of inclination to harvest. This relationship was strengthened when certain control variables were included, notably particular

aspects of cultural values. We end with a discussion of how these results affect the interpretation of resource use games and their implications for policy development.

Keywords: local ecological knowledge, forest, games, cultural values

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Spiritual commons: sacred sites as core of community conserved areas in Kyrgyzstan

We have been analyzing two conservation models that overlap in the Ysyk-Kol area of Kyrgyzstan: the Ysyk-Kol Biosphere Reserve, a formal protected area at national and international levels, and sacred sites, some 120 of them within that Biosphere Reserve. Defined as areas of land and water which are spiritually meaningful for local people and where sacral practices and rituals are performed, sacred sites represent local-level, informal conservation. Sacred sites are diverse: they include burial sites, springs, river gorges, clumps of trees, rock formations, and Lake Ysyk-Kol itself (the second largest high-altitude lake in the world).

They are biocultural hybrids because they have both cultural (beliefs, ceremonies, practices) and biophysical elements. Sacred sites often serve as the 'core' of community-conserved areas. We refer to sacred sites as 'spiritual commons' because they represent sites at which there exist shared spiritual values. Access to most sacred sites is unrestricted; anyone who visits a sacred site has a right to make wishes and conduct ceremonies. The 'spiritual commons' characteristics of sacred sites provide motivations to conserve for two reasons: (1) shared beliefs that pilgrimage to these sites help to heal diseases, achieve personal goals and happiness, and (2) pilgrimage involves exercising care ('conservation') of the site by following a set rules of behavior. Unrestricted access allows more people to do pilgrimage, with the result that the site is better cared for. Conversely, if local people cease to consider a certain site as a spiritual commons, the area or biophysical element that used to contain sacredness 'loses' its sacredness and becomes 'just another' spring, lake, gorge, or rock formation. Thus, within formal conservation strategies, there is an opportunity to use sacred sites instruments for (a) nurturing a caring attitude towards nature and biodiversity, (b) fostering stewardship through the notion of sacredness, and (c) helping transmission of traditional ecological knowledge. However, there is little evidence that Ysyk-Kol Biosphere Reserve is able to use these opportunities to engage local people in formal conservation. We discuss the reasons for this and possible policy changes so that the two kinds of conservation can be brought together.

Keywords: Sacred Sites, Governance, Protected Areas, Community-Based Conservation

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Local knowledge and ethnobotany survey of medicinal plants for traditional healthcare delivery in Ghana

The World Health Organization's Health For All agenda remains far from fruition in Ghana. This is due to inadequate finance and personnel among others to support the mainstream orthodox healthcare system. The World Health Organization (WHO) encourages the development and utilization of herbal medicine in the Primary Health Care delivery in developing countries. This policy is based on the sound recognition of the role that herbal medicine plays in health care programs in most developing countries. In Ghana, 70% of the population depend on traditional medicines for their primary health needs. This is because it is comparatively inexpensive than orthodox medicine and traditional medical practitioners are often more readily available in communities for consultation compared with modern orthodox health facilities. Plants constitute the major curative materials used in traditional health delivery. However, the uncontrolled exploitation, improper harvesting technique of medicinal plant species over the years without replacement pose a lot of danger to the continued existence of these species and the knowledge of their efficacy. Furthermore, the parts of the plants often harvested for use sometimes coincides with the parts used for anchorage, nutrient uptake, photosynthesis and regeneration by the plants. Hence, continuous existence of the species in natural ecosystems are now greatly threatened. As a result most of them are now either endangered, threatened or nearing extinction. Medicinal plant users therefore travel long distances to collect preferred plant parts. A great deal of useful ethnobotanical information are also being lost because the custodians of these traditional or indigenous knowledge are aging without adequate transfer of their knowledge to younger generations or any proper documentation.

The study identifies medicinal plant species used by traditional healers or herbal practitioners for curing diseases and document indigenous knowledge on their utilization. A total of 147 herbalists were interviewed in towns and villages in Ashanti, Brong Ahafo, Central, Eastern and Western Regions of Ghana. Data was collected using structured questionnaires, administered in their fetsih grooves and homesteads. Ethnobotanical knowledge, part and frequency of use and availability status of 395 medicinal plant species were documented. The traditional healers treat ninety one (91) different kinds of diseases using different combinations of 395 medicinal plant species. The study revealed that, bark and roots are the most frequently used plant parts for healing. Most of the frequently used medicinal plant species are scarce/unavailable in some districts due to various reasons including over exploitation for timber, farm expansion, wildfires, destructive harvesting techniques by medicinal plant collectors and high demand for medicinal plant parts.

These observations indicate the importance and relevance of traditional healthcare to local communities as compared to treatment from orthodox medicine. However, the knowledge of efficacy of these medicinal plants could be lost if the the practice is not documented and the resource base conserved.

Keywords: Ethnobotanical Information, Herbal Medicine, Indigenous Knowledge, Medicinal Plants, Orthodox Healthcare

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Sustainable forest management and marketing of forest products and services

The concept of community forestry was first elaborated in 1989, and the first community forests were established in 1990. The legal basis for community forestry implementation is enshrined in the 1998 Forest Act which in Part VII, Section 58 mandates that the Ministry of Forestry and Environment with the responsibility to designate forest areas as Community Forests (CFs). The overall goal of community forestry is to increase the welfare of local communities through the introduction of ecologically adapted natural resource management practices'. As with other long-term resource management interventions, community forestry has to be understood as the initiation of a process of ecological, economic, and socio-cultural transformation from de-stabilized systems to a restored balance Empowering local communities with the technical skills and resources necessary to achieve a regular income is vital in addressing many of the problems afflicting developing countries. The Market Analysis and Development (MA&D) methodology provides the crucial structures necessary to achieve this through sustainable forest management and utilization of forest resources. Poverty alleviation is addressed by identifying potential forest products and then developing corresponding markets. This increases individual and community revenue while at the same time encouraging the active protection of forest resources through Participatory Forest Management. The MA&D process promoted the collaboration between the forestry service and the local communities, thirteen out of the 26 villages currently participating in MA&D related activities have applied to extend their CFs. The MA&D has fostered a sense of ownership and responsibility, MA&D is integrated into Forestry curriculum, Increased economic incentives for local forest users and Community Forest Committees; Improved employment opportunities and Revenue to the Forestry Department through National Forest Fund. Increased consideration of gender aspects; The MA&D process has already made a huge impact in many communities across the Gambia and there are sound reasons to expect this to continue far into the future.

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Managing Private Terraced Paddy Fields as Transcommons in Japan

Literature on commons has usually developed with a focus on commons overuse from the perspective of provisioning ecosystem services that commons generate for users who then have

common property rights thereto. Provisioning ecosystem services also have marketable value. When landholders conduct farming activities on their privately owned terraced paddy fields (TPFs), they provide not only provisioning ecosystem services, such as rice, to the landholders (which have marketable value), but also extremely valuable cultural ecosystem services, such as scenic views and environmental, recreational, spiritual, and educational value, which are of nonmarketable nature to non-farming beneficiaries at local, regional, and national levels, including urbanites and other stakeholders. From this cultural ecosystem services perspective, these TPFs are considered both local and global commons. Because of depopulation, an aging society, a lack of successors, and low income in the mountainous and hilly village area in Japan where TPFs are located, TPFs are being abandoned at a significant rate by landholders, and the level of cultural ecosystem services has consequently decreased. Drawing on case evidence from TPFs located in Niigata Prefecture, Japan, this study seeks to determine how abandoned TPFs can be managed as local and global commons. The study demonstrates that the management and use rights, if not the property rights, of TPFs are transferring from farming beneficiaries to non-farming beneficiaries—hence, the term “transcommons.” Because urbanites and other beneficiaries do not have property rights to TPFs, and because they do not either the appropriate skills or built-in shared institutional arrangements to collectively undertake farming activities, underuse and consequential tragedy (degradation due to underuse) of the transcommons follow. Both first- and second-order underuses lead to the tragedy. First-order underuse ensues when landholders abandon farming activities and provisioning ecosystem services, which are necessary for generating cultural ecosystem services, stop producing as a result. Second-order underuse takes place because non-farming beneficiaries have neither property rights nor the required skills to produce both provisioning and cultural ecosystem services. Since cultural ecosystem services are of substantial importance to not only urbanites in particular but also to stakeholders at higher levels in general, the solution to the tragedy requires a polycentric governance approach. An extant polycentric approach, which consists of multiple, overlapping centers of federal, regional, and local governments and community authorities, and which was originally developed to address overuse, could be very useful to dealing with the underuse of TPFs. The International Partnership for the Satoyama Initiative (IPSI) was developed in 2010 by United Nations University to foster a harmonious relationship between human society and nature’s ecology in satoyama areas, while involving all levels of authority. Insights and principles from polycentric governance have the potential to enhance the functioning and effectiveness of this initiative.

Keywords: Commons; Tragedy of the Commons

The Role of State-Reinforced Self-Governance for Managing Postwar Coastal Fisheries Commons in Japan

Ostrom (1990) challenged the traditional belief that users do not have the ability to communicate and self-govern commons and that commons management unavoidably requires the provision of state ownership or privatization. Ostrom instead established the notion of user self-governance, which involves little or no state, as a third policy option for managing commons. Along this line of thought, Ostrom developed eight design principles that self-governing institutional arrangements follow, while the role of the state is minimal. Her studies, as well as those that follow her school of thought, also tend to employ these design principles where the state’s role is regarded as implicit. How the design principles characterize user self-governance in a locale that plays an explicit state role has not been substantially addressed in commons literature. This paper seeks to establish how design principles explain users’ self-

governing institutional arrangements when the role of the state is explicitly incorporated within said principles; and thereby, find new theoretical insights. Drawing on case evidence of Japan's coastal fisheries commons, this study shows that design principles can better explain self-governing institutional arrangements when the state is involved with a pro-user self-governing role to provide strategic support for users, but neither takes ownership of commons nor participates in prescribing users' self-governing institutional arrangements. The policy option can be described as state-reinforced self-governance, which is different from resource co-management (or co-governance), with some certain overlapping features. In co-management (or co-governance), decisions and management responsibilities are typically shared equally between government and resource users.

Reference

Ostrom, E. 1990. *Governing the Commons: The evolution of Institutions for Collective Action*. New York: Cambridge University Press.

Keywords: Fisheries, Commons, Institutions, state-reinforced self-governance, Japan

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Common-Pool Resources Management in Experimental Economics and Neuroscience Perspectives

Common-pool resources (CPRs) such as fisheries, irrigation systems, forests, and the atmosphere have provision and appropriation problems to deal with. These two problems lead to the degradation of a CPR. On the one hand, when beneficiaries derive benefits from a CPR but do not contribute to its operation and maintenance, provision problems occur. On the other hand, when beneficiaries overuse the CPR, appropriation problems occur. Provision problems are the focus of this article. Consumption rivalry and the difficulty to exclude beneficiaries from deriving benefits from a CPR cause provision problems. The difficulty to exclude provides beneficiaries with the free-riding opportunity to derive benefits at the cost of others' contribution, resulting in under-provision and eventual degradation of the CPR.

Studies typically focus heavily on appropriation problems. In our study, we have demonstrated how the establishment of beneficiaries' property rights to the CPR, communication among beneficiaries, and self-monitoring over contribution improve the performance of economic contribution to resolve provision problems. We investigated this in a laboratory setting as well

as from neuroscience perspectives. Our study demonstrates that property rights, communication, and self-monitoring contributed to the resolution of the provision problems, but that interaction between average payoff structure and participants' mindsets to free-ride or not to free-ride led to underperformance.

We developed an experimental economics game involving 90 participants (mostly undergraduate students) who were divided into 15 groups, and with each group comprising six individuals. Six participants used single computers, while wearing six synchronized Electroencephalography (EEG) devices to record their neural activities while participating in the game.

The participants in a group were asked to imagine that they had a common fishery pond to which they had property rights, while also possessing a certain amount of token money to contribute to the operation and maintenance of the pond. During the first phase of the ten betting rounds, the participants played the game without communication; a participant was only able to view the average payoff that he or she derived at the end of each round. Before the second phase started, the participants had communicated and discussed how they could increase the performance of economic contribution. During the second phase, which also involved ten betting rounds, each participant could view the average payoff. During the third phase, in each betting round, a participant could view the average payoff as well as all participants' names and contributions as part of self-monitoring process.

We conclude that although the establishment of property rights inspires users to contribute to the provision of CPR, the free-riding problems prevail. In the presence of communication and self-monitoring, economic performance tends to improve. The combined effect of two internal and external determinants conditioned the participants' economic behavior. The internal determinant was linked to some of the participants' original mindsets not to free-ride. The external factor was linked to payoff structure. Some participants did not seek to free-ride but tended to contribute lower amounts, in order to reduce the economic losses that would result from others' lower contributions.

Keywords: Common Pool Resources, Provision Problems, Property Rights, Experimental Economics, Neuroscience

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Imperatives for Addressing Depleting Commons in the Western Himalayas Linking Research, Policy and Practice: A Case study of *Chilgoza* Pine

This paper evaluates the trajectory of a socio-ecological research study on an endemic species of Western Himalayan pine, specifically designed to promote the necessity of evidence-based research as a prerequisite for implementable State policy and to eventually spearhead conservation action in the field. The process of collaborating with the State as an independent researcher, the outcomes of the research study and the status of actual policy implementation for conserving the species threatened mainly due to anthropogenic disturbances are outlined in the paper.

Known as *Chilgoza* in local parlance, the State owned pine forests harbor and sustain a fragile ecosystem and are native to relatively small pockets of steep xeric mountain terrain. But these forests are distinct also because, unlike most pine species, the seeds embedded in *Chilgoza* pine cones are edible and consumed as pine nuts by local inhabitants in the vicinity who have customary rights to harvest cones for self-consumption or sale. The changing façade of the Himalayan landscape, characterized by road connectivity and consequent market integration has led to reckless and excessive extraction of this valuable produce for discernible lucrative gains jeopardizing natural regeneration and long-term sustainability of these rare forests.

The interdisciplinary field study conducted under the aegis of the State Forest Department at the behest of the researcher who alerted authorities about the plight of these forests, focused on unearthing resource use regimes, livelihood stakes and resource status under changing contextual parameters. In retrospect, a venture of this nature was a rare feat in an otherwise passive atmosphere of government departments. The principal enabling factor triggering this exercise was the existence of visionaries with foresight, at the top brass who conceded to the study proposal granting complete research autonomy and support. The field study findings that reaffirmed the dismal state of natural regeneration and excessive lopping of mature trees on account of destructive harvesting practices were well received and tactfully disseminated to warrant attention to a depleting resource. These efforts resulted in a well endowed 'action-plan' biased heavily towards a citizen science framework by capitalizing on the researcher's meticulously developed social network for ensuring sustainable resource use and for monitoring its impact on natural regeneration. What came as a serious blow to the project's sustainability, stalling the pace of implementation, was the sudden tenure termination of forest officials responsible for initiating the conservation program. The ousted officials were replaced by a new regime antithetical to scientific enquiry, skeptical to the engagement of expertise outside the State machinery and inclined towards preference for complacency through postponement of decision-making necessitating action.

The study effectively highlights the volatile nature of underlying conditions that can thwart the much needed link between research policy and practice for sustaining the status of a host of degrading commons in the Western Himalayas that are enmeshed in conflicting livelihood and biodiversity concerns in the contemporary context. Under these circumstances, institutional changes and alternate frameworks for conservation action is an ardent necessity in order to foster prolonged cooperation and collaboration across all stakeholders engaged in conservation.

Keywords: Western Himalayas, endemic species, resource use regime, research-policy link, conservation action

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Analyzing the Institutional Grammars of the Rio Grande River Basin

The IAD and SES Frameworks serve a variety of purposes in supporting research on governing public goods, common pool resources, and social ecological systems. One such purpose is providing a common set of variables and concepts that allow for a meta--- language

to develop among scholars, but more importantly to allow for the accumulation of knowledge as researchers explore and test a commonly understood set of variables and concepts across multiple cases (<http://sesmad.dartmouth.edu/>; <https://seslibrary.asu.edu/seslibrary/welcome>). Another purpose, and one that E. Ostrom explicitly used in introducing and explaining the SES Framework (E. Ostrom 2007, 2009) is as a diagnostic tool. Without a diagnostic framework, scholars may provide poor policy advice; or, as E. Ostrom (2014:270) warned, “analysts may make recommendations based on naïve ideas about which kinds of institutions are ‘good’ or ‘bad’ and not on an examination of performance.” A key component of both frameworks are institutional arrangements. For policy analysts, diagnosing the strengths and limitations of institutional arrangements and prescribing solutions is foundational to the discipline, as E. Ostrom’s above quote suggests. Thus, developing a diagnostic tool based on the concept of institutional arrangements from the frameworks is a critical step forward in further extending the value of the frameworks and providing policy analysts with the tools to provide sound policy advice. This paper builds on the pioneering work of scholars who operationalized the grammar of institutions, first developed by Crawford and Ostrom (2005), into an institutional grammar tool (Crawford & Ostrom, 1995; Basurto, McQueen, Smith, & Weible, 2010; Siddiki, Weible, Basurto, & Callani, 2011). The grammar tool will be used to carefully parse and code the institutional statements comprising the three constitutions governing the Rio Grande River basin, the two treaties between the US and Mexico and the compact (treaty) among the US states on the Upper Rio Grande. The coded institutional statements will be used to compare the design of collective choice venues, monitoring systems, compliance mechanisms, and water allocation rules among the three constitutions. The analysis of the institutional designs will be paired with a prior analysis of the robustness of the Rio Grande River Basin governing arrangements to drought to form a more complete exploration of Rio Grande River Basin governance and provide a blueprint for the analysis of the design of institutional arrangements in other transboundary international river basins.

Keywords: Institutions, Institutional Grammar, SES Framework, Rio Grande River

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Harvesting, Food Security and Wildlife Management in Nunavut

The economy of the recently established territory of Nunavut in the Canadian Arctic is a unique mix of traditional or subsistence and market economies. This paper looks at food security in the context of Nunavut’s mixed economy. The scope of the issue is dramatic: 70 percent of Inuit households are food insecure, 35 percent are severely so (Council of Canadian Academics (2014)). Subsistence harvesting and access to country food from the land is becoming increasingly important for food security due to a volatile wage economy, the high cost of store food and corresponding consumption choices that are not healthy. Based on this analysis, we provide insights that may contribute to the development of better wildlife

management and social and environmental policies in Nunavut in order to build a more sustainable economy and healthier society.

This paper examines the unique and largely unexplored data of the Nunavut Wildlife Harvest Study (NWHS). This survey provides monthly data on harvest and number of hunters by detailed species for each of the 27 communities in Nunavut. The data covers the period from June 1996 to May 2001 that includes the time of creation of the Territory of Nunavut in 1999.

The harvest study provided the Nunavut Wildlife Management Board (NWMB) and its co-management partners with a vital long-term tool for making sound wildlife management decisions, and for determining Inuit basic needs levels (BNLs). Should it ever become necessary to limit harvesting from a wildlife population, the first call on any such limit will be to meet the basic needs level of Inuit. As well as being used to establishing BNLs, the harvest study produced a database that has been used by the NWMB and other co-management agencies in addressing and assisting with wildlife management issues such as research prioritization, development of management plans, negotiation on impact and benefits agreements, and for assessing international compensation on shared stocks.

The NWHS defined basic needs and to this date determines the distribution of wildlife species to various communities in the territory. Some of the species are harvested under the constraints of a total allowable harvest while others do not have any effort or quantity restrictions. Currently the determined basic needs level as defined by the NWHS are under scrutiny as certain wildlife population (such as the Southampton Island caribou herd and Hudson Bay beluga populations) show signs of decline and are subject to stricter conservation measures.

Our paper provides the first in-depth analysis of the Nunavut Wildlife Harvest Study. We derive edible quantity of meat per capita by community under different sharing assumptions for the major key species hunted in Nunavut. We find a large variation in the distribution of most key species by hunter. We construct a community vulnerability index based on labour market statistics, hunter composition and demographic structure of communities. We find that there is a positive relationship between the unemployment rate and the proportion of occasional hunters. The opposite holds for intense and active hunters that rise in numbers with lower unemployment in a given community. We create a map of Nunavut that contrasts community harvesting potential, the proportion of intense surplus hunters and labour market data including our vulnerability index. We discuss food insecurity, challenge the current definition of basic needs in terms of food security and discuss implications of our analysis for food policy and wildlife management in Nunavut.

Keywords: Basic Needs, Wildlife Management, Subsistence Harvesting, Food Security

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Polycentricity and the Design Principles: Explaining Regional Scale CPR Self-Governing Arrangements

Garrett Hardin's articulation of environmental collective action dilemmas as the tragedy of the commons in the late 1960s, spurred decades of research on how and under what conditions resource users can address dilemmas and devise sustainable governing arrangements (E. Ostrom 1990; Poteete, Janssen, and E. Ostrom 2010). Long criticized for focusing on local, small scale resources, can such theories be scaled up to encompass and explain how governments, as the primary actors, cooperate to devise, implement, and monitor, self-enforcing intergovernmental arrangements for regional scale resources? The answer is not straightforward, in some obvious and not so obvious ways. The obvious difference is that governments are not individuals. Government officials face different incentives than do individual resource users. For government officials, stinting in the use of a commons often means they have to limit the use of the commons by their citizens in order to benefit the constituents of another government. Whereas for individual resource users stinting means limiting their use in order to benefit their neighbors. In the latter case, it is possible to draw upon norms, discount rates, and saliency of the resource (E. Ostrom 2005) to account for the emergence of cooperation among individuals. But what accounts for the emergence of cooperation among governments? And, why would governments enforce unpopular restrictions on their citizens to benefit others? The not so obvious differences revolve around institutional settings. Monitoring and enforcement and graduated sanctions are critical for maintaining cooperation and rule following behavior among individuals in smaller scale commons over long periods of time (E. Ostrom 1990; Tang 1992; Lam 1998; Chhatre and Agrawal 2008). Monitoring and enforcement and graduated sanctions are likely to be important among governments as well, but what forms do such mechanisms take among governments to encourage rule following behavior compared to individuals? Using the case of the New York City Watershed Agreement, an arrangement governing water quality among NYC and the watershed jurisdictions, we identify the design principles present in the agreement, and explore how the forms the design principles take in intergovernmental agreements differ from the forms found in agreements among individual resource users. We argue these differences provide key insights for explicitly incorporating polycentricity and scale into common pool resource theories.

Keywords: Polycentricity, Design Principles, New York City Watershed

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Turtle eggs harvesting and the incentives of an NGO: an experiment with Nicaraguan fishermen

Turtle eggs are harvested by poor people and it is legally forbidden in the case of Nicaragua. Preventing people to harvest turtle eggs is in the interest of many environmental NGOs and also the state is doing some effort to prevent people from harvesting turtle eggs. It seems to be an activity, which is particularly suitable to give monetary incentives for non-harvesting, as the ratio between the necessary payment for saving eggs and the potential output in term of ecosystem value is particularly beneficial. On the other hand, using a monetary incentive scheme might be dangerous particularly if one thinks about the fact that NGO schemes do not run forever. Using a framed field experiment based on Cardenas 2004, we test various possible policy interventions. Particularly we focus on the questions, what happens if the scheme stops to exist.

Keywords: Turtle Regulation, Marine Issue, Experiment, Incentives, Crowding Out

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Who should care for nature? Perceptions of Caçara communities and protected area managers/staff in Paraty, Brazil

Ecosystem Stewardship may be understood as a sense of responsibility and a strategy to care for the state of socio-ecological system. On the Atlantic Forest domain along the coast of Paraty, Brazil, we investigated resource use, management and conservation measures and strategies in two Caçara communities, whose main natural resource bases are located inside protected areas (PA) created over their territories. The Juatinga Ecological Reserve is currently undergoing a re-categorization process, enabling to rethink its conservation goals: from no-take to sustainable-use PA. The Tamoios Ecological Station, a no-take marine PA, has been pressured by Caçaras and has engaged in a negotiation process with them to allow artisanal fishing inside this PA. Perceptions of community members and PA managers and staff about responsibility and care for nature and well their own conception on the meaning of conservation were investigated through semi-structured interviews. We interviewed 39 Caçaras from the community of Praia do Sono and 10 managers/staff from Juatinga Reserve where Praia do Sono is located; and 22 Caçaras from the community of Tarituba and 5 managers/staff from Tamoios Ecological Station – an area used by Tarituba fishers. Overall, the concept conservation was associated with good environmental conditions and maintenance of natural resources sustainability. Good environmental conditions were related to not polluting, throwing garbage or sewage directly into the environment. Resources sustainability was related to respecting resources reproductive cycles and maintenance of stocks in order to

sustain local culture and livelihoods. Caçaras and PA staff perceive conservation measures such as PA as being both negative/harmful and positive/beneficial to the communities. It is common sense that PA implementation restricted Caçara livelihood options: e.g., shifting cultivation and hunting at Juatinga Reserve and fishing at Tamoios Station. On the other hand, it contributed to gradually reducing some destructive practices related to wildlife in Praia do Sono and allowed for Caçaras to ‘re-signify’ its relation with some species which has favored eco-tourism at this community. At the Tamoios Station, the negotiation process leading to an agreement with Tarituba fishers tends to allow artisanal, low-impact, fishing and restrict trawling and other more destructive larger-scale fishing. Our data indicates that there is no consensus among Caçaras on who is responsible to conserve nature. Among PA managers and staff, some

understand that it is responsibility of the entire society and some of the government. Although ongoing changes in management and conservation strategies may benefit both conservation efforts and Caçaras livelihood, a broad understanding of an integrated management approach, engaging local users and managers in conservation effort is still incipient, hence ecosystem stewardship needs to be fostered in these areas.

Keywords: Conservation, Stewardship, Management, Conflicts, Traditional People

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The Rise of Nature Access Institutions in Kyushu, Japan

In this study, I investigated the process of newly establishing and reviving nature access institutions. Moreover, by comparing these institutions, I clarified their characteristics. Access defines an important aspect of the relationship between nature and humankind. Nature access institutions tend to change depending on the characteristics of nature and the times—becoming more open or more closed. Understanding the process of these changes is very important in the study of commons.

During the 2010s, institutions for public access to nature have been rapidly developing in the Kyushu area, which includes seven prefectures—Fukuoka, Saga, Nagasaki, Kumamoto, Oita, Miyazaki, and Kagoshima—located in the southwest part of Japan.

Three newly established and revived institutions are the following: the Kyushu Olle, the Footpath Network Kyushu (FNQ) certified footpath, and the Kyusyu Nature Trail. Kyushu Olle was introduced by the Kyushu Tourism Promotion Organization and owes its origin to the South Korean island of Jeju. The Jeju Olle is a well-known, popular trekking trail in South Korea.

FNQ, a non-profit organization established in 2014, certifies footpaths. Before FNQ was established, some footpaths, such as the Misato, had already succeeded in attracting tourists to the rural area. Many local governments and NPOs tried to replicate this model of success, and FNQ was organized by mainly Misato people to enhance the quality of these new, increasingly popular footpaths established in different locations.

The Kyusyu Nature Trail was established by the National Government as a part of a nationwide nature trail in 1981. The trail is 2,936 km long, winding through all seven prefectures in Kyushu. Some parts of it attract many visitors and are well maintained, but other, poorly maintained parts have almost disappeared. Volunteers who were attracted by the trail and concerned about the poorly maintained area established the Kyushu Nature Trail Forum in 2012. The Forum aimed at reviving the trail in collaboration with local residents, volunteers, related groups, and national and local governments.

To study the physical characteristics of these nature institutions, I conducted an on-site survey of each institution's trail. In addition, I interviewed staff members of related organizations, such as local governments, the national government, and NPOs, to study the process of establishment and revival. Through these investigations, I also clarified the characteristics of Japan's newly established and revived nature access institutions.

Keywords: Open Commons, Nature Access Institution, Kyushu Olle, Footpath Network Kyushu, Kyusyu Nature Trail

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Rebuilding commons for addressing issues associated with food production efficiency and agri-environment: A new institutional approach for collectively managing individual farm lands in Japan.

The agricultural sector in Japan is now experiencing a drastic structural reform, in which large-scale farmers are expanding their farming sizes by renting farm lands from small-scale farmers retiring from the sector. Consequently, the share of large-scale farmers with their holding size greater than 15 ha has increased from around 4 % in 2000 to 13 % in 2010. Although the farming size has been increasing, the production efficiency has not improved proportionally because of the scattered farm plots that each large-scale farmer cultivates. The majority of rental transactions are made bilaterally between landowners and cultivators, which are based mostly on mutual trusts. There is no guarantee under this process that a farmer could rent a land that is adjacent to a plot the farmer has already cultivated. Scattered plots hamper the production efficiency by decreasing the working hours of agricultural machinery in each plot. The Government has been trying to address this issue by establishing land banks that would rent lands from retiring farmers and lease them to large scale farmers. The land banks could contribute to consolidating scattered plots especially when the majority of landowners decide to lease their lands to the land banks. However, this arrangement has two issues; one is that many landowners would still prefer bilateral transactions with farmers whom they could trust, which would damage the ability of this arrangement to consolidate scattered plots. The other one is that it would become difficult for those who used to be farmers and are now landowners living in agricultural villages, to plan how their lands in each village should be utilized collectively.

This is an important factor for those living in villages because each village and houses in a village are surrounded by farm lands, and therefore how they should be used could affect the landscape and environment in each village. Once landowners lease their lands to the land banks, they would have no control on how their lands would be used. We propose a new institutional approach, in which landowners of each village form the association of landowners and each association would determine to whom they should lease their lands and how their lands should be used. This arrangement would allow scattered lands to be consolidated easily and preserve the landscape and environment in the village. We found an example of this arrangement among 1600 agricultural villages in Shiga Prefecture (there are 47 prefectures and 130,000 agricultural villages in Japan). Based on the analysis of this extremely rare example, we will discuss how private properties could be managed collectively, which contributes to both improving production efficiency of farmers as well as preserving landscape and environment. More importantly, this discussion could have a potential of developing a new idea as to how new types of commons could be developed to provide collective goods after commons were transformed into private properties.

Keywords: Agricultural lands, Associations of land owners, land banks, landscape, scattered land plots

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The forest-food paradox: Rethinking Nepalese community forestry in the face of food insecurity

Nepal is facing escalating challenge of food insecurity, with nearly 3.4 million people identified as food insecure in the recent years. Being an integral component of rural livelihoods system, the forest sector cannot afford to ignore such national development challenge. Community forestry has a particular role to play, as the poor have limited access to private land for food cultivation. This paper analyses what we term ‘forest-food paradox’, as reflected in Nepal’s forest governance, and then explores ways to reframe community forestry system. It is based on a review of forest governance literature, policy documents, recent fieldwork in Lamjung and Kavre districts in central and western Nepal. The paper has two analytical objectives. Firstly, we explicate the forest-food paradox focussing on two important dimensions. On the one hand, communal land has been found to be crucial to the livelihoods of the poorest households. As such, forest areas in the agricultural landscape in the Nepal hills are integral part of rural livelihoods system. On the other hand, the current policy and practice of forest governance continue to promote natural forest vegetation without paying attention to food crops. The existing regulatory system is designed to enhance traditional forestry practices, without looking at opportunities for enhancing food security. Furthermore, the recent forestry policy emphasizes ‘forestry for prosperity’ but still continues to reinforce conservationist approach that denies any linkage between forest and the food security agenda. Secondly, we trace the

roots of this paradox in the underlying institutional regimes of agriculture and forestry, identifying drivers to food insecurity. Using examples, we show that food security outcomes depend on how forest and agriculture are managed as unified systems, and rural poor are forced to pay the price when forest is delinked from the wider food system. Based on this analysis, we conclude that conservative orientations that persist even in the community based forest management are detrimental to food security in the developing world, and there is a need for urgent and fundamental reversal in the way forest management is handled in isolation from the agenda of food security. Drawing on our recent action research funded by Australian Center for International Agricultural Research, and implemented in partnership with Nepal Department of Forest, we identify critical policy insights for resolving the forest-food paradox.

Keywords: Food Security, Community Forestry, Forest Governance, Action Research, Innovation

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Alleviating Malnutrition of the Tribal Families in Rural India – A Case Study of Kollihills – An Agro Bio Diversity Hotspot Region in India

Home garden provides nutritious vegetables and fruits for a healthy diet in many rural families of India. Structured and unstructured gardens with diverse vegetables, greens.

legumes, root crops and fruit trees were established in Valappur region of Kolli hills under the joint research programme of M.S Swaminathan Research Foundation, Chennai with University of Alberta, funded by CIFSRF, Canada. Besides addition of greens and vegetables in a tribal farm family's food basket, twofold increase in vegetable consumption (from 4kgs/month/family to 7.5kgs/month) were observed among the families studied. Adoption rate of home garden increased from 10.3% (2011) to 57% (2013) from the 804 households studied. Major constraints faced by the participants are inadequate water, damage from backyard chickens and animals, non availability of seed materials. Periodical nutritional awareness training, selection of place, fencing, selection of suitable vegetable crops including local greens and herbs, practicing of crop rotation, seedlings production in trays, cooking demonstrations, water management practices, caring plants for pest and diseases, own seed production are crucial elements in determining the sustenance of home gardens under dry land conditions as per the perceptions collected from participants. Easy access to fresh organic vegetables at the homestead, reduced expenses on food, diversity in the diet, increased exchange of vegetables among the family members and neighbours are major benefits participants gained.

Study Area: Kolli Hills in Eastern Ghats is one of the agro-biodiversity hotspot in India having diversity of nutritious millets, vegetables, herbs and fruits. Traditional food habits are increasingly under pressure due to the invasion of cash crops, poor socio-economic status of hill dwellers, of course, poverty and malnutrition. Valapur village is one among the 14 revenue village located in Kollihills of Tamil Nadu with more than 2100 households highly depend on agriculture for their livelihood. Under nutrition, anemia and protein deficiency is prevalent among the men, women and children as like any other hot spot region in the country.

Research Question: Do promotion of home gardens, training and capacity building of men, women, children increase the nutritional status, knowledge, changes in food habit, increased dietary diversity of the family in particular, women and children?

Objective of the study:

- Introduction of home nutrition gardens to each household help increasing consumption of fruits and vegetables, thereby increasing family nutritional status
- Training, cooking demonstrations, behaviour change communication help changing food habits among the participants of each family

Methodology:

- Conducting baseline, midterm and final surveys (home gardens, dietary survey, food frequency etc),
- Participatory Rural Appraisal and Focus Group Discussions
- Implementing structured and unstructured home gardens, vermicompost pits and growing various vegetables as per calendar of operation.
- Behavior change communication through Street theatres, food meals, convention, video films, training and capacity building of local volunteers and at least one member in a family.

Results and Discussions:

- 80 % increase in vegetable consumption (from 4kgs to 7.5 kgs /month/ HH)
- Two fold increase in Consumption of greens and legumes among women participants
- Dependency on local market and shops for vegetables reduced.
- Expenditure for purchase of vegetables reduced and surplus used for children education purpose and purchase of hens, eggs etc.
- Nutrition awareness among family members increased.
- Drudgery in fetching vegetables from distant markets curtailed.
- Increased adoption of Good Home gardening Practices like seed collection, nursery raising, adoption of crop calendar, vegetable diversity, water and pest management, mulching, compost application
- Revival of Social network established - Exchange of surplus vegetables to neighbor/group members
- Decision making capabilities of women increased

Keywords: Home Nutrition Garden, Malnutrition, Tribal Families, Kollibills

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Fishers' knowledge can improve spatial planning for conservation and fisheries management in a tropical floodplain

The scientific knowledge on protected freshwater no-take areas is still scarce if compared with marine ecosystems, despite some successful co-management initiatives. Moreover, lack of enforcement, conflicts with local fishers, and lack of scientific knowledge are additional challenges to the establishment of freshwater protected areas in the Brazilian Amazon, where fishing pressure and habitat alteration (impoundment of rivers) may reduce fish supply. We applied fishers' local ecological knowledge about fishing grounds and fish biology to indicate potential sites to establish no-take protected areas in the lower Tocantins River (Brazilian Amazon), downstream of a large dam. We georeferenced 125 fishing spots based on the information provided by five knowledgeable fishers from four fishing villages. These were also spots regularly used by fishers, according to our sampling of 590 fish landings. We also conducted two meetings with experienced fishers from these four communities, who indicated in a map (mosaic of a satellite image with 30 m resolution) some other fishing spots and relevant sites for fish spawning, for conservation (protected areas) or both. We did 48 samples of the fish assemblage using gillnets of varied mesh sizes in 12 floodplain lakes, resulting in 10,378 fishes collected during four hydrological seasons. We also analyzed data from fish samples provided by the staff from Eletronorte, the company that runs the Tucuruí reservoir, from 17 lakes (28 samples, 1,870 fishes) and six sites in the main river channel (135 samples, 27,417 fish). We visually checked the reproductive stage of fishes ($n = 1,713$ randomly selected fishes in the 12 lakes we sampled and all fishes sampled by Eletronorte), to calculate the proportion of reproductive mature fishes in each lake and river site. Most ($n = 47$) of the fishing spots were located in tributaries of the Tocantins River, 29 were located in backwaters (lakes connected to the river), 24 in lakes, 17 in the main river channel, and 8 in flooded camps, and each village had their own fishing spots. The fish spawning sites recommended for protection by fishers were mainly lakes. The observed mismatch between fishing grounds (in tributaries) and suggested protected sites (in lakes) would reduce conflicts with local fishers, thereby favoring compliance and facilitating enforcement. However, this may also indicate that fishers strategically avoided protected areas in their preferred fishing grounds. Although not

statistically significant, we observed a higher average proportion of reproductive mature fishes in lakes (30.2 %) than in the main channel of the Tocantins River (23.3 %). While in the sites of the Tocantins River no more than 30 % of fish were spawning, six lakes (including those indicated by the fishers) had more than 50 % of fish reproductively mature, and two lakes had more than 70 % of spawning fish. Therefore, fishers' knowledge provided ecologically relevant advice to spatial planning, which may aid to establishing no-take areas in selected lakes and exclusive territorial rights to local fishers in tributaries, supporting future co-management initiatives. These measures could improve fisheries sustainability and help to mitigate potential adverse effects of river impoundments.

Keywords: Co-Management, Small-Scale Fisheries, Mapping, No-Take Areas, Zoning

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Complex disasters: Nicobar Islands in the aftermath of the 2004 tsunami

The Asian tsunami has clearly revealed the vulnerability of coastal communities with respect to dealing with ecological hazards. An area that was highly affected was the Nicobar Islands, an archipelago belonging to India located in the Bay of Bengal. Critiquing disaster management and humanitarian aid structures, the paper looks at how an indigenous, subsistence, island community of hunters-and-gatherers were transformed into an aid dependent, monetary economy embedded in the regional market. Results from a computer simulated model reveal unsustainable trends triggered off in terms of material and energy flows after the tsunami, land use changes, and time use requirements for the local population to meet its present consumption. The new metabolic profile goes hand in hand with social conflicts and institutional change affecting leadership, social coherence, family structure, and self-reliance. In introducing the notion of 'complex disaster' the presentation reveals the inherent metabolic traps in terms of the islands' sustainable future, both ecologically and institutionally, and the role of disaster response in driving them to their biophysical and social limits as islands in the aftermath.

Keywords: Disasters, Nicobar Islands, Tsunami, Institutional Change, Metabolism

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Governing Common-pool resources: Can Payment for Ecosystem Services (PES) Deliver?

Market instruments such as Payment for Ecosystem Services (PES) emerged as a concept to compensate and encourage landowners and local communities to improve land management

practices for the maintenance and provision of ecosystem services. Since the beginning of the 1990s hundreds of PES schemes have been implemented all over the world (prominent among them is REDD+) with varying levels of success. The paper presents results from analyses of 40 PES cases in Latin America using an impact matrix. We evaluate each PES case across several criteria related to ecosystem type, compensation package, incentives, spatial and temporal scales and institutional arrangements. The outcomes are grouped as successful, partially successful and not successful cases. This classification generates a typology of PES schemes that provides information regarding how program factors determine the potential for success or failure of a given PES scheme. Based on these findings, the paper explores the potential of market instruments in the governance and management of common pool resources.

Keywords: Common-Pool Resources, Ecosystem Services, PES, Governance, REDD

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People's Initiatives to Conserve and Develop Traditional Tanks / Lakes in Cascades in India for improving Livelihoods, food security and Water Use Efficiency

India receives an annual average rainfall of about 1200 mm, concentrated in four months of the monsoon. But the distribution is so erratic and varied that the rainwater has to be conserved for use during the rest of the year. There is a growing awareness among the policy makers to provide water security to all. Irrigation tanks (Traditional water harvesting structures called Lakes) are our heritage handed over to us by our ancestors and are the lifelines of villages. Tanks are small irrigation structures predominantly serve small and marginal farming communities to sustain the agriculture production by supplementing the monsoon rains for improving the livelihoods. There will be festivities in the villages if its irrigation tanks get filled. A proper maintenance of the tanks will prevent famine, starvation and unemployment and bring in prosperity. In most of the Southern states in India, the major threats to tanks are mainly from the encroachers, inefficiency in the functioning of tank system and improper use by the government itself, it is affecting the livelihoods of the poor small and marginal families drastically. India has about 5,00,000 irrigation tanks of which around 1,60,000 are situated in Andhra Pradesh, Tamil Nadu and Karnataka States. Their performance efficiency also has been deteriorating due to inadequate maintenance and neglect. These tanks are mostly spread over rural and drought prone areas and the users are predominantly small and marginal farmers having land holdings of around one hectare each or even less. Their livelihood depends on such small water bodies called minor irrigation tanks. Many of these tanks are hydrologically linked in chains (called tank cascades) that cut across administrative boundaries. With deteriorating tank systems, marginal and small farmers are increasingly at the mercy of monsoon and are forced into a cycle of deprivation and debt. DHAN Foundation, a not-for-profit Non Governmental Development organisation since 1992 demonstrated successfully at grassroots in rehabilitation of over 3,200 traditional irrigation tanks with community empowered nested institution approach. Due to this effort, around 3,20,000 families got

incremental benefits in addition to assured water supply for crops for irrigation. But, the Govt. support for the rehabilitation of tanks is lacking. So, there is a strong felt need for reviving the traditional tank irrigation systems to their original standards with strong political will so that the surface water storage capacity could be enhanced substantially with lesser costs than looking for new infrastructures for water resources development in India. Traditional tanks are considered as flood mitigators due to their equitable water distribution among hydrologically linked tank cascades. They are also seen as drought mitigators. The paper describes the methods by which people's participation is mobilised, their capacity is built up and local management is ensured, all of which aimed at improving the water use efficiency, alleviating their poverty and enhancing their livelihood. This paper analyses the revival of tank cascades in Nalgonda district of India with participation of relevant stakeholders to improve food security and livelihoods of the poor families.

Keywords: Tank (Lakes) Rehabilitation, People's Involvement, Ensuring Food Security And Water Use Efficiency, Participatory Irrigation Management, Livelihood Enhancement

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Public Policies to Enable Community Forests in Canada

The recent downturn in the Canadian forest sector led to widespread negative socio-economic impacts in forest-based communities. The resulting crisis, in combination with an evolving legal context that increasingly supports Aboriginal and treaty rights in relation to traditional lands, has triggered a fundamental rethinking of relationships linking forest-based communities, governments and industry to create a sustainable future. In response, various actors throughout the country are promoting community forests within the country's forest commons. Advocates see this approach as being most effective to build resilience in forest communities and ecosystems by activating forest resource development opportunities, local benefits, and social responsibilities. This presentation is part of a panel that will address the bridging of practice, research and advocacy among academics and civil society to advance community forestry. The presentation will provide an overview of community forestry in Canada focused on provincial government policies, a key tool in enabling or impeding the establishment and success of community forest initiatives.

Keywords: Canada, Collaboration, Community Forestry, Public Policy

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The Context for Development in Ontario's Far North

Ontario's Far North comprises of 455,000 sq km and 42% of Ontario's land mass. This boreal forest and tundra territory is homeland to over 30 Anishinaabe and Cree First Nations that are signatories to Treaty #5 (1875) and Treaty #9 (1905 & 1930). These communities are "remote" with most of them being fly-in reserves with no road access other than winter ice roads. This

land had been traditionally used by these First Nations in common for hunting, fishing, trapping and gathering. While the area has been a historical commons for First Nations, since colonization the territory has been under the control of the Province of Ontario. The Far North is an area ripe for development, especially minerals, but also a target for increased protection of what is oft called the “intact” boreal.

To facilitate both development and conservation, Ontario passed the Far North Act in 2010. The Act sets out a framework for community based land-use planning where land will be segmented and categorized into land use parcels. These categories are under development, but it has been stipulated that 50% of the land will be an interconnected network of protected areas. Land use planning is meant to occur before major resource development activities can start (i.e., mining, forestry, hydro transmission and generation, road construction and/or rail).

This presentation is part of a panel that will investigate the merits of resource development from various perspectives, including how both provincial and federal governments approach development in the Treaty #5/#9 territory and how this contrasts with First Nation perspectives about land use. The presentation will provide an overview of development, which includes both natural resource extraction and conservation initiatives, such as the establishment of protected areas, in the Far North, including enabling policies such as the Far North Act, community-based land use planning, the development of a Far North Strategy and Ontario’s commitment to protecting 50% of this area.

Keywords: Boreal, Indigenous Peoples, Ontario, Northern Development, Land Use Planning

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Is your program resilient? Lessons from testing resilience in the Sahel

There is a new trend in the development community aimed at building resilience. To truly understand this process, Mercy Corps has designed a theoretical framework and measurement process to test the resilience of our development work across the globe. This includes asking relevant questions for each specific context in order to frame a project in resilience terms: Resilience... to what shocks and stresses? ... for what spatial and temporal scale? ... for which groups? ... through what capacities? In the context of the Sahel, we are testing several hypotheses stemming from a specific theory of change for Mali, Niger, and Nigeria. The theory is that it is possible to create more resilient social ecological systems for rural, natural resource-dependent communities in the Sahel in the face of rainfall hazards, conflict, and associated political and economic change. We hope to test several concepts that have shown in past research to promote resilience. These include: strengthening the social networks of female heads of households, financial integration of marginalized groups to build their capacities, protecting and sustaining commonly shared resources, building adaptive management processes, and supporting iterative learning processes for rural users.

Our initial research began in 2014 with a gender assessment in Niger and Mali. This supported the development of theories of change. By March 2015, two vulnerability and capacity assessments will be completed in Nigeria and Niger. The purpose of these assessments is to

frame current projects in social ecological systems resilience and clarify the complexities of the various contexts. The presentation will focus on the results from the three assessments and anecdotal evidence from all three countries. Specifically, we will explain the iterative learning process that has been ingrained in all our project work as a result of the resilience initiative, impact from our resilience programming, and how and why adaptive management promotes the process of resilience in development.

Keywords: Social Ecological Systems, Resilience, Sabel, Common Pool Regimes, Financial Inclusion

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The production of contested landscapes: Changes to ecosystem services in the Sahel

In the Sahel, land degradation is caused primarily by agriculture and overgrazing, and is exacerbated by high rates of rainfall variability resulting from climate change. Access to commonly shared ecosystem services provided by soil, water, and forests can shift between user groups (pastoralists and agriculturalists) based on how institutions manage land. Land use change, promoted by the greater frequency of drought events in the dryland systems of the Sahel, such as conversion of pasture to cultivated land has the tendency to further degrade soil, increase runoff, and create conflict with users who rely on pastoral resources. While regenerative methods such as planting nitrogen-fixing trees in degraded areas has promoted what some have called the “greening” of the Sahel, such change is not widespread and does not necessarily resolve land use conflicts. Using remote sensing methods for change detection and time series analysis, as well as qualitative analysis of environmental histories, this article evaluates the inequities of current changes to ecosystem services in common pool regimes in Niger, evaluated for both pastoral and agro-pastoral livelihoods.

The case study focuses on Tahoua, Niger using a mixed method approach. Remote sensing high-resolution images such as Quickbird-2, WorldView-2 and RapidEye allow for the detection of adaptation and changes to specific ecosystem services (enclosures in pastoral areas or around seasonal lakes). The temporal development in these regions was then analyzed for a period of 14 (2000 – 2013) years using time series from the Moderate Resolution Imaging Spectroradiometer (MODIS). Satellite images demonstrate the detection of changes to ecosystem services, like the increase of gardening, the presence/absence of fences, or the dynamics of seasonal lakes, and these are related to concurrent weather fluctuations. In the same spatial region, we chose three villages in the different rainfall zones and performed more than 117 qualitative and expert interviews to assess the changes to ecosystem services for users within both rain-fed agricultural and pastoral systems. Results over a 14-year timescale show that cultivation is spreading even in the highly contested, government-designated ‘pastoral

zone,' despite that this is maladaptive for pastoral livelihoods. Moreover, irrigated agriculture has grown significantly around ephemeral lakes in the same timescale, showing significantly higher percentage of enclosures. Most users perceive that the benefits supplied by ecosystems in the Sahel are waning as a result of multiple forces, yes perceptions of needing to "adapt" through these measures promotes a consistent downward spiral for which the common spaces are becoming more and more contested. The dominant perception is that degradation of soil and pastoral resources is promoted by cultivation. These 'divergent' adaptations are supported by inequitable or corrupt institutional practices, which are shifting the entitlements to water-based shared ecosystem services and enabling dominant groups to enclose and cultivate such areas. Understanding and evaluating changes to ecosystem services using this combined method of remote sensing and qualitative research can support and promote sustainable ecosystem management, especially in the context of climate variability.

Keywords: Ecosystem Services, Sahel, Climate Change, Adaptation, Pastoralist, Remote Sensing, Conflict

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Resilience and institutional arrangements related to the use of forest resources in a Reserve of Biosphere in Cuba (POSTER)

The future of forest resources depends largely on the ability of man to build new institutions or improve those that exist for sustainable management. Human institutions currently operating, a product of a historical utilitarian relationship of man with nature, affect the environment resilience, which can be solved with the development of effective management institutions, but there is no consensus about such institutions (Moran, 2011). The Reserves of Biosphere (RB) are an attempt to reconcile nature conservation and human development. This poses a great challenge, because to ensure the sustainable use of natural resources in harmony with nature conservation need the development of effective regulation and control of productive activities. The failures in the institutions that regulate the functioning of RB leads to inappropriate use of natural resources and, therefore, their degradation over time, and also affect development projects of local communities (Brenner, 2006; Yang & Xu, 2003). Assess the resilience of an environmental system is to make an exploration of the relationships within that system. The core of such exploitation is the discussion of hypotheses about the interaction of the system components and analysis of what makes the environmental system persists. This paper proposes a case study of a RB in Cuba addressing the following issues: Institutional arrangements for resources use in the RB are being effective in the management and conservation of forest resources? This system is resilient to these institutional arrangements? Thus, identifying the actors, forest uses and institutional arrangements in this context, we intend to understand the relationships between man and forest of this RB and the feedback mechanisms between the social and ecological domains.

Keywords: Institutional arrangements, resilience, forest resources, Reserve of Biosphere, Cuba

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Barriers and Bridges to Including Traditional Ecological Knowledge in Land Use and Resource Development Planning in British Columbia

Land and resource ownership and management are culturally defined concepts. Since the earliest contact between European settlers and First Nations peoples in BC, there has been no common agreement on land ownership and associated resource use. Ethnobotany and ethnoecology have many practical applications in examining and integrating cross-cultural systems of land and resource planning and management in British Columbia (BC). These research areas have been successfully used in legal contexts (cf., *Tsilhqot'in Nation v. British Columbia*, 2014 SCC 44); however, they have even more to offer to policy and development planning outside the court system. Although there have been significant efforts over the past two decades to incorporate Indigenous knowledge and perspectives into land and resource planning, over 90% of the lands in BC are currently under dispute, due to the lack of clarification of Aboriginal rights and title. Consequently, public land use planning and resource development remain in a state of deep confusion and uncertainty. Ethnobotanical and ethnoecological research, we propose, can be a powerful tool to help non-Indigenous people comprehend the complex web of relationships governing Indigenous practices, cultivation, and management of diverse plant populations in numerous habitats used continuously for millennia. Why then, with these powerful tools at our disposal and an ever increasing body of traditional ecological knowledge research to consult, is Indigenous knowledge of the land and resources seemingly ignored within the public planning system, outside of specific court cases? Our paper will identify practical applications of ethnobotany and ethnoecology in this context and will discuss both the value and limitations of these fields in providing a conceptual bridge from Indigenous ways of comprehending and managing the environment to scientific and public planning concepts and management regimes.

Keywords: Ethnoecology, Indigenous Knowledge, Resource Development

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Womyn, Water, and Well-Being: Looking at Indigenous Knowledge Downstream from Alberta's Tar-sands

Globally, natural resource development impacts Indigenous peoples' land base, water sources and interferes with access to traditional food sources (Downie 2003). Fort Chipewyan, a small Indigenous community in Alberta, downstream from tar-sand extraction, is dealing with large impacts from oil and gas developments. The extent to which pollution from tar sands' industrial activities in northeastern Alberta, affects ecosystem and human health is a matter of growing international concern (Timoney 2007). The Athabaskan Fort Chipewyan people have begun to learn that their traditional foods contain foreign contaminants, which may result in families ceasing to eat them; with no ready alternatives in remote Fort Chipewyan, the

communities' nutritional and cultural concerns are compounded (Schindler 1998). Local Elders have noted the declining availability of traditional foods due to intensive industrial development in the oil sands region, hydroelectric developments, and competitive hunting and recreational harvesting (Nation 2003). In this research I explore the connections between their relationship with the land in Fort Chipewyan and a sense of well-being; 'being alive well' in a Cree cosmology means that one is able to hunt, to pursue traditional activities, and to eat traditional foods (Adelson 2000). This presentation will provide an Indigenous feminist critique of development impacts while sharing Indigenous womyn's stories from Fort Chipewyan that demonstrate resilience and how their day-to-day practices on the land embody resistance.

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The impact of institutional heterogeneity: A mixed methods approach to understanding management outcomes of the invasive mile-a-minute weed (*Mikania micrantha*) in Chitwan, Nepal

Previous research has conveyed the important role that institutional arrangements play in mediating relationships between communities and the environment in social-ecological systems. Chitwan, Nepal is a rapidly urbanizing region adjacent to the internationally important Chitwan National Park. Community forests were formally established in the region in the mid-1990s in order to provide residents opportunities to collect forest products and timber in forests that were largely self-governed. While the community forestry program in Nepal is considered one of the most successful in the world, a new social and ecological threat looms with the increasing invasion of the mile-a-minute weed, *Mikania micrantha*. The purpose of this study is to understand how selection of various institutional arrangements has or could affect the sustainability of the social-ecological system (SES). Little is known about the impact of differential institutional arrangements on the management of *Mikania micrantha* in community forests in Chitwan. Based on 29 semi-structured interviews conducted with 87 people in June 2014 in five case study community forests in Chitwan, differences in institutional arrangements and *Mikania* management efforts and outcomes are explored. An institutional analysis informs an exploration of differential governance capacity and collective action related to *Mikania* management, while a content analysis provides an understanding of reoccurring themes in the interviews and their implications for future social and ecological outcomes in the community forests. We find the relationship between governance capacity and collective action related to *Mikania* removal is multifaceted, with governance capacity and collective action similar in some forests, but diverging in others. The complex institutional relationships and regular themes of distrust of government and non-government officials help to explain collective action efforts. These and other factors influencing collective action are explored in depth in these heterogeneous community forests. Additionally, the content analysis suggests that *Mikania* is impacting social relationships and people's daily lives but the degree of severity and the response to the disruption varies substantially and is heavily impacted by other problems experienced in each community forest. Both the content and institutional analyses contribute to better understanding of the different dimensions of *Mikania*'s impact on the social-ecological system. These results have implications for successful efforts to manage the invasive *Mikania* plant, and other invasive plants, in the future.

Keywords: Nepal, Mikania, community forests, institutional analysis, content analysis

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New Models for Redefining the Commons: Local and Governance Success

Failure to make and implement land governance policy through local institutions has contributed to frequent failures to realize objectives in both the land sector and development programs and projects. Thus, decentralization, and sometimes devolution, is currently being embarked upon across the globe. But, what are the best ways to implement these changes? This paper first examines examples of successful land governance by different forms of local institutions: (1) decentralized or devolved local government institutions with broad mandates that are capable of meeting new land governance challenges; (2) a variety of local institutional forms and innovations that have enabled local communities, including indigenous communities, to participate effectively in decisions over the land they use; (3) changes in the roles of customary land governance institutions, and (4) user-group institutions created to access and manage publicly-owned natural resources under government supervision. Examples are drawn from Africa, Asia, and Latin America. The paper then draws some conclusions about the factors that are critical to the success of local land governance institutions: (1) the institution's rights over the land it governs; (2) the incentives of the institution to undertake the governance task and related institutional reforms; (3) the organizational capacity and inter-institutional linkages of the local institution; and (4) the enabling roles played by other actors. Finally, some recommendations are ventured.

Keywords: Commons, Local Land Governance Policy, Development, Decentralization, Devolution

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Science and Practice Toward Building Social-Ecological System Resilience: Experiences From a Pilot Project in Taiwan

Scholars and practitioners are increasingly recognizing the important roles of transformation processes in which people proactively pursue social-ecological system resilience (Olsson et al., 2014). In resilience literature, there have been some well-documented case studies, e. g. the Ecomuseum Kristianstads Vattenrike (EKV) in Sweden (Olsson et al., 2004). Resilience scholars also have established a comprehensive analytical and action framework (Chapin et al., 2009; Resilience Alliance, 2010). How scholars and practitioners can work together toward building social-ecological system resilience, among numerous transformation issues, represents a topic with both academic and practical significance. The journal *Ecology and Society* has recently issued a special feature “Science and Practice of Ecology and Society”, in which 9 articles from various social-ecological settings addressed this specific topic. The inquiry into this topic, however, is generally still at its early stage, and therefore deserves more in-depth research.

Our study aims to investigate the above concerned topic in a specific setting. In Taiwan, local communities are usually deeply trapped in the poverty trap during rapid socio-economic and environmental changes, while the state-centric natural resource management regime is typically characterized by rigidity trap syndrome.

The Taiwanese academic community of environmental studies is not used to transdisciplinary collaboration. Moreover, for both scholars and practitioners, resilience thinking remains a newly emerging framework with which they are still unfamiliar, whether conceptually or practically. Under these circumstances, authors of this paper chose a specific social-ecological system, and launched a resilience-based pilot study in 2012 that has rarely been conducted in Taiwan.

In this study, we investigate the long-term dynamics of a social-ecological system, the Danungdafu Forestation Area (DFA), which represents one of the most controversial case concerning land use, indigenous rights, and environmental issues in Taiwan. The joint project includes 6 sub-projects, and studies the SES from transdisciplinary aspects: ecosystem processes and services, citizen science and environmental education, environmental performance index, economic evaluation, and governance institution. By applying the Resilience Assessment Framework, the study begins by describing the system and

understanding system dynamics. This is followed by the task of evaluating system governance. And then, findings are synthesized, and transformation processes are initiated toward a resilience-based stewardship, which may involve single-, double-, or even triple-loop learning. The study attempts to answer the following questions: How a resilience-based research project affects those initiatives taken by communities, government authorities, and the research team itself? How practitioners and scholars interact in the subsequent processes? And finally, how initiatives and interactions change the status of SES resilience after the research project was launched? We believe that, in the special context of Taiwan, these findings might represent valuable feedbacks to the existing resilience thinking framework.

Keywords: Social-Ecological System, Resilience, Stewardship, Transformation, Taiwan

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How did policy intervention work out for forest commons in Japan? An analysis of time-series, prefectural data

Since the inauguration of the Act on Advancement of Modernization of Rights in Relation to Forests Subject to Rights of Common (Act No. 126 of 1966), the Japanese government has promoted the so-called "modernization of forest commons," i.e., the creation of modern (group or individual) property ownership out of Iriai-type (customary rights) forest management schemes in Japan, which were estimated to constitute about 8% of all forests in Japan. Over this period, the creation of modern property ownership has slowed down, but by the year 2010, in terms of area, 36.5% of Iriai forest commons in Japan had been "modernized." This paper examines the factors that are correlated with the creation of modern property ownership in 45 prefectures in Japan and evaluates the consequences of this policy. It is found that the member size of forest commons and the ratios of plantation forests in each prefecture are negatively correlated with the creation of modern property ownership; strength of unity among members (e.g., rights allocation to new residents, etc.) is positively correlated with the creation of modern property ownership; strength of Iriai-type management (e.g., loss of rights after leaving the village, etc.) is positively correlated with the creation of group ownership; and that past labor contribution is positively correlated with the creation of individual ownership. A close examination reveals that the economy of scale in the creation of modern ownership turns into a dis-economy of scale at around 201 households. The possibility that Iriai-type characteristics remain in forests of modernized ownership is identified. Possible policy intervention should be targeted to certain types of commons forests, depending on the strength of Iriai characteristics, with policy instruments modified for each type.

Keywords: Forests, Iriai, Japan, Statistics, Modernization, Ownership

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Polycentralization of Urban Governance and the Role of Law to Open Community Boundaries: Legal Geography of Business Improvement Districts in San Francisco and New York City

Early studies by Elinor Ostrom focused on ways of providing urban public goods in metropolitan areas. She argued that a polycentricity of public and private agents and community-based organizations providing services performed better.

In recent decades, American metropolitan cities have promoted the creation of Business Improvement Districts (BIDs) in their central areas, delegating to them responsibilities such as the management of public space, provision of public safety, and cleaning services. The BIDs, which are community-based organizations run by private property owners within the district, have succeeded in general at reducing crime rates and at economic revitalization. This success is often explained by Ostrom's theory. David Harvey, however, criticizes BIDs for the increase in property values; excluding the homeless, street vendors, and activists from public spaces; and changing these spaces into commercialized, homogeneous areas. More theoretically, he notes that Ostrom did not consider the type of legal framework required to control the polycentric governance and enable dialogues between multi-level agencies and among people.

This paper considers the legal-theoretical question raised by Harvey, based on long-term participatory observations of BIDs in San Francisco and interview surveys in New York City. By examining this question, this paper aims to characterize the role of law in polycentric governance, which assures a rightness of city.

Keywords: Polycentric; Urban Governance; Property Law and Judicial Review

Vacant Properties: A New Challenge for Commons Studies (POSTER)

Commons Studies have long struggled with the challenges posed by the overuse of finite resources. However, in Japan, where economic recession and population decrease are ongoing problems, the issue of vacant properties, such as abandoned houses, vacant lots, and deserted cultivated lands, has become prominent. This issue arises from the underuse of resources, which produces negative externality to surrounding communities. This paper examines whether Commons Studies can provide a research framework to address such issues, by reviewing the vacant housing policies undertaken by Japanese local governments and communities. I have conducted my field works in communities of Kyoto, Fukui, Nara and Okinawa Prefectures. A review of the policies and practices in other countries is also informative. In France, the central government intervenes to accomplish the active conversion of vacant properties into social housing; in the US, vacant properties are accumulated through cooperation between the courts and land bank systems to prevent the segmentation of properties and to provide greenbelts. In comparison, Japanese policies can be characterized as having no connection with the national housing policy and making less use of judicial mechanisms. In recent years, most of Japan's local governments have enacted ordinances that impose upon the owners of vacant properties the duty of appropriate management. However, municipal legal enforcement action for such ordinances is rare. It is often the neighborhood and community that persuades owners to take appropriate measures, referring to the municipal ordinance. To avoid having to undertake legal action, the municipality relies on this social pressure. Even though vacant

properties often have potential for habitability, the Japanese, timid around strangers, have a tendency to avoid renting or selling these properties on the market, except in metropolitan areas. To reduce the owner's anxiety and to check the personality of a newcomer, there are community-based organizations that serve as mediators between the parties. These community-based approaches are effective, although too much emphasis on the homogeneity of the community—that is often inevitable through such approaches—often has the result of excluding diversity and low-income family. The current analysis suggests that a hybrid approach, drawing from the French view that regards housing not as private property but as a condition of human rights, and the American perspective that relies on Heller's anti-commons theory and the pursuit of efficiency, be blended with the Japanese community approach. To integrate these approaches, appropriate property law theories are needed for us.

Keywords: Under-use Problem, Property Law, Vacant Housing, Anti-commons and Japanese Rural Society

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Local challenges to create new communal management institution in Japan –from 2 examples regarding agriculture and forestry

Under the post-industrial age, the lack of successor both in agriculture and forestry is a major challenge in Japan. After retired elderly generation to support the current agriculture and forestry as the owner and farmers, subsequent generation become owners of the farm and forest by inheritance. However those people are not familiar with in agriculture and forestry during their life time, then their experiences are poor and also willingness of management is thin. Therefore, it will lead the poor management of farmland and forest land. On the contrary, there are many young people who want to do agriculture and/or forestry, but because of some reason like the land ownership system in Japan, the lack of market which treat land selling or lending etc., it is not easy for those new entrant to buy or lend from local land owners.

As for farmland and forestland, individual land ownership is private property and each land owner's and/or farmer's harvest is private benefit from land. However, there are large-scale benefit which is brought by communal land management such as water management, pest and disease control, road network, land scape, and so on. These co-benefits affect significantly individual benefit. Therefore, owners with no motivation are big problem for local agriculture and forestry.

To seek implications for such situation, we have investigated two examples. One is the collective farmland management in agricultural settlement of Shiga Prefecture. In this village, land owner if you lend the farmland retired from agriculture to other farmers in the same village, he has to consult with the land arrangement organization consist of the land owners and farmers of this village. The organization mediates owners and farmers so that farmers can

borrow the land nearby. It means that the organization promotes integration of the farmland. This organization is born from discussions within settlements.

Another example is the case of forestry school operated by Kanazawa City. The objective of this school is the re-education of adults who wants involved in forest management and utilization. Half of the students are forest owner who have not been engaged in forest management. It means that this school educates former no-motivated forest owners how to manage their own forests.

In Shiga case, rural residents have created new organization by themselves in response to the change of agricultural industry. On the other hand, second case, it is the local government which leads to complement the knowledge and skills of inheritance which has been disappear inside rural village. Although the approaches of two cases are different, both examples seek same goal; the regeneration of communal management in agriculture and forestry those have been lost during depopulation and modernization era. Such effort would contribute not only revitalization of primary industry but also creating new registration for the rural and natural resources management.

Keywords: Communal Management, Agriculture, Forestry, Japan, Local Community

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Understanding the Contribution of Parks and Green Spaces to Harare's Residents Wellbeing

Green spaces are parks and gardens used for playing, exercising or enjoying that exist inside city spaces. Urban green spaces are important for improving the quality of life, air quality, reducing the heat island effect, increasing property value due to their amenity and their aesthetic characteristics which attract the eye. Urban green spaces provide social, economic, cultural and ecosystem services which provide recreation and leisure facilities to urban dwellers and tourists. The quantity of green space that exists in a city is measured against its population of all walks of life. Green space draws people outside and fosters social contact. Academic and grey literature was used for this study including random interviews with people found in green spaces and key interviews with Harare City Officials as well as observation on the use of green spaces. Data was collected and categorised into themes for analysis. There is weak evidence for the links between physical, mental health and well-being, and urban green space. Environmental factors such as the quality and accessibility of green space affects their use for physical activity. User determinants, such as age, gender, ethnicity, education, place of residence and the perception of safety are also important determinants of the use of green spaces by residents of Harare. Harare City Council should invest more in green spaces because when residents have more vested interests in a place, their participation in community vigilance increases, and they will watch to make sure that these spaces are not tainted and spoiled. The better maintained a residence or public space is, the safer it becomes. With increasing knowledge, residents choose eco-friendly options of taking public transportation, bicycling or walking to work. This requires eco-friendly green spaces thus the need to spruce up these areas through planting trees and flowers amongst other activities.

Keywords: Environment, Geography, Public Health, Recreation, Urban Green Spaces

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The impact of community based Forest management on Local community Livelihoods in Belete-Gera Forest, Ethiopia

The forest resources in Ethiopia have suffered decades of mismanagement due mainly to loosely defined property relations over these resources. As one of the solutions, Participatory Forest Management (PFM) scheme was introduced during the early 1990s by some NGOs. The system of community forest management (participatory forest management) seeks to initiate the process of eliminating the main causes of forest depletion through participation of local communities and at the same time enhance the livelihood community. This study examines the impact of participatory forest management (PFM) on forest-adjacent households in Belete- Gera forest in Ethiopia. This study reports the experience from Belete-Gera PFM project, which is one of the oldest pilot sites established by JICA and Ethiopia Government. It compares the impacts on households near PFM forests (PFM zones) with those near forests with no PFM zones. The study questions were: does conservation of Belete-Gera forest result in net household income? Does PFM increase net household benefits? And are household benefits uniformly distributed with in the 5km PFM intervention zone? The hypotheses tested were: forest conservation benefits exceed forest conservation costs; PFM zones have higher household benefits than Non-PFM zones; benefits and costs reduce with distance from forest edge. In the year 2009, we collected data on household benefits and costs in PFM and non-PFM zones. Data were collected along 10km transects at 1km intervals, sampling 600 households up to 5km away from the forest. The results show varied household dependence on Belete-Gera forest. The forest benefits exceed costs in PFM zones but the forest is a cost in non-PFM zones, and costs and benefits reduce with distance from forest edge. The study concludes that, though not cheap, PFM is a tool can help the Belet –Gera Forest wins the support of the adjacent local communities.

Keywords: Participatory Forest Management, Forest Resources, Household Livelihoods Belete-Gera

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Polycentricity, competitive governance, and market competition theory and analysis: The potential and the limits of a theoretical analogy

How do we estimate the degree of polycentricity of a system? How do we estimate how polycentric (or monocentric) a system is? How is polycentricity measured? The paper looks at how a similar problem has been tackled for a special case of polycentricity, namely markets.

How do we measure how competitive (or monopolistic) a market is? A fairly elaborate theory of this exists. Can we now go back from this theory tackling a special case, to the general case of polycentricity? To do so we plan to analyze and elaborate the “competitive governance” aspect of polycentricity. We thus want to see what can one learn from the analysis of competitive processes developed in other disciplines, and more precisely we want to see what are the limits of competitive markets/monopolistic competition theories and of the methods of empirical assessment of degrees of concentration of a market, as potential models of conceptualizing and analyzing polycentric orders. How far does the analogy competitive market – competitive governance could go? Could we get relevant insights about the measurement and estimation of polycentricity from the economists’ approaches to competition/monopoly?

Keywords: Competitive Governance, Monopoly, Oligopoly, Market Concentration, Tiebout Competition

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Local people’s perception on the carbon project and socio-economic effect of community based forest management: the case of Soddo district, Wolita zone Ethiopia

Global climate change is causing widespread socio-economic and ecological impacts in the world. CDM & REDD+ are emerging as strategies to mitigate the build-up of greenhouse gases (GHG) in the atmosphere, which are the causes of climate change. Several CDM projects are emerging in Ethiopia, However systematic assessments of their progress, achievements and challenges are scanty. This study was conducted in Wolita zone with the main focus of investigating whether the anticipated carbon based incentives can bring impacts on how locals manage forests and thereby on their livelihoods. Both primary (socio-economic survey and vegetation inventory) and secondary data sources were used for the study. From the result of the socio-economic study it was found that due to the demarcation of land for CFP, most farmers’ loss their farmland. As a result the average land holding by individual farmers has been changed and about 80% of the interviewed farmers possessed < 1.0 ha of land for farming. However, vulnerable social group and forest dependent were assessed and social mitigation strategies were prepared to develop their own livelihood strategy. As an upshot dairy farming, fattening, poultry, and petty trade as supplementary of subsistence were developed by locals using the credit system stretched by the project and about 2.23% formerly food insecure households are now could satisfy their subsistence. This was an indication of initial shift in the livelihood and lowering the reliance on forest for livelihood by the locals. More interesting, farmers (82%) have now developed sense of ownership of the CFP forest and appreciate the project for the conservation and development of their forest. Their participation in the management and protection has increased and 97.78% of the interviewed households were members of the forest user group and benefited from the projects as a daily laborer and guarding. Results from the vegetation assessment also revealed that, the CFP forest found to be with high number of trees, seedlings and samplings of good diversity. The population also found to be with better structure which seemed a healthy population structure as compared to the adjacent non CFP forest block. This might be because of increased protection and the change in trend of forest. More interesting in this study was farmers (58.89%) began planting of trees for subsistence and commercial use thereby reduce pressure on the natural forest. However, complain are still been raised for benefits sharing (41.11%) as there was high expectation for immediate benefit, demarcated farmland as carbon forest (35.56%) and

restricted access to the forest products (75.56%). Moreover, locals strongly insisted compensation and customary rights to be reinstated in a way that allowing them the right to use their former farmland in the forest for cultivation. Therefore, it is unquestioned that these complains should be solved otherwise it will have negative impact on the sustainability and successful intervention of the project. Or else it will abolish the sense of ownership already developed by the locals.

Keywords: Wolita Soddo, Bio-carbon, Forest management, Enrichment plantation, Livelihood, Perception

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Climate Change Mitigation in Russia's Agricultural Sector

Agriculture is not only affected by global warming, but actively contributes to this phenomenon, for instance through the emission of greenhouse gases. One contributing agricultural practice is the burning of harvest residues, which generates high levels of methane and nitrous oxide.

We face the social dilemma that we will all gain from mitigation strategies in the agricultural sector to reduce climate change, but for an individual farmer it might be lucrative to continue the prevailing production practices. In most cases it is not only the individual profit maximization, other institutional factors may constrain a social desirable change.

We take the burning of harvest residues on Russia's steppe soils in the Kulunda region of the Altai rayon as an example. During the Khrushchev era an area as big as 2.3 Mio ha has been converted from steppe to arable land there. Its potential began to be exploited and yet overexploited leading to massive soil degradation in the Kulunda region. One of the contributing agricultural practices, crop harvest burning, usually happens, after grain harvest. Based on statistical data we could calculate for spring 2014 a total area of 76.000 ha of agricultural land under fire in the Altai rayon. Smoke, methane and nitrous oxide contaminates the air, fires spread to adjacent forest and often fauna and flora is badly impacted. Subsequent massive wind erosion afterwards contributes to the soil degradation.

Supporting land-use change, including terminating farming practices that contributes to global warming is partly an economic question, but to a large extent an institutional question in Russia. Institutions, such as property rights on land and the governance structures, such as the advisory or monitoring mechanism, play a central role in the way how supporting policy measures could be implemented in order to become effective at the local scale. Since 2012, we investigate the institutional constraints that hinder a change in farming practices towards more soil-conservation practices including no burning. What are the reasons that let the agricultural producers – despite the banning by law – continue to burn their harvest residues? What are the institutional constraints of the current command and control policy?

We found hampering factors in policy implementation and constraints in the land governance mechanisms: 1) differing and unclear rights and responsibilities assignments between the tenant and the owner of the land, 2) lack of knowledge on environmental policy objectives 3) monitoring problems, 4) ineffective sanctioning and 5) unclear responsibilities of administrative bodies.

Likewise we found strong socio-economic factors that let farmers refrain from changing their production practices: 1) limited innovation capacities, 2) poor environmental awareness, 3) customary habits, 4) aesthetic value consideration, 5) insufficient old technology and 6) lack of investment capacities.

We conclude that a policy which is difficult to monitor and face difficulties to sanction offenders should not be the only mitigation strategy. A comprehensive approach, including educational programs, and environmental-sound conditions for existing payment schemes is needed that take the cultural and technological production facts into account.

Keywords: Crop Harvest Residue Burning, Climate Change, Russia, Institutional Analysis, Policy Implementation

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Analyzing performance and change of SES governance from the Transaction Costs Economics perspective: the cases of drainage management in Uzbekistan and wildlife management in Germany

This paper explores opportunities to facilitate the development of self-governance within the context of concepts about feasible pathways for institutional change. Polycentric governance, network governance and related ideas provide a framework for thinking about the interaction of collective action at multiple scales. This goes beyond simple ideas of top-down and bottom-up to envision multiple directions and forms of interaction. Community involvement in water resources management offers examples of different approaches to encouraging greater self-governance, particularly efforts to encourage organization at community and basin scales. Within a design space, institutions occur in a variety of configurations. The idea of the “adjacent possible” offers one way of thinking about what alternative states may be reachable, and which counterfactuals might be or might have been. Possibilism emphasizes feasible reforms, in contrast to aiming for more remote ideals. Path dependence highlights how earlier institutional changes shape what trajectories may come afterwards. Conceptual frameworks for institutional analysis and development (IAD) and socio-ecological systems (SES) offer tools for mapping institutions and their dynamics, which can be applied to analyzing what may be possible. Civic studies emphasizes how citizens take part in co-creating institutions, highlighting the space for initiative and agency within wider patterns of social co-evolution. Social imaginaries, including concepts such as “commons,” often frame the ways in which issues and aspirations are defined and discussed within epistemic communities. Visionary concepts can emphasize valued goals and processes that help define and guide the growth of good institutions, including related ideas such as flourishing, renewal, “life,” positive deviance, and creative destruction. The organization of governance processes may be influenced through a

variety of means, including information, research, advocacy, policy change, community organizers, and participatory techniques, including multi-stakeholder processes. While interventions are often planned and assessed in structural terms of “establishing” organizations, it may be useful to pay more attention to indicators of collective action in problem-solving and provision of services, and ways of facilitating change in such processes. Based on a review of relevant concepts concerning feasible and desirable possibilities and pathways for institutional change, the paper points out promising opportunities for understanding and supporting changes in self-governance.

Keywords: Governance of SES, Transaction Costs Economics, Wildlife Management, Drainage Management

The institutional economics of climate change adaptation: modeling uncertainty in collective action and collective actors

The literature emphasizes that institutions are key in understanding climate change adaptation. However, it hardly spells out what this means for research on climate change adaptation from an institutional perspective. This paper tries to do exactly that with specific reference to institutional economics. It first presents a definition of climate change adaptation and its relations to an institutional economics research program and distills the key features of climate change from an institutionalist perspective. Key research questions are defined that institutional economics may want to answer in regard to people’s adaptive actions concerning climate change (polycentric/ substitutive adaptation/ uncertainty). Specifically, we argue that from an institutional economic perspective structured work on institutional performance in regard to uncertainty associated with climate change adaptation merits attention. We evaluate existing knowledge in this regard, namely what institutional configurations are held to perform well in regard to outcomes in the face uncertainty associated with climate change adaptation. Upon closer scrutiny we argue that literature on adaptive capacity, resilience and robustness needs to be evaluated cautiously with regards to its generalizability. In consequence, we therefore argue that institutional economics promises fruitful insights into climate change adaptation, specifically where it investigates institutional aspects that determine performance of climate change adaptation at higher levels of societal organisation. As outlook derived from this conclusion we suggest a research approach based on a transaction cost economics informed categorization of research problems on analogous cases. It could inform a more structured approach to understanding actors’ behavioral responses to uncertainty in relation to specific institutional aspects and external uncertainties. Transaction cost economics warrants a fruitful research program because it specifically addresses the governance of uncertainty in transactions.

Keywords: Climate Change Adaptation, Institutional Economics, Research ideas

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Embedding and distinguishing polycentricity in research on environmental governance: a review and outlook

Polycentricity is an important concept for understanding and analyzing situations involving multiple interacting decision centers and actors. The concept is more than a half-century old, yet its definition, understanding and operationalization continue to evolve. The concept overlaps in important ways with others in political theory and political economy (e.g., multi-level governance, legal pluralism, federalism, polyarchy, spatial polycentricity, institutional fit, scale and interplay, markets, subsidiarity, local public economies, FOCJ, Type I and Type II governance, etc.) and yet is not identical to any of those, so we argue. The paper aims at ordering and discussing the relations between some of these concepts in relation to the analysis of environmental governance in order to learn about the distinctive contributions they make. For this purpose, the paper will develop a map that characterizes the descriptive, explanatory and normative dimensions of the corresponding concepts and their relation to Ostrom's nested levels of rules. Second, it will review the role of the corresponding concepts in research, such as for example their association with specific "instruments of research" (i.e. sensitizing, ontological and operational concepts, theories and conceptual and analytical frameworks). Further, it will review the research programs that each of the concepts launched. That way, the paper aims to answer the question if polycentricity has proven a useful concept, and if that was the case, what exactly distinguishes it from related concepts, what the merit is of the research that it launched but also how it can be usefully related to interrelated concepts and their associated research programs. In result, this stock-taking of polycentricity and related research on environmental governance aims to prepare the ground for formulating remaining and new questions concerning our understanding and analysis of environmental governance and its research.

Keywords: Polycentricity, Governance, Conceptual

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Evolution of common management: Opportunities and challenges for fishing communities in Thailand

This paper seeks to analyse the evolution of the Common Fisheries Policy as a Community tool for the management of a common -pool resource in the context of Ban Don Bay in Surat Thani Province, Thailand. This study applied a qualitative approach to collect data by interviewing key informants in the study area. The participants of the study were traditional

fishermen and their families. The study used a paradigms of fisheries management (conservation, economic and social/community) and the concept of common pool resource. Results from the study found that policies of the state in each of the affected resource management. And the livelihoods of fisheries. People living in traditional fishing communities tend to be a vulnerable group due to the rapid changes caused by the environmental degradation that has resulted from short-sighted governmental policies, capitalization and natural disasters. It was also found, however, that the people living in these communities are extremely resourceful, industrious and adaptable, showing a commendable degree of flexibility in their ability to cope with severe situations by invoking a variety of effective strategies that utilize human capital, natural capital and social capital. They have been particularly effective in drawing upon their local wisdom and knowledge, conducting local research to identify and analyze various problems, which has, in turn, permitted them to propose and implement successful solutions to the problems they face.

The fishing communities of Ban Don Bay, therefore, have a lot to offer in terms of teaching and assisting others communities who face similar problems in terms of the rapid change wrought by environmental degradation and ill –conceived government policies.

Keywords: Common-Pool Resource, Fishing, Evolution of Common Management, Opportunities and Challenges

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Mobilizing Protection of the Genetic Commons: Seed Conservation Activities by Local Residents in Post-Industrial Society

Sustainable farming of local varieties is thought to be important for maintaining plant genetic resources and agricultural biological diversity. Local varieties adapted to immediate environmental conditions are maintained through cultivation by local farmers and their communities worldwide. However, many farmers have begun to abandon on-farm seed saving due to the oligopoly of seedlings sold by seed companies, both in Japan and across the world. Current trends in the preservation and utilization of these varieties are poorly researched, especially in Asian industrialized countries including Japan.

Our research aims to provide a detailed, quantitative view of seed production by farmers and non-farmers, i.e., self-sufficient producers and individuals managing small vegetable gardens or home gardens, at the regional scale in industrialized countries. Because seed conservation in industrialized countries is more difficult than in developing countries, it is important to examine these countries in detail, particularly east Asian countries like Japan, an area registered as a Globally Important Agricultural Heritage System by UNESCO. We also analyzed the relationship between products and eating habits in the context of seed growing and product cultivation. Additionally, we identified the types of vegetables cultivated on local farms and in home gardens, and studied the prevalence of saving seeds at home by local inhabitants. Our objectives were to identify the local varieties that continue to be cultivated versus those that are

no longer cultivated and to examine the factors affecting these results. We sent questionnaires via post to 7,068 families in the Peninsula, and received 1,662 responses in return.

We found that many residents, including both farmers and non-farmers (or hobby farmers), were involved in cultivation. They do this in conjunction with small cooperative groups, fewer than 30 farmers in each group, that overlap with other cooperative organizations in rural villages. While many respondents purchased seeds, more respondents cultivated homegrown seeds for soybeans and azuki beans through on-farm seed saving. In addition, they kept many other seeds and grew them locally. We used cluster analysis to classify the crops and vegetables into four clusters based on the rate of self-seeding and the reduction of cultivation (because cultivating beds for newly planted seed is not necessary if existing plants are allowed to self-seed to produce the next crop). The results suggested that we may need different conservation strategies to suit the characteristics of each cluster. Our results help us understand current trends and address the challenges different actors in the region need to cope with for managing seed.

Keywords: Seed-saving, Landraces, Agro-biodiversity, Farmer's Right

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How the De Jure Rule of European Law Can Complement a De Facto Dispossession of Indigenous Lands: Probes into the Mystery of Property

Prescriptive schemes deriving from New Institutional Economics isolate and rank individual, transferable (i.e., marketable) property rights as a leading requirement for economic growth. Significantly, social benefits derive from private property because owners will take account of social costs. Individual, transferable property has become a policy panacea for the loss of economic opportunities stemming from collective ownership and regulatory inefficiencies of First Nations reserves in Canada. But on its own, will the Dead Capital of reserve lands really become the engine of growth for future First Nations economies? Towards an exploration of this question, this presentation will: (1) reconstruct the political legal processes that encouraged dispossession by the market; (2) indicate some outcomes of the individualization of Indigenous land interests; and (3) suggest that a distinction between de jure and de facto authority is a relevant consideration for determining the potential outcomes of the proposed reshaping of reserve lands in Canada.

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The legitimacy of ejido and community governance in the context of REDD+ early actions in southern Mexico

Despite the gradual erosion of the social property sector in Mexico through the enactment of a series of reforms from 1992 onwards, ejidos and communities remain a central feature of Mexican rurality. These collective property regimes, a legacy of the Mexican Revolution, still account for around half the national surface area, a figure that rises in the southern, more indigenous regions of the country. Two-thirds of Mexico's forests are located within these

collective tenure regimes, repositioning ejidos and communities as key players in the regions selected for REDD+ early actions in five Mexican states, four of which are in predominantly indigenous areas in the southern part of the country.

Despite the historical importance of ejidos and communities in Mexico in the management of local landscapes, and their role as a fourth layer of governance, beneath the municipal level, informed policy discussions regarding the function, composition and role of this sector in the context of a multi-level governance REDD+ structure have been curiously absent. But whilst the social property sector is currently facing a series of challenges - a growing economic marginalization, internal differentiation and processes of internal exclusion -, there are some indications that the institutions associated with this level of governance are recovering legitimacy at a local level, due to the channeling of new government and international funds in the context of REDD+ early actions. This contrasts with the limited energy dedicated to analyzing or understanding the current dynamics characteristic of this sector of the rural population in policy circles, despite the official discursive emphasis on jurisdictions, safeguards and transparency.

This paper reexamines the question of the ejidos and communities in rural Mexico in the context of REDD+ implementation in Chiapas and Yucatán, to show how contradictions in the current political project are affecting environmental governance at a local level. On the one hand, the sector has been progressively weakened by legislative reforms and rural development policies that favor private property, but on the other, ejidos and communities have returned center stage as potential managers and providers of (and market for) environmental services. Based on semi-structured interviews carried out in Chiapas and Yucatán in the context of CIFOR's Global

Comparative Study on REDD+, this paper looks at the current role of the social property sector in the governance of natural resources and considers questions of legitimacy both from within and outside of these territorial units in the context of pilot REDD+ implementation in southern Mexico.

Key words: Ejidos, Agrarian Communities, REDD+, Legitimacy, Mexico

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Evaluation framework for adaptive co-management: towards commons governance in an uncertain world

The commons have been increasingly conceived as complex systems characterized by uncertainty and multiple scales. The need to recognize the existence of relationships among stakeholders at multiple levels, and to incorporate a learning-by-doing component for becoming more robust, has also become part of co-management, and more recently, adaptive co-management research. Adaptive co-management combines the dynamic learning characteristic of adaptive management with the linking characteristic of co-management, vertically and horizontally. By combining these and other ingredients, adaptive co-management is an important governance innovation because it aims to foster social-ecological resilience and ecologically sustainable livelihoods, while encouraging inclusive and empowering approaches to development. Even though this is a growing research field, efforts towards evaluating the process of adaptive co-management and the relationship between goals and outcomes have been scarce. Building on existing efforts, and drawing also from the field of public participation, we propose a formative evaluation framework for adaptive co-management, which focuses on its operation and how outcomes are produced. Looking at multiple scales, the framework consists of three components and two methodological approaches. The components of the evaluation framework are as follows: (i) Setting (biophysical, social and socio-ecological, institutional, external drivers); (ii) Process (practices and activities, participation, relationship building, learning process, power sharing); and (iii) Outcomes (tangible and intangible, social capital, social learning and adaptation). Methodologically, our framework integrates two evaluation approaches: constructivist (e.g. understanding participants' and non-participants' perceptions through interviews) and participatory or collaborative. In the former, outcomes anticipated from adaptive co-management are considered as set out in the scholarly literature. In the latter, researchers engage as facilitators in a process in which the multiple actors involved define the goals and methods for the evaluation of the adaptive co-management initiative, carrying it out collaboratively. This participatory evaluation can foster learning and strengthen relationships among stakeholders, thus contributing to the maturation of adaptive co-management from its early stages. The evaluation framework is applied in a case study in coastal Uruguay, where a local council for small-scale fisheries (consultative) co-management was implemented in 2012 related to a new fisheries law. We analyze how the twofold evaluation framework for adaptive co-management, aiming at improving practice, informing policy, and building capacity, may catalyze collaboration and adaptation

Keywords: Governance, Adaptive Co-Management, Participatory Evaluation, Social Capital, Learning



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Transformations of the Property Ward System in Modern Japan and Nagasaki

In light of Japan's aging society, its diminishing number of children and the depopulation of regional communities, the reactivation of regional communities has become an important policy issue among local governments. Toward this end, the role of systems such as the property ward (*zaisanku*) system has been discussed. The property ward is a system of community resource management that can be traced back to the Edo era (1603–1867), in which the land, waterways and forests are managed for the benefit of the local community. The *iriai* system, i.e., the right of common resources, had been developed earlier but after the Meiji restoration in 1868, the *iriai* system was transformed to the property ward system. The property ward system has also experienced various government institutional transformations regarding the rights of resource use in the community. An “old property ward” was formed after the merger of municipalities during the Meiji era (after 1868), and a “new property ward” was formed during the Showa era (1926–1989). Mergers of municipalities that took place during the Heisei era (1989–present) created a problem of decreasing flexibility in the management of property wards. In 1889, when Nagasaki City was inaugurated, a total of 28 property wards were newly established to manage the common resources for the benefit of the local communities under the City's administration. Since then, Nagasaki City experienced a series of expansions and continued to merge property wards under city administration, and there are now 87 property wards in Nagasaki City. Although the property wards in rural areas have been well documented, not many studies deal with urban property wards in Japan. In this study we investigated the history of the property ward system in modern Japan and the current status of communal resource management system in Nagasaki City.

Keywords: property ward, common pool resources, zaisanku, iriai, community resource management, Nagasaki



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Tempering mechanisms for governing boom & bust cycles and the utility of evolutionary analyses; the case Alberta, Canada.

This paper is an early result of an ongoing team- research on governance for boom & bust, where Alberta serves as a founding and grounding case study. We focus on rural communities, with a history of steep decline, rapid growth, or a combination of those, and reconstruct the governance path of them, looking at internal features and co- evolutions, and at linkages with larger context, most importantly Provincial government and international markets. We identify dependencies, as rigidities in governance evolution, as mechanisms making certain evolutions more likely than others, and distinguish between path dependence, interdependence and goal dependence, as the influence in the present of visions for the future. The internal organization of governance is described in terms of configurations of actors and institutions and power/knowledge. Governance innovations to enhance resilience in this perspective can be best grasped after analysis of dependencies and configurations, allowing a better assessment of new institutions, and new knowledge, inserted into self- reproducing local governance. For Alberta, we elucidate dependencies stemming from resource histories, speculative development patterns, strong local self- government, political conservatism, and international economic orientation. The specific form of multi- level governance which evolved represents unique patterns of flexibility and rigidity, brings a particular combination of opportunities and risks. In terms of resilience, we pay attention to difficulties in the self- transformation of local governance. We propose a preliminary typology of Alberta communities in terms of governance configurations, and pathways, each marked by specific opportunities and risks, each offering different challenges for governing boom & bust cycles.

Keywords: Governance, Boom and Bust, Tempering Mechanisms, Alberta

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Konohiki: Restoring community governance of inshore fisheries in Hawaii

In less than a century, formal property rights for nearshore fisheries in Hawai'i have shifted from local, exclusive harvest rights, to de facto open access regulated by centralized government agencies. However, in certain parts of Hawai'i, communities have maintained access to the benefits of these fisheries despite termination of their formal property rights, dramatic shifts in land tenure, demographics and governance. Despite regulatory power shifting from the community level to government, Hawaiian families on the north shore of the island of Kaua'i continue to retain substantial authority, employing ancestral knowledge, mobilizing labor for surround fishing, and sharing the harvest through social relations. In this paper, we focus on these mechanisms of access which continue to allow local groups to benefit from and govern near shore fisheries despite formal termination of property rights.

We also consider one model case restoring governance rights to the local level in one community along the coast. We consider that community's efforts at collaborative rule making with state government agencies to base laws governing coastal use on traditional management practices for this rural nearshore fishery. By selecting a case in which many established success factors for collaborative management are already in place, we elucidate new considerations including the importance of defining community based on responsibilities, of cross-generational leadership development, and geographic separation of the co-management rule-making process from the target community and natural resources themselves. We offer recommendations to improve other fledging co-management efforts, while considering the broader implications of our findings for access in small-scale fisheries.

Keywords: Community, Coastal, Indigenous, Collaboration, Hawaiian

"Mahele: Sustaining Communities through Small-Scale Inshore Fishery Catch and Sharing Networks"

Throughout the Pacific, "subsistence" fishing feeds not only individual fishers and their families but a much broader network of people through the noncommercial distribution, or sharing, of fish. This study evaluated the current importance of this sharing, through tracking subsistence fish catch and distributions (mahele) in one small Hawai'i fishery over an 18-month period. We found that the traditional and customary system of sharing fish, like subsistence activities in other mixed-economy settings, provides benefits beyond provisioning of food. These benefits include perpetuation of traditional and customary skills and practices, social status, social networks, reciprocal exchange, and collective insurance. Taken together these benefits enhance resilience of community-level social and ecological systems.

Keywords: Resilience, Sharing, Indigenous, Fishing, Community

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Sustaining Non-Timber Forest Products Based Rural Livelihood of Tribals in Jharkhand: Issues and Challenges

Jharkhand literally means 'forest region' where forests play a central role in the economic, cultural and socio-political systems and the entire lives and livelihoods of a majority of the people revolve around forests and forestry. Non-timber forest products (NTFPs) play an important role in supporting rural livelihoods and food security in Jharkhand. The NTFPs have variable abundance according to season and the collection of these NTFPs record variations with the seasonal occupation of the local people. The present study tries to explore the spectrum of rural livelihood contributions of Non-Timber Forest Product (NTFP) to the tribals of Bishunpur block in Gumla district of Jharkhand state. However, the main objective is to assess and analyse the contribution of NTFPs to rural livelihood for both subsistence and commercial use and to identify factors influencing household level of engagement in the various cash incomes. For the present study two (2) villages were selected based on their proximity gradient from the forest. A sample of 50 respondents was randomly selected from two (2) villages Banalat and Haraya of Nirasi panchayat in Bishunpur block of Gumla district. A structured interview schedule was administered on the respondents. The study is based on empirical field work using both quantitative and qualitative data, both from primary and secondary sources. The result of the study indicates that major employment (52%) was generated by the crops cultivation followed by NTFPs collection (30%) and other sectors (18%). Comparing income and employment from various sectors indicates that: (i) NTFPs collection is performed by all households irrespective of income contribution but (ii) income contribution from crop cultivation is highest. The study concludes that local people practice diverse livelihood activities mainly crops cultivation (cereals and cash crops) and livestock husbandry, gather forest products and on/off-farm activities for their survival.

For making the rural livelihood of the tribals' through NTFPs sustainable, the role of institutional arrangement is extremely important in natural resource management (NRM) in general and common pool resources (CPR) in particular. The effectiveness of CPRs as collective strategy is directly linked with community's concern, commitment, norms and group action to enforce them. Forest resources with shared access right to the members of a group acquire the status of CPR only with their collective involvement in its management. Thus an efficient distribution of existing benefits through collective institutional mechanism is needed. This can add in realizing sustainable income and employment throughout the year. The paper proposes a collective action institutional model drawing example from some success stories from study area.

Keywords: NTFP, Institution, Collective Action, Rural Livelihood, Tribal

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A Venetian Narration of the Commons: experimenting with the definition of Commons between city and lagoon

The concept of the Commons has been used to gather consensus and organise protest and resistance in a local social movement against the big infrastructural projects proposed to

accommodate mass tourism, and especially next generation super big cruise liners, in the Venetian lagoon. Despite the fact that the use of the word Commons was initially done with blurred objectives and aiming at attaining mutual recognition among actors promoting protest, it gradually began to be used as a tool to investigate how strategies and design principles of the Commons could be used to achieve a more equitable and democratic management of the lagoon of Venice, and envision new scenarios for its management. If initial concerns were on the internalisation of externalities and regeneration of the lagoon resource through collective action, the proximity and interdependence of the lagoon with the city, forced the social movements to question the validity of such principles when placed in an urban context, characterised by volatility, flexibility, openness of actors and their objectives. The paper presents an overview of the social movement strategy of action and of their demands in the face of official top down State led projects and, through a series of non-structured interviews shows how, with which objectives and expectations, the concepts relating to the Commons were being used to re-think urban and infrastructural transformation and lagoon uses from a bottom-up perspective. The paper will expose how narration building was a central aspect of sharing and building knowledge across groups within the social movements and of gathering scientific data and analysis able to efficiently counteract official policies, while promoting, in embryo, a vision for an alternative management.

Keywords: Commons, Narration, Urban Commons

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Gender-specific appreciation of landscape multi-functionality and ecosystem services in Southeast Asia

A landscape is both a physical and a social unit, where socio-ecological systems interact. Social systems in fact, underpin differential preferences and expectations of stakeholders on landscape functions. It has been recognized that women play significant and multiple roles at household, farm, and landscape levels, yet many research and development interventions do not take cognizant of these roles when it comes to land use or farm-level decision-making. Women stereotypes have often led to misconception of what women can do about landscape conditions. This study therefore aims to determine the differences in appreciation of landscape functions and ecosystem services by women and men, to better design gender-responsive/sensitive landscape management interventions that benefit both women and men in selected and Asian countries (Indonesia, Philippines, and Vietnam). In this research presentation we will address the detailed objectives: 1. To characterize gender-specific appreciation of landscape multi-functionality 2. To determine gendered roles, access and control including decision-making in production activities and landscape management; and 3. To identify gendered-approaches that help reconcile gendered differences in 'landscape appreciation' and promote complementation of men and women

Keywords: Gender, Land use decision making, Socio-ecological systems, Ecosystem services, Land use change

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Frameworks and scholarly networks on institutional analysis of socio-ecological systems

This paper presents preliminary results of a bibliometric analysis of the knowledge domain of institutional analysis of socio-ecological systems (SES) and associated research communities. We analyzed more than 200 publications over the last 20 years and explored how they are related in terms of co-authorship relations, and citation relations.

Specifically, the paper builds on and tests an initial classification of dominant frameworks for institutional analysis of socio-ecological systems, including most prominently the SES Framework, the Institutions of Sustainability Framework and the Adaptive Cycle framework among others. Relevant authors and citations associated with each framework are then listed and content analyzed for subsequent visual network analysis.

The analysis confirms the notable increase of publication in the institutional analysis of SES domain during the last two decades. As expected, different communities have developed different approaches to it and are only loosely connected with each other in terms of co-authorships and citations. This is argued to be associated to the different disciplinary backgrounds of each communities and the absence of frameworks that integrate perspectives across.

Keywords: Epistemic Communities, Network Analysis, Institutional Analysis, Socio-Ecological Systems, SES Frameworks

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Using the Social-Ecological Systems Meta-Analysis Database (SESMAD) to characterize cases: the Rio Conchos example

Large-scale resource management problems are arguably the most difficult to address due to the number of actors and the complexity of social-ecological interactions involved. By their nature they also impact the welfare of large numbers of people. While some of those problems have been successfully addressed, extensive governance and analytical challenges must still be met in order to systematically understand and confront others. Water scarcity management in the Rio Grande is a paradigmatic example of the complexity associated to large scale resource systems. The Rio Grande is shared by the US and Mexico and forms the international border for 1935 km. The river originates in the San Juan Mountains in Colorado and flows through Northern New Mexico until it reaches the border cities of El Paso and Ciudad Juarez, where the river is reduced to irrigation return flows and wastewater. In the Lower part of the river, the Rio Conchos (Mexico) increases average flows from 3 m³ s⁻¹ to 30 m³ s⁻¹, most of which is used for irrigation purposes on both sides of the border. The upstream position of each

country has created downstream obligations governed by international treaties in 1906 and 1944, and internal arrangements within the US and Mexico; however, a series of droughts since the 1990s, as well as the increased water demand in the Conchos and Low Rio Grande, have put in jeopardy both the international and national governance systems on both sides of the border.

Methodologically, this study builds on the larger Social-Ecological Systems Meta-analysis Database (SESMAD) project which analyses data on a series of physical, actor and governance factors that can be related to sustainable management of environmental commons. The SESMAD database, which was initially conceived as an adaptation of the SES Framework, is a relational database containing approximately 200 variables relevant for the study of Social Ecological Systems (SES). The variables contain information about three classes of components: an environmental commons (e.g. resource system), a governance system, and an actor group. Variables also record interactions between these components and can be coded across different temporal “snapshots” of the case, facilitating the identification of changes in the components, attributes and interactions over time.

Three interacting resource systems can be distinguished in the Rio Grande SES through the SESMAD lens: the High Rio Grande, the Rio Conchos, and the Low Rio Grande. The former systems can be associated to relatively independent national governance systems (US and Mexican, respectively), while the latter is highly dependent on a third, international-level governance system. The case also shows both independent and overlapping drought events across the High Rio Grande and the Conchos, with cumulating or counterbalancing effects in the Low Rio Grande sub-system. Different actors and governance characteristics of the three governance systems can help to understand differences in effectiveness across drought and non-drought snapshots. Also, droughts that affect one of the resource systems may create asymmetries in the compliance issues, while basin-wide drought is likely to create reciprocal compliance problems. However, because drought interacts with water demand and governance characteristics, even minor anomalies have led to compliance problems.

Keywords: Epistemic Communities, Network Analysis, Institutional Analysis, Socio-Ecological Systems, SES Frameworks

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Understanding governance of large freshwater systems: a comparative analysis of transnational watershed regimes in the Mediterranean region

The capacity of common pool resource (CPR) theory to explain resource allocation problems under scarcity conditions in local contexts is well proven. The conceptual and empirical validity

of the theory to understand the management of similar problems in large-scale contexts is more of an open question. This paper addressed this question by first putting CPR theory in dialogue with international environmental regime (IER) theory. Then a series of conjectures on the relationship between political heterogeneity, leadership and trust on the one hand and cooperation on the other, were formulated and tested against the cases of the Nile, Guadiana, Jordan and Tigris-Euphrates. The cases were selected for their increasing exposure to severe water scarcity problems and their coverage of a relatively wide spectrum in terms of the variables of interest. The testing exercise was then used to qualify CPR and IER theory with regard to the mediating role of other social and physical variables. Methodologically, the paper relies on the Social-Ecological Systems Meta-Analysis database (SESMAD) and coding protocol and a stratified random sample based on existing world river datasets.

Keywords: SESMAD, Transboundary Watershed Management, Mediterranean Region, Common Pool Resource Theory, International Environmental Regimes Theory

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Understanding individual and collective responses to droughts in Mexican irrigation systems

Sergio Villamayor-Tomas, Gustavo Garcia-Lopez The robustness of common property-based SES like many irrigation systems can be partially explained by looking at the collective and uncoordinated responses of farmers to different types of disturbances. This study aims to understand adaptation to severe water scarcity by looking at both types of responses and synergies and trade-offs. For that purpose, the study relies on an analysis of responses to droughts and other disturbances in eight irrigation communities from the Yaqui and Conchos valleys (Sonora and Chihuahua, Mexico). Household survey data and community interview data were collected and analyzed together.

According to the results, there is a wide diversity of responses to droughts; however, three categories of dominant responses can be identified. The first and most prevalent are technical ones related to agricultural practices and efficiency of water use; these include measures such as technological improvements (e.g., cementing the water channels) and best practices (e.g. leveling of cropland). A second type are political responses, i.e., lobbying government for support. Finally, there are market responses such as diversifying products and looking for new markets.

Also, short term individual adaptations such as delays in fee payments or crop changes can jeopardize existing and new coordination efforts such as the maintenance of the system infrastructure or water allocation schedules. Alternatively, there are important collective responses that complement the individual ones, such as the collection of external resources and information for technological and infrastructure improvements and the promotion of learning within and across communities.

Finally, it is important to note the high percentage of household-level non-responses across both droughts and other disturbances, (from 17 to 30%, depending on disturbance). Preliminary interpretation of existing data points to lack of resources or the possibility to temporally exit irrigated agriculture.

Keywords: Robustness, Irrigation, Mexico, Disturbance, Droughts, Climate Change, Common Property Regime, Synergies, Trade-Offs



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The Grey's influence on individual's perception of wolves in light of Cultivation Theory

Wolves are an essential part of Alberta's ecosystem – a designated keystone species. Unfortunately, Alberta's public policy concerning wolves is marked by a fearful orientation built on an inaccurate understanding of wolves. These public policies have influenced, reinforced, and normalized a discrimination against wolves. This paper challenges this foundation through a critical examination of the 2011 movie *The Grey*. This examination of *The Grey* gives insight into the erroneous ways wolves are presented in mainstream popular culture. Subsequently, the misinformation of *The Grey* is compared and contrasted against established academic biological knowledge. This contrast of information is fundamental for understanding how many North Americans view wolves and predators generally. Additionally, *The Grey* is analyzed as a media text capable of perpetuating fear. Through this analysis, the effects of this media text are examined in light of Cultivation Theory. *The Grey* is one of many examples of media in North America, which engage in this demonization of predators. Through this academic examination of *The Grey* the reader can extrapolate this paper's method of critiquing to other media they will encounter. With the ability to critique North American culture, and the popular media that is illustrative of it, policies can be reevaluated which will enable positive change.

Keywords: Wolves, Policies, Cultivation Theory, the Grey, Media

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Why water user association's underperformance in China: Analysis in SES framework

Water User Association(WUA) is widely regarded as a remarkable variable which exerts significant impact on water governance, but a number of studies have revealed that WUA has little influence when it comes to China's case. This paper once again proves this point by adopting the latest nationwide survey data, and finds that the most significant factors that affect water governance include social culture, natural characteristics as well as governance system, among which social capital and leadership play critical role. For those villages which embrace high level of leadership and social capital, they accordingly enjoy good water governance, regardless of the existence of WUA; conversely, for those where the level of leadership and social capital is relatively low, the water governance effect there is also poor. The results indicate that the success of self-governance relies on the performance of more fundamental variables which influence collective actions.

Keywords: irrigation; governance; social ecology systems; social capital; leadership

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Exploring institutional openings for cooperative watershed management in the Mackenzie River Basin

As Canada's longest river and North America's largest river flowing northward, the Mackenzie River drains into a basin covering over 20% of Canada's land mass (Rosenberg International Forum 2013). Scholars convening at the Rosenberg International Forum urged people to consider the Mackenzie River Basin (MRB) as part of the global commons because the Mackenzie River influences the circulation of the Arctic Ocean, therefore contributing to climate stabilization, and the Mackenzie Estuary houses significant biodiversity. Therefore, understanding how to better manage the MRB commons is important for protecting its vast resources and for ensuring its environmental services continue to be sustainable. It is even more important to manage the MRB commons effectively because the Mackenzie is an understudied river compared to other rivers in the world.

This project aims to explore how to overcome the institutional barriers to the MRB achieving its vision of cooperative watershed management. The proper management of Canada's largest watershed matters for Canadians living in its vast reach of five provinces and territories (British Columbia, Alberta, Saskatchewan, and the Yukon and Northwest Territories). This project especially explores how Aboriginal Canadians living in "end of pipe" NWT downstream of Alberta oil sands may be afforded more agency in the management process (Rosenberg Forum 2013). This matters because they are disproportionately burdened by inadequate watershed management (Parlee 2010) and the Alberta and NWT governments were previously slow to negotiate a concrete bilateral agreement (Saunders 2012).

Given these needs to examine how to manage the MRB commons, this proposed ignite talk seeks to examine the "power and agency in the governance" of these commons. Taking an institutional economics approach, we ask: what institutions drive the current management scheme? What are the institutional barriers to achieving greater cooperative watershed

management? Where is the room for MRB residents to co-create more institutional openings toward cooperative watershed management? Specifically, if we perceive the basin governments are not moving fast enough to negotiate bilateral agreements that determine the specifics of a Master Agreement for the Basin, how might more institutional openings be created to allow for collective action among more local units of government? How can monitoring systems be adapted to account for different economics and social interests? In particular, this talk explores the potential for a mechanism from inclusive cross-scale watershed management: the “fractal process” of collective action, which means that collective action “at one level of social-spatial organization can have spillover effects at lower and higher levels” (Swallow 2006). In doing so, we aim to empower Northern Canadians to co-create greater agency toward managing their water in the MRB commons.

Keywords: Mackenzie River Basin, Cooperative Watershed Management, Institutional Economics, Power, Agency

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Polycentric Ideals, Institutional Change and Forest Governance in South India

Over the past decades forest policy in India has seen increasing calls for models of forest governance which emphasises decentralisation, democratisation and people’s participation. Such transitions have not come about easily and there is wide-ranging consensus among scholars and practitioners that reform has been weak and wrought by difficulties. In India the central forest administration is often identified in extant literature as a major impediment to reform, but is rarely subject to close observation and scrutiny. This paper suggests that studying the role of public agencies in forest governance may be aided by applying the concept of polycentricity (V. Ostrom 1991) as a theoretical ideal-type. An ideal-type in the Weberian sense (in contrast to a normative one) may be fruitfully employed as an analytical prism in understanding a given problem, such as the institutional arrangements governing a natural resource. By contrasting anomalies observed in the field with our ideal-theoretical expectations, we may abductively develop a more comprehensive understanding of the empirical problem at hand. The paper has two related goals. First, it constructs and defines a theoretical ideal-type of polycentricity relevant to the case of Indian forest governance. To this end it draws upon the IAD-framework (E. Ostrom 2005) and particularly the idea of rules in specifying actors’ institutional position in a polycentric order. Next, it employs the ideal-type to the empirical case of forest policy reform in the State of Kerala, a context where a centralised hierarchical forest administration wields significant influence and constitutes a considerable obstacle to policy reform and institutional change. The paper examines resistance to reform within the administration by focusing on how and why mid- to senior-level officials interpret and understand contemporary forest policies prescribing democratisation and participation, key features of a polycentric order. It makes the argument that in order to explain reform failures we need to understand the internal ideologies, machinations and values of the administration, and how externally-formulated policies are apprehended and interpreted. Employing an ideal-type may abductively build such an understanding. The paper is part of a larger study examining challenges to forest policy reform in Kerala and derives its’ empirical data from in-depth interviews with forest officials, ethnographic fieldwork, and thorough policy analysis. It

offers new and contextually grounded insights of reform-resistance, necessary for providing much-needed policy advice, but also considers the broader applicability of polycentricity, a well-established theory originating in metropolitan America, to the Indian context.

Keywords: Polycentricity, Institutional Change, Public Bureaucracy, Forests, India

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A multilevel evolutionary framework for sustainability analysis

Sustainability theory can help achieve desirable social-ecological states by generalizing lessons across contexts, and improving the design of sustainability interventions. To accomplish these goals, we argue that theory in sustainability science must (1) explain the emergence and persistence of social-ecological states, account for (2) endogenous cultural change and (3) cooperative behavior, and (4) address the complexities of multilevel social-ecological interactions. We suggest that cultural evolutionary theory broadly, and cultural multilevel selection in particular, can improve on these fronts. We outline a multilevel evolutionary framework for describing social-ecological change, and detail how multilevel cooperative dynamics can determine outcomes in environmental dilemmas. We show how this framework complements existing sustainability frameworks with a dynamic description of the emergence and persistence of sustainable institutions and behavior, a means to generalize causal patterns across social-ecological contexts, and a heuristic for designing and evaluating effective sustainability interventions. We support these assertions with case examples from developed and developing countries in which we track cooperative change at multiple levels of social organization as they impact social-ecological outcomes. Finally, we make suggestions for further theoretical development, empirical testing, and application.

Keywords: Sustainability, Theory, Cultural Evolution, Cooperation, Multilevel Selection

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Challenges of Namibian administrative structure to implement the Access to genetic resources and Benefit Sharing legislation

Since 1980s, problems and alteration of conventional schemes for transactions of genetic resources and related knowledge, originally shared by local indigenous communities, to their users of pharmaceutical companies, plant producers, and food manufactures as ingredients for their products, have been discussing as the question of access to genetic resources and benefit sharing (ABS). The basic idea of ABS is to create the missing governance structure that regulates the assessment of values on resources and transaction flows of biotrade among contractors, in a way that transferred benefits work as incentives of local communities for in-

situ resource conservation. ABS was conceptualized as the third objective of the UN Convention on Biological Diversity and institutionalized as the Nagoya Protocol, which is further mandated for each contract party to enforce as its national legislation.

In case of Namibia, a leading country of the ABS negotiations, although the Ministry of Environment and Tourism (MET) was assigned to administer the ABS legislation, its implementation, employed by the adjustment of the present Namibian governmental structure, was not fully designed yet in 2011, due to political context that various ministries already regulate transactions of different genetic resources under various regulations.

This study aims to depict Namibian administrative structures regarding ABS governance policies, based on the concepts of an analytical framework of Hagedorn's Institutions of Sustainability and using concepts of power from Herbert Simon and transaction costs, in order to summarize implementation problems as distributional problems of administrative resource allocation and rules on administrative works related to characteristics of bureaucracy, including given power and resources as well as their motivations, and their hegemonic relations. Following Charmaz, a methodology of a grounded theory with abduction approach is employed. Qualitative data were collected by document surveys and interviews in fieldworks in Namibia in 2011.

We found that the administrative scopes and functions of the ABS legislation are regulated by seven ministries. Designed institutional performance, including a formation of multi-stakeholder administrative bodies, entails problems of allocations of information, administration property rights and mandates, and human resource between ministries, identified as action situations where the MET confronts power asymmetric relations among ministries, associated with their legally defined action choices under a bureaucracy. Due to the ABS legislation being a new concept for actors, information transactions, including planned distribution of work and time schedule, are found as a key to rule-making and enforcement of ABS legislation. Information transactions form further action situations with other ministries. Reflecting a lack of human resources and support structures in present ABS regulation activities, it is important to allocate mandates for ministries in a cooperative way through designed information transactions before and after its adoption. These allow MET creating an incentive for ministries to collaborate in the enforcement of the ABS institutional framework.

This study reveals that understanding power asymmetries between actors, in terms of jurisdiction, control of financial resources, information, and enforcement rights, forming different rationalities, is important for elucidating the mechanisms of the implementation problem encountered in Namibia, as the county works to crafted ABS institutional change.

Keywords: Access to genetic resources and Benefit Sharing (ABS), Namibian ministerial structure, Institutions of Sustainability, power, information transactions

An institutional analysis on the management of a Namibian Women's Cooperative

Marula is one of the traditionally used multipurpose fruits trees in the north central region of Namibia. A traditional custom rule regulates access to marula fruits and its processing to alcohol as gendered collaborative activity for local women. After the abolition of apartheid, Namibian government initiated to establish the Eudafano Women's Co-operative (EWC) for

the commercialization of marula crude oil, which is sold to two foreign customers through alternative trade contracts for the income increase of local women.

This study conducts an institutional analysis on this cooperative with analytical frameworks of Hagedorn's Institution of Sustainability and Williamson's four level model of economic institutions and using the concept of power relations and different rationalities from Hebert Simon, in order to understand mechanisms of institutional changes caused under interactions between co-operative institutions designed under Western context and custom rules under African context. Following Charmaz, a grounded theory with abduction approach is employed. Qualitative data were collected by the combination of document surveys and interviews to 31 individuals and groups during a fieldwork in Namibia in 2011.

This study first summarizes the organizational model of the EWC as designed institutional performances. Parallel to these intended institutional changes, we found six kinds of institutional changes, designed but not generated or generated in unintended ways. Cooperative rules of membership and decision makings are substituted for those of social rules as rules-in-use in cooperative. Labor with machine in the EWC factory is male dominated, which can be associated with social beliefs on gendered labor allocation. Due to administrative obligations in the EWC, the secretary of the EWC has access to EWC transportation, which enables her further access to good quality fruits. Regarding rules of marula fruits collections at village level, some husbands of the EWC members start collecting fruits although a traditional norm prohibits men to even come close to trees during harvest season. In terms of human capacity, the literate rich members tend to leave the EWC for a better paid-work or even stop processing fruits, reflecting social contexts that rapid expansion of urbanization increases opportunities of well paid-jobs.

First change can be interpreted that EWC members, facing action situations of rules-in-use of cooperative organization, do not hold a rationality to understand the concept of cooperative, contrived in Western context. Second and third phenomena, observed in action situations to allocate fruit access rights and labor in the EWC, and the fourth change, seen in an action situation of EWC members to allocate fruits access rights, can be caused by and exacerbate existing power asymmetrical situations among rich and poor members as well as between genders, in terms of employment and access to resources. The fifth phenomenon represents alteration of cognitive rules on values of collaborative works and marula processing, which forms action situation of literate rich members on labor.

This study elucidates mechanism of institutional changes, reflecting to what extent the designed cooperative institutional sets are successfully enforced. Findings can be understood as future tasks for stable management of the EWC under unstable social contexts.

Keywords: Cooperative, Marula Plant Oil, Gender, Institutions of Sustainability, Power

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River Catchment as Commons: Law, Civil Engineering, and Ecology in Contemporary Japan

In contemporary Japan, repentance for past industrial blunders has come in the form of environmental remediation. This paper discusses recent changes in river catchment governance by examining three domains of knowledge that have helped transform the ways in which people think about and act upon rivers: law, civil engineering, and ecology. The history of Japan's rapid industrialization and urbanization was also a history of taming rivers: floods were controlled and their flows were harnessed for hydroelectricity, industry, and agriculture. Dammed and diverted by the state, these rivers lost the ecological functions needed to sustain a healthy watershed. In recognition of these problems, restoration of river ecosystems began by removing concrete and allowing for greater public access to the water. River policy changed in 1997 with an amendment to the River Laws that called for greater community participation and added, to industrial use and flood prevention, a third goal of river fellowship (*shinsui*). Civil engineers have begun to introduce, even in Japan's most urban areas, design ideas that protect the environment and give community access by way of re-discovering premodern river governance practices. Ecologists have teamed up with local fishermen and loggers to rescue folk knowledge and practice by poetically describing the river as a tether of love binding the sea and the forest — an understanding that resembles the scientific vision of watersheds as an integrated ecosystem.

Shifts in these three domains reflect an emerging conception of river basins as a common natural resource that requires a multi-stakeholder, horizontal governance rather than the top-down arrangement of the past. The paper discusses the promises and problems in this re-formulation of the relationship between society and its rivers.

Keywords: River Catchment, Law, Civil Engineering, Ecology, Japan

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The importance of communal “wild” lands for beekeepers in Burundi

In the small East African nation of Burundi, beekeeping is growing as a form of rural economic development. In 2005, Burundi emerged from a debilitating 12-year civil war. Today, the country is investing considerable effort into economic development, education, and political stability, particularly in rural communities. Cattle herding was traditionally of major importance in much of the country; however, contentious land tenure, high population density and mounting pressure on marginal lands threaten the sustainability of this practice. Likewise, the growing popularity of individualized, non-subsistence entrepreneurial activities, such as banana and coffee cultivation, exacerbate existing competition for productive land and have resulted in the loss of nearly all wild lands. Many young people are now migrating to the capital city of Bujumbura in search of work. But the city currently lacks both the necessary jobs and infrastructure to support this influx of rural migrants. As a result, development organizations are increasingly interested in finding innovative methods of revitalizing depressed rural regions.

One such form of rural development is beekeeping, which has long been practiced using primitive hives and traditional methods, though only for subsistence or supplemental income. Beekeeping offers potential as both a livelihood strategy and a means for conserving native vegetation, which is often concentrated on communal or shared lands. These shared lands are

owned by the state, but communally managed by local people and used in a diversity of ways. Beekeepers benefit from shared lands as they preserve native vegetation, which provides abundant, year-round floral resources for bees.

My research, based on two summers of field work in Burundi, focuses on ongoing apicultural development projects in three villages in the rural provinces of Muramvya and Rutana. Through interviews with beekeepers, this research provides important demographic data, insight on the effectiveness of beekeeping as a potential for rural economic development, and a better understanding of how beekeepers use native floral resources. Specifically, the results of my research challenge common practices of many development and aid programs, which often provide modern, moveable frame hives to beekeepers and discourage the use of primitive traditional hives.

While modern hives do provide some key benefits to beekeepers, the results of my research reveal several factors are of greater importance in the success or failure of beekeeping-for-development initiatives in rural Burundi. The most significant factors include access to communally managed “wild” lands and participation in beekeeping cooperatives. A greater understanding of beekeepers’ use and perception of communally managed areas is critical for future development projects weighing the value of these seemingly “unproductive” parcels of wild lands, where beekeeping offers promise for both the revitalization of local, rural communities and the protection of the commons.

Keywords: Beekeeping, Burundi, Development, Conservation, Livelihoods, Rewilding

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From government to governance: a case of Marine Protected Areas in Costa Rica

Mainstream conservation paradigms, which had historically applied a more top-down approach to the management of protected areas (PA), began to change in the 1990s. This became specially true after the launch of the UN Convention on Biological Diversity (CBD) in 1992, when governments began to be demanded to include communities and resource users in decision-making processes of PAs. In this paper we discuss how this sharing of power has been taking place in Costa Rica. Owner of an international reputation for its terrestrial conservation achievements, the country passed its Biodiversity Law in 1998. The instrument was praised for being ambitious in creating national, regional and local councils of conservation areas, where the involvement of civil society should play a key role. A previous bill had emphasized the participation of nearby communities in the declaration and management of PAs. This was another important step ahead, since the lack of consultation has been a pitfall in the conservation history of the country. However, if the formal rules evolved at a rather fast pace, it seems that the mental models apprehending the role of the government, and thus orienting

the norms of how things are done in practice, have been lagging behind. For instance, the law of biodiversity was contested for almost ten years, specifically because of the councils. One lawyer considered unacceptable that the councils would decide over issues that were traditionally only under state jurisdiction. Another indication of the difficulties of this transition from government to governance is illustrated by the fact that the term co-management does not exist under the law in Costa Rica. It is associated to the management of public funds by civil society and is treated almost like a taboo. Finally, it is not uncommon to come across the view of participation as voting in a candidate for president and delegating to her the responsibility for decisions. Obviously, this is only one part of the story. The other parts are the several experiences happening on the coastal areas of Costa Rica that demonstrate the value of more participatory governance models. Learning from these experiences could help update the mental models about power sharing between state, society and market. This actualization could eventually result in norms catching up with formal rules of participation. The case of marine protection provides a good example of how necessary this change is. Unclear boundaries of the seas and mobility of marine resources make more difficult for a top-down approach relying on surveillance to succeed in this domain. Our findings suggest that even if far from being hassle free, more participatory governance models can potentially yield benefits for conservation in Costa Rica and in other countries with similar challenges. Our argumentation is based on institutional theory, with a particular focus on the role of institutional path dependencies. Policies at the national level and the development of four Marine Protected Areas have been analyzed using qualitative methods such as Process Tracing.

Keywords: Marine Protected Areas, Institutional Change, Path Dependencies, Governance, Participation

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Connecting to place through sharing stories: Using modified focus groups through place-based inquiry to create opportunities for participation in the Common Ground Land of Kenora, Ontario

Participation in resources management decision-making process is considered an important aspect to fostering a person's ability to care for place. Sense of place literature suggests that care of place encourages enhanced wellbeing and could further participation in shared place decision-making. The Rat Portage Common Ground Conservation Organization is a unique partnership attempting to improve cross-cultural relationships through co-ownership of a piece

of land known as the Common Ground Land (CGL) in the northwestern Ontario municipality of Kenora. The CGL was the focus of this study in 2010, which drew on an Indigenous research paradigm and made use of sharing circle methodology by collecting data through modified focus groups (3) and semi-structured interviews (27). Data analysis suggested that these methods were useful in building relationships, hearing a diversity of perspectives on the CGL, and creating a safe avenue for participation.

Keywords: Sense of Place, Common Ground Land, Participation, Collaboration, Modified Focus Groups

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Traditional Ecological Knowledge (TEK) and Traditional Land Use and Occupancy (TLUO) from a First Nation's worldview

Matthew Whitehead explains and describes Traditional Ecological Knowledge (TEK) and Traditional Land Use and Occupancy (TLUO) from a First Nation's perspective. He will describe and demonstrate the inter-generational transfer of TEK and will explain how TEK is a non-static inter-generational knowledge system. He will explain how the "Bush way of life" is interpreted and reinterpreted through the life experience as a First Nation person. TEK is distinct from the descriptions of TEK revealed during the environmental assessment process and in academic literature. His research stresses that the maintenance and preservation of Aboriginal identity, culture, lifestyle, and livelihood is predicated on a healthy environment.

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Attitude Toward Environmental Consideration Among Non-industrial Private Forest Owners in Sweden

People on earth face major challenges mitigating climate change, reduce loss of biodiversity and prohibit irreversible changes of earth's ecosystems. For one, management of common ecosystems is an important challenge for policy makers. Especially the forest is a vital provider of ecosystem services. In Sweden, forest cover about 57 per cent of total land area, and is one provider to the local economy. About half of the forestland is owned by nonindustrial private forest owners, while the rest is owned by forest companies or the government.

Swedish forestry has during most parts of the 20th century focused mainly on production of timber, supported by the Forestry Act. However in the 1993-years forest policy decision, environmental issues became equally important as production, as the Forestry Act stated that "[t]he forest is a national resource. It shall be managed in such a way as to provide a valuable yield and at the same time preserve biodiversity" (Swedish Forestry Act 1979:4291). Details on how environmental consideration should be taken is not regulated by the generally written Forestry Act, but is regulated by regulations stated by the governmental agency (Swedish Forest Agency) according to the so-called Swedish Forest Model. Forest owners, regardless of ownership structure, have the freedom but also the responsibility, to manage their forest to

fulfill the general consideration paragraph. The general consideration paragraph is built on three instruments: governmental financed set-aside areas for environmental consideration (Nature reserve, habitat protection and conservation regulation), voluntary set-aside areas for environmental consideration, and an overall general consideration in relation to all forest management actions. Further, forest owners have to engage in eco-system services outside the demands of the law for Sweden to reach the environmental goals. The new policy thus increased the demand of more competence of the forest owner in terms of knowledge of e.g., environmental consideration.

The general consideration and environmental consideration has been evaluated by the Swedish Forest Agency, and results show that the environmental consideration at regeneration felling has decreased over a ten-year period. The environmental consideration has improved since the general consideration paragraph was first installed, but the effect has abated during the first years of the 21st century. It seems that forest policy is failing, as the environmental goals are not reached. The question is why is policy not successful? One question, not previously researched, is how forest owner's attitudes and values affect their behavior toward environmental consideration. Do forest owners value environmental concerns? Do forest owners act according to their beliefs? What affects the forest owner's attitudes and behavior?

To find the answer to these questions, the largest forest owner group in Sweden, nonindustrial private forest owners, is surveyed asking questions on their attitudes and behavior, to offer policy makers an understanding on what is driving forest owners behavior, a knowledge helpful when evaluating why policy is failing. This paper and presentation will offer the results of the survey to 3000 forest owners in Sweden.

Keywords: Attitude; Environmental Behavior; Ecosystem Services; Forestry; Non-Industrial Private Forest Owners; Policy Failure

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Community responses in a changing hydrosocial system: Community-Based Monitoring among Indigenous nations of the Yukon River Basin

Arctic watersheds are undergoing alterations as a consequence of climate change and threats posed by resource development. Indigenous peoples in these high latitude hydrosocial systems

are among the first to be affected by these changes due to the complex interconnections between culture, health and environment, but expert approaches to studying these problems frequently fail to incorporate local concerns and communities often distrust the resulting data. Alternately, communities are initiating water quality monitoring programs in response to concerns about changes in water resources. Community-Based Monitoring is a process where stakeholders including Non-Governmental Organizations and representatives from territorial/provincial, federal and First Nations governments work together to monitor and respond to community concerns. This paper examines the benefits and challenges associated with two related Community-Based Monitoring programs coordinated by the Yukon River Inter-Tribal Watershed Council. The Yukon River Inter-Tribal Watershed Council, an Indigenous grassroots organization consisting of 70 signatory Indigenous nations from Alaska, Yukon and British Columbia, engage local knowledge and community concerns through water quality monitoring to protect and preserve the Yukon River and its tributaries. Analysis reveals that participating Alaska Native Tribes and First Nations value these programs for their role in providing independent data that increases knowledge of environmental change within their traditional territories and across the Yukon River basin. While it also demonstrates how water quality data can be applied to directly address diverse community concerns about health and environment, further analysis of the various uses of this data in decision-making processes is needed. This case study highlights some best practices for addressing common problems associated with Community-Based Monitoring including program sustainability, quality control and effective methods for communicating results to community partners. Furthermore, we provide suggestions regarding how current programs might be developed to both better represent community concerns by community uses, values and traditional knowledge of water and improve the use of data in decision-making processes.

Keywords: Community-based monitoring, watershed governance, Indigenous governance, Traditional knowledge of water, Yukon First Nations

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Oilseed: Precious Resource for Enhancing Food Security, Agroprocessing and Export Promotion in Ethiopia (POSTER)

In Ethiopia, oilseeds are the third important crop in acreage after cereals and pulses and the second largest export earners after coffee. They are cultivated on 7 % of the total agricultural lands and about 3.7 million smallholder farmers are involved in oilseeds production. Sesame, noug, linseed, groundnut, safflower and Ethiopian mustard are the most common oilseeds grown in Ethiopia. The country has also great potential to grow soybean and sunflower. Edible oils that we get from oilseeds constitute the most important sources of calories in developing countries like Ethiopia, after food grains. They are also source of essential fatty acids, proteins, vitamins and micronutrients and can serve as a source of renewable energy and industrial oils. The meal remaining after oil extraction of oilseeds crops are good sources of livestock feed. Despite their diverse importance, the contribution oil-seed sector in Ethiopia for food security, agro-processing and export is very minimal. This can be justified by the following facts (i) the minimum requirements of fats recommended by human nutritionist is 20-25% while the estimated consumption in Ethiopia is only about 10%, a deficit of more than

half, (ii) despite high demand of edible oil in domestic market, local oil-millers produce oil below their full capacity due to low yield potential as well as production volume of oilseeds and, thus the country imports large amount of palm oil from abroad and distribute with subsidy, (iii) lack of international market information, poor handling and quality control of oilseeds and poor market channels are becoming the challenges of oilseeds export. The scenario of oil seed sector in Ethiopia was assessed by conducting survey that involves various actors in the oilseeds sector and secondary data that was drawn from various public sources. A strategy for the 'way forward' in the Ethiopian oil-seed sector are worked out under the involvement of all stockholders in the oilseeds value chains as well as considering local, national and international markets and resources. The overall aim of this paper is to review the status of oilseeds sector in Ethiopia along the value chain and suggest possible intervention areas that enhance the role of oilseeds for food security, agro-processing and export promotion.

Keywords: Oil Seeds, Food Security, Agro-Processing And Export

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Multilevel land use planning in Vietnam: authority and capacity misalliance

Land use decisions are made by an array of government and non-government actors. Within government the power dynamics, interests and coordination both vertically and horizontal will determine how land use decisions on the ground are shaped. But whether land managers choose to accept or disregard those policy decisions will relate to the legitimacy of those decision making processes. Thus, policy engagement of local people will influence the suitability of those decisions and their outcomes. Further gaps in capacity and knowledge of lower government tasked to develop and implement policy decisions will also present as barriers to appropriate land use decisions at a local level.

Since 1986, power to manage land and forests was shifted to lower levels of government in Vietnam. Central and supreme power is held by the central committee, however authority and decision making powers have been delegated to lower governments at provincial, district and commune levels. The Vietnamese government has also been further emphasising the management role of individuals and households allocating them land and forests, further retracting state control. However allocations extend to the right to 'use' but not to 'own' the land, as the State retains fundamental jurisdiction.

This study draws on results from over 105 key stakeholder semi-structured interviews that investigated land use decisions making processes from the two provinces Nghe An and Dien Bien. Interviews were conducted with a range of government and non-government actors at provincial, district and commune levels in Vietnam. The study investigated how legislation

framed government and non-government land use and forest responsibilities, and the interviews revealed how these actions were perceived to be implemented in practice. Results indicated the disconnect between political decision making and peoples existing livelihood practices. By fulfilling central obligations for land use classifications quotas, lower governments were unable to meet local needs through capacity and knowledge shortfalls. Land use plans were perceived unfavourably by some households, who indicated their resistance to proposed reclassifications that would increase states control once again. Overall efforts to decentralise land use and forest management and the effectiveness of those decision was impeded not by the authority but the capacity of lower government to enact those responsibilities effectively. Lower governments need to be equipped with the suitable skills and knowledge to develop land use plans that incorporate and balance the needs and interests of local people's livelihoods to those of the State.

Keywords: Multilevel Governance, Land Use, decentralization, Vietnam, Policy

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Contextualising farmer-herder conflicts in Ghana: A Socio-Geographical Approach

Fulani herders migrating into southern West Africa has occurred for several decades, spurred on by the political ecology of their livelihood adaptations, where herders either travel with the West African rain belt to exploit the growth of greenery and water resources or sedentarise in new environments (Bassett and Turner 2007; Diallo 2001). For these, herders harness networks involving traditional authorities, fellow herders or cattle owners to facilitate their entry into specific locations. Apart from the opposition to the herders in-migration on grounds of crop damage, pasture and water competition and cattle theft (Bassett 1994; Breusers et al. 1998; Moritz et al. 2002; Tonah 2007), it appears farmer-herder relationships are also influenced by factors which are not immediately material.

This research was conducted to develop a deeper understanding of farmer-herder conflicts in Northern Ghana drawing on a socio-spatial lens to examine respective conceptualisations of space, place and territory, the rhetoric related to environmental worldviews, the resultant environmental discourses, and the roles these play in the development of conflict behaviour. Drawing on interviews with 20 herders and 87 farmers, this paper presents results related to these socio-cultural notions of space, place and territory, potentially providing an explanatory framework for rocky farmer-herder relationships that transcend the obvious issues of resource competition and livelihood consolidation.

Our main findings indicate that farmers and herders harbour different notions of spatial concepts which reflect aspects of their worldview, lives and livelihoods. Whilst farmers for instance consider 'space' as any unit under political jurisdiction consisting of spaces all people can use and spaces some people can use, herders consider space as any area on which there is

no obvious landuse. Interestingly, herders do not consider as 'space' any area where the garig plant grows because the garig causes their livestock to bloat and even die when they ingest any part of it. Also, whereas farmers think of 'place' as anchors of lives continuities, livelihood stability and their heritage, herders view 'place' as units in which cattle thrive, where herding contracts can be had, and where they can be rooted and yet remain footloose. In terms of territory farmers express perspectives including 'political' territory and 'subsistence' territory whereas herders for the most part appear uninterested in territory because they consider it to be an encumbrance but appear interested more in what we call 'inalienable' territory.

These highlighted notions of space, place and territory suggest an apparent clash of perspectives which not only produces differences in the rationalization of actions but also the propensity for problematic relationships. Coupled with herder's entry into farmers' locales with no or few permissions, farmers consider the herders influx a violation of their "sovereignty" for which reason the herders' access and use of local resources are non-valid. We think these differences of notion and opinion play important roles in the rhetoric between farmers and herders and have an impact on their respective (conflict) behaviour.

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Keywords: Herders, Farmers, Space, Place, Conflict Context, Ghana

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The effect of information feedback on social-ecological system robustness: Evidence from a behavioral laboratory experiment

Navigating social-ecological systems (SESs) through change and uncertainty is an information-intensive endeavor. Numerous studies have highlighted the role of information feedback in enabling SES sustainability: people collectively learn how decisions may best be modified to sustain their SES by sensing outcomes and changing conditions, as well as by exchanging

knowledge. For example, ecology-related information such as status of ecological indicators and local ecological knowledge (LEK) can help people to detect and cope with environmental crisis. Social feedbacks such as voicing of social norms, group assessment of individual behavior, and the information regarding the expected behavior or reputation of others may also have a huge impact on outcomes. Such feedbacks influence whether stakeholders learn to build mutual trust, a shared understanding of their social-ecological system, and common goals and strategies for managing their SES, all of which are essential for collective action. Furthermore, the context in which such information feedbacks occur matters. For instance, studies have shown that the underlying context of social network structure likely influences the diffusion of information in a SES. Asymmetries in power or social influence among actors may also influence how information feedbacks are interpreted and translated into policy actions. Put simply, interactions between information feedbacks and the underlying context can significantly influence whether a SES maintains its performance under internal and external perturbations, i.e., robustness. What characterizes the right information feedbacks and the enabling context that help to build SES robustness to environmental variability? We tackle this question by employing a behavioral experiment of an irrigation system -- a controlled action situation designed to study how people make decisions to manage an irrigation system under social dilemmas and environmental shocks. In this experiment, participants generate and consume diverse information feedbacks before making decisions to manage their irrigation system. The key context of the action situation is the systematic asymmetry of power intrinsic to a natural setting of irrigation systems, i.e., upstream participants often access benefit (water) before downstream participants do because of the structured advantage of their upstream location.

Keywords: Behavioral experiment, Experimental economics, Irrigation system, Robustness, Resilience, Information feedback

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Motivations for Community-Based Conservation: A case from Odisha, India

Community-based conservation has been defined by Western and Wright to include natural resource or biodiversity protection by, for and with the local community. However, surprisingly little is known about what enables community-based conservation. The aim of this paper is to explore and identify potential motivations to understand why a community-based organization chose conservation of endangered olive ridley (*Lepidochelys olivacea*) and environmental

stewardship as their flagship project. Samudram Women's Federation is a State-level organization working with small-scale fishing communities in Odisha, one of the poorest states in India. This organization, recipient of the 2010 UNDP Equator Prize, was used as a case to explore questions around collective action for community-based conservation. Data for the research was collected through participant observation, semi-structured interviews, key informant interviews, and focus group discussions. The study analyzed how the interactions and interests between multiple actors within a community shaped the goals and activities for the conservation initiative. Government prohibition of fishing in the nesting season and penalties for killing turtles, or any one single factor, could not explain the conservation behavior. Rather, it was the presence of many complementary factors (economic, political, environmental, social and cultural) that enabled or motivated the community to take up conservation and environment stewardship. Economic factors included job creation involving relatively small incomes from beach patrolling. But economically and socially more significant were the indirect benefits of empowerment through Samudram's capacity-building: gender empowerment, financial literacy program, micro-finance, low-cost equipment and infrastructure, direct linkage to wholesale fish markets, training in value-addition, and marine product diversification. Cultural factors were also important for community-based conservation. For Hindus (and almost all locals are Hindu), the sea turtle is one of the avatars (incarnation) of Lord Vishnu, the preserver of life. As one Samudram member put it, "It is our responsibility to protect them [the turtles] ... if we don't, who will?"

Keywords: Community-Based, Conservation, Motivations, Marine Resources, Resource Management

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Conflict over Indigenous Commons: Self-Organization to Influence Institutional Space

Many indigenous peoples worldwide face increasing exploitation pressure directed towards their commons, not least from mineral extraction which has played a prominent role in economic development globally although with inevitable adverse impacts on society and ecology. Consequently, mining-led development is often associated with conflicts between corporate mining objectives, indigenous peoples' and recipient community needs and governmental policy goals. The institutional setting often promotes certain of these groups while marginalizing others, which may worsen conflicts. Ostrom's design principles suggest that local users should have the right to participate in the modification of operational rules, which corresponds well with principle of free, prior and informed consent of indigenous peoples increasingly being recognized. This paper analyses how open the institutional framework of mining in Sweden is to the indigenous Sami people, as well as other local interests and how it affects their self-organization. Large parts of the Sami territories are threatened by mineral developments, and the Sami are mobilizing for institutional change along with environmental NGOs and local interests. The paper studies two ongoing cases of mining development processes on Sami lands; through mapping formal interactions as registered at the Mining Inspectorate, drawing on official policy statements, conducting interviews with key actors and observing local meetings.

Keywords: Indigenous Peoples, Mineral Extraction, Institutional Change, Conflict, Self-Organization

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Local forest governance in Guatemala: Can Polycentric Governance Theory Explain Variation in Outcomes?

What are the drivers of sub-national variation in forestry outcomes under a uniform national decentralization policy? The literature on decentralized governance of natural resources in developing countries is decidedly mixed in terms of theory and findings. Some scholars argue that decentralization reforms will lead to improved policy outcomes, other scholars view decentralization with great skepticism, and a third group believes that whether governance reforms will lead to positive or negative environmental outcomes is conditional on an array of ancillary factors. Unfortunately, many empirical investigations of decentralization's effects fail to evaluate these competing explanations under circumstances where there are tangible tradeoffs pushing actors toward disparate environmental outcomes. Our contribution to this policy-relevant debate involves innovations in both theory and empirics. First, this study builds upon and applies polycentric governance theory, arguing that the strength of connections between actors across levels of government shapes forest cover change under decentralization. Specifically, we hypothesize that municipalities exhibiting higher levels of polycentricity will be more effective in improving forest conditions. Second, we test this theory using a unique longitudinal dataset on forestry governance for 100 municipalities in Guatemala, combining socio-economic information, two waves of surveys with mayors, and remote-sensed data on forest change over twenty years. Preliminary results suggest that governance systems characterized by higher polycentricity are able to counteract the pressures towards deforestation when agriculture is important for a municipality, whereas those with lower polycentricity are not.

Keywords: Polycentricity, Local Forest Governance, Decentralization, Local Government, Guatemala

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To Harvest or Not to Harvest: Institutional Change in Farmer-Trader Exchange Practices in the Indonesian Shallot Market

Novel incentive mechanisms are being negotiated between farmers and traders to manage the harvest of shallots in rural Indonesia. This presentation will use descriptive data and a

theoretical model developed by Eswaran and Kotwal (1985) to demonstrate that the evolution of harvesting institutions is a response to the development of rural markets. A testable hypothesis of our model is that the dominance of one form of harvesting (i.e. tebasan) over another is driven by differences in the comparative advantage of farmers/ traders in two non-marketed inputs – internal labour-supervision and external-management. Although informal, these contracts are shaping nascent markets for a high-valued agricultural commodity in Indonesia.

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Keywords: Institutional Change, Informal Institutions, Harvesting, Market Development, Indonesia

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First Nations-settler collaboration and learning for the governance of forests in Northwest Ontario, Canada

The forests of Northwest Ontario show characteristics of a complex commons in that they involve multi-party governance with diverse actors, including local, provincial and federal governments, industry, and First Nations. Historically, Indigenous peoples have not been included in forest governance in Northwest Ontario, with any input they provide coming mostly through the government's duty to consult and accommodate. More recently, socio-economic factors have influenced forest tenure reform in Ontario, and in the northwest this has contributed in part to examples of collaborative forest governance involving First Nations. This study looks at two interconnected case studies that represent this shift in policy and the response by local actors in the form of the development of collaborative forest governance. The first is Wincrief Forestry Products Ltd., a forest products company that is 49% industry owned and 51% First Nations owned. The second is the Miiitigoog General Partner Inc., a larger collaboration (inclusive of the first) that was set up to manage the Kenora Forest through an Enhanced Sustainable Forestry License with decision-making authority shared equally by First Nation and industry partners. Focusing on the learning outcomes of participants to these initiatives, our goal was to understand collaborative governance, especially cross-cultural processes meant to be mutually favourable. Key informants and those involved in governance [n=43] were interviewed using a semi-structured approach. Data included information from policy documents as well as interview data, which were analyzed using a framework including both Western and Anishinaabe learning ontologies. A key result of this work is that learning occurring prior to formal collaboration was important for building cross-

cultural understanding and initiating relationships. Another important finding is that collaborations, such as Miitigoog, which are built to take on new partners, are affected by different learning outcomes depending on when collaborators enter into the collaboration. We conclude that informal learning processes, relationship building, and working through initial conflicts were important aspects of setting up a collaboration that was reported as being mutually favourable by partners from both First Nations and industry.

Keywords: Collaboration, Complexity, Indigenous Resource Development, Forest Governance, Learning

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Exploring visions, perspectives, and systems for engaging in the collaborative governance of “Common Ground”, Kenora, Northwest Ontario

In Kenora, northwest Ontario, “Common Ground” is a term used to describe both a physical resource commons - 400 acres of heritage lands of historical, social, recreational, and spiritual significance to both Anishinaabe and settler (Euro-Canadian) communities - and a broader philosophical movement that looks to strengthen collaborative relationships between these same groups within the context of shared resource governance at larger scales. The Common Ground Research Forum (CGRF), whose partners include the City of Kenora, Grand Council Treaty #3, the First Nations of Obashkaandagaang, Ochiichagwe’babigo’ining, and Wauzhusk Onigum, the University of Manitoba and the University of Winnipeg, was developed to explore processes of cross-cultural communication, social learning, reconciliation, conflict management, and institution building around resource use and management. Our panel comprises of four CGRF researchers whose respective presentations focus on the experiences and perspectives of those involved in collaborative resource management initiatives in the Kenora area. Jim Robson begins the session with an introduction to “Common Ground”, and the ways in which the term is being used locally. He focuses on the heritage lands close to the city’s downtown that have been a focal point for the “Common Ground” movement. As they shift from a de facto to a de jure commons regime, he asks how formal regulation may best be layered over customary usage and informal institutions. Mya Wheeler’s presentation looks in detail at the users of these heritage lands. Having adopted the geographic concept of Sense of Place to guide interviews and modified focus group discussions, Mya reports on the nature of users’ ongoing connections to the Common Ground Land in an effort to build a shared vision for future participatory decision-making - findings that provide context for the final two papers.

These move the discussion from a local to a more regional scale, with a focus on collaborative fisheries and forest governance respectively. Megan Bob will speak about the cross-cultural collaboration underway between the local Ontario Ministry of Natural Resources and the Anishinaabeg of Kabapikotawangag Resource Council (tribal council of five First Nations) who are working together in fisheries management. The research explores relationship building, conflict resolution, and how learning occurs in this setting. Our session ends with a presentation by Melanie Zurba. Her research centres around two interconnected case studies involving cross-cultural collaboration and learning in forest governance. The first collaboration serving as a case study is Wincrief Forestry Products Ltd., a corporation that is 51% owned by Wabaseemoong Independent First Nations and 49% owned by Moncrief Construction. The second is the Miitigoog Limited Parter Inc., which is a 50/50 partnership to govern the Kenora Forest through an Enhanced Sustainable Forestry License (Enhanced SFL). Our panel concludes with a discussion about the development and practice of meaningful forms of cross-cultural collaboration, and the degree to which efforts to affect social change around resource governance in this corner of northwest Ontario resonate with other parts of the country.

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Rethinking Democratic Governance as an element of inclusive and sustainable development

The aim of this paper is to contribute to the discussion on the future agenda for innovation in governance reforms and the steps for building a public sector that can deal with complex, interconnected, cross-cutting and global issues, such as education, poverty, inequality, environmental issue, healthcare and the rethinking of welfare for an aging society. These challenges and problems express the limits of the Welfare State bound within 20th Century models and the need to develop the strategic design as a tool to better conceptualize and respond to the so-called “wicked” problems. Public innovation is moving to the top of the agenda at all government levels in most parts of the world. National governments around the globe are actively seeking new ways of citizen participation to identify and address issues of public concern and are investing in innovation labs and centers where the design of organization form are now being explored and applied to transform and innovate the public sector (Mindlab in Denmark,). At the same time, there is a growing frustration with the traditional form of bureaucratic governance as well as with the impact of New Public Management and the neoliberal model.

Citizen engagement has become an essential part of modern government. Most innovation is the product of collaboration between multiple actors. This tends to transform the role and identities of public and private actors that are participating (e.g. politicians, public managers, professionals, citizens, labs etc.). This implies building a strong innovative experimental and anticipated culture, a new citizen mobilization method in collaborative arenas and a new form of organization that undermines the administrative and political silos.

In this context, the aim of this paper is to root in the systemic properties of complexity for thinking in public policies, focused on co-production of services and public policies (Ostrom) and on the role of the social capital (Putman). This analysis is divided into three parts. The first

part explores new approaches in the 21st Century by using an interdisciplinary of some topics: citizen participation, co-design, coproduction and the social capital as an element of inclusive and sustainable development. The second part reviews some case studies to understand how and why certain countries have responded to the challenges of the new millennium, especially different cases of Denmark, the UK, USA, Finland, New Zealand, Australian, Singapore and Latin America. The paper concludes with a discussion about the challenges and opportunities of how to improve social capital (“innovative”, “networked”, “collaborative”, “and co-produced”) in public governance in Latin America. This is not only a question of making productive use of public resources. This is also an emerging democratic problem where representative democracy increasingly seems to consist of more than just casting a vote every four or five years.

Keywords: Public Policy, Public Innovation, Democratic Governance, Sustainable Development