



Minutes – Friday, May 26, 2023
Video Conference
9 am to 11 am

Attending: Rachel Bezner Kerr, Chuck Geisler, Stephanie Redmond, Agnes Guillo, Meredith Rutherford, Sara Hess, Aaron Fernando, Alice Green, Caitlin Cameron, Dave Bradley, Susan Riley, Terry Carroll, Tom Hirasuna, Rod Howe, Ray Burger, Margaret Johnson, Leon Porter, Ken Schlather, Janelle Bourgeois, Jack Wright, Ingrid Zabel, Holly Hutchinson, Hailey Delisle, Guillermo Metz, Irene Weiser, Sarah Carson, Rebecca Evans, Leigh Miller, Gerri Wiley, Don Haas, Diane Cohen, Dawn Montanye, David Kay, Peter Bardaglio

Climate Change and the Global Food System – Rachel Bezner Kerr

Rachel Bezner Kerr is professor of global development and director of graduate studies for the Ph.D. in Development Studies at Cornell's College of Agriculture and Life Sciences. Rachel was the lead author of the chapter on food in the IPCC's Sixth Assessment Report issued in 2022. She discussed the findings of that study and shared with us an overview of her work on the global food system, including her research in Malawi and Tanzania.

- Served on IPCC for 31/2 years – arms-length scientific advisory group to UN to provide policy-relevant information for governments and others to act on
- So far six assessments – Rachel worked on Working Group II, “Impacts, Adaptation, and Vulnerability” – reviewed all relevant literature since last assessment
- 270 authors in all from 67 countries – more than 34K scientific papers included in the assessment
- Rachel’s team had 13 people plus contributing authors – both social and natural scientists
- Draft placed online for peer review – received over 1,000 comments on her chapter – then revise chapter twice before final version released
- Full report synthesized into summary for policymakers – Rachel contributed to this summary
- Negotiate each word of summary with governments – they then sign off on this document
- Recent work on climate focuses on interconnections among climate change impacts, risks, and responses
- Underlying ecosystems, including biodiversity, critical dimension – must make sure we’re supporting those to bolster our ability to withstand climate change impacts
- Also social dimension: who’s more vulnerable to climate change? Need to make sure more marginalized groups in society are at table for discussion of adaptation responses
- Compared with previous report, more robust and widespread evidence of impacts on food systems – increasing extreme events have exposed millions of people to acute food insecurity
- Climate change has slowed agricultural growth over past 50 years globally with regionally different impacts
- Women, children, low-income households, Indigenous or other minority groups and small-scale producers, at higher risk of malnutrition and livelihood loss
- If we fail to limit global warming to 1.5 degrees C, risk even more severe impacts:
 - Heat stress
 - Water scarcity
 - Food security & nutrition
 - Flood risk, especially in coastal areas
- Wanted to make clear much more disruptive events if we don’t significantly reduce GHG emissions – no one will be spared from impacts on food systems: rising food prices, supply chain challenges
- Five key risks in food systems
 - Food security and nutrition: acute and/or chronic food and feed shortage
 - Food safety and dietary health: climate-related food poisoning or pollutant contamination as well as limited access to dietary diversity leading to malnutrition
 - Livelihoods of people in the food and ecosystem service sectors

- Ecosystem services: declines in soil health, pollinator, biodiversity
 - Policy related risks
- Multiple climate hazards cause multiple impacts, interacting to compound risks to food security, nutrition, and human health and leading to cascading events
- Key messages related to adaptations in food systems
 - Adaptation happening in food systems, but not quickly enough
 - Many effective, feasible adaptation options in food systems that have synergies with other goals
 - Several barriers to transformational, widespread adaptation
 - Robust evidence for ecosystem-based adaptations supporting ecosystems, biodiversity, and food systems
 - Integrated, inclusive solutions that take ecosystems and enabling conditions into account to avoid maladaptation particularly important
- Effective & feasible adaptation options
 - Cultivar improvements
 - Agroforestry
 - Agroecosystem diversification
 - Community-based adaptation
 - Agroecological approaches
 - Wider benefits
 - Food security and nutrition
 - Health and well-being
 - Livelihoods
 - Ecosystem services & biodiversity
- Ecosystems, biodiversity, and climate systems deeply connected
- Agroecology, ecosystem-based management in fisheries, & other approaches that work with natural processes can be key strategies in adaptation & mitigation
- Need to widen effort beyond just technical fixes and adopt broader, holistic approach to adaptation and food systems
- Agroecosystem diversification, instead of monocropping: multiple spatial & temporal patterns, e.g. mixed planting, intercropping, crop rotation, diversified management of field margins, agroforestry, integrated crop livestock systems
- Improves regulating and supporting ecosystem services such as pest control, soil fertility and health, pollination, nutrient cycling, water regulation, buffering of temperature extremes, yield stability, and reduced risk of crop loss
- Synergies with agroecosystem diversification
 - Crop diversification reduces sensitivity to precipitation variability, yield losses, and crop insurance payouts under drought
 - Example: study in Canada compared diversified rotations vs. corn – found significant positive yield impacts, yield stability, and increased soil organic carbon
 - Variable impacts depending on crop combination, agroecosystem;
 - Rigorous assessments of adaptive gains and potential trade-offs still need to be conducted across socioecological contexts
- Evidence of maladaptation
 - Adaptation can result in unintended consequences, including increased GHGs, inequity, or ecosystem degradation
 - Most disadvantaged groups often affected by maladaptation
 - Need to think about how you're doing adaptations, who's involved, where it's being carried out, and risks involved for ecosystem and people
 - Irrigation done poorly, for example, can lead to increased salinization, inequity among food producers, groundwater pollution
- Agricultural intensification tradeoffs
 - Can increase GHG emissions with fertilizer, fuel use, land use change – potential negative impact on biodiversity and ecosystem services such as soil erosion, salinization, and water quality decline
 - Short term food production increases, but may displace local food producers and worsen their food security and livelihoods

- Overall impact could increase climate risk and vulnerability, especially marginalized groups such as smallholders and farmworkers
- Addressing social inequities should be key dimension of adaptation
 - Marginalized groups (e.g. farmworkers, women, Indigenous people, and other ethnic and racial minorities) at greater risk from climate change impacts
 - Inclusive governance approaches which involve marginalized and vulnerable groups ensure adaptation benefits them
 - Technical approaches in adaptation which ignore power inequities can worsen climate impacts for these groups
- Integrated & inclusive solutions to transform food
 - Combining mitigation & adaptation for transformative pathways
 - Integrated, multi-sectoral solutions that address social inequities
 - Differentiate responses based on climate risk and local context will enhance food security and nutrition
 - Adaptation strategies which reduce food loss and waste or support balanced diets contribute to nutrition, health, biodiversity, and other environmental benefits
- Major gaps in adaptation research
 - Climate risk reduction of ecosystem-based adaptation and diversified production systems under different contexts/scenarios
 - Risk reduction from integrated and inclusive approaches under different climate scenarios
 - Post-production and across food value chain research
 - Cost of adaptation programs and cost savings from implementation
 - Global and regional assessment of maladaptation impacts
 - Regional gaps in adaptation research
- Rachel has done research in Malawi and Tanzania for over 20 years
- Contrasting approaches to food security & climate change adaptation in Africa
- Most common approach to climate change adaptation in Africa is called “sustainable intensification” – combination of synthetic fertilizers, hybrid seeds, and expert-driven strategies – doesn’t deal with social and political inequities
- In contrast, Rachel has focused on agroecology – dynamic concept, expanded from field and farm to whole food system
- Transdisciplinary science: brings together agronomy and ecology
- Set of practices: harness ecological processes in agricultural production – generic principles, applied locally - no prescribed set
- Social movements: political, assert collective rights for smallholder farmers, holistic approach to food system, and advocate diversity in agriculture and food systems
- Rachel participated in panel in 2019 that produced report on agroecology – literature review that identified underlying principles
- Some of them at field level: recycling, finding synergies between plants and animals, reducing reliance on toxic and fossil fuel based inputs, and enhancing biodiversity
- Much of agroecology is on the “beyond the farm” levels – bringing in research on local and Indigenous knowledge, democratizing food system, addressing questions of equity and fairness, producing foods that are culturally appropriate, diversifying food system, and building greater connectivity between producers and consumers
- Diversified production enhances resilience, strengthens adaptation to climate change
 - Agrobiodiversity a key principle in agroecological systems
 - Reducing synthetic inputs also principle
 - Strengthens key ecosystem functions e.g. pollination, soil organic carbon, soil microbial activity, nutrient cycling, water quality
 - Biodiversity in turn increases resilience to extreme events e.g. droughts, pest outbreaks;
 - Multipurpose benefits e.g. food, shading, food, fodder, income
- At heart of agroecology is involving farmers and food producers in crafting the way food is produced, bringing in local knowledge, and addressing inequities in food system – not just set of practices
- UN panel reviewed literature to see if agroecology could improve food security and nutrition – found strong evidence that it could do so
- More complex agroecological systems (e.g. crop diversification, farmer-to-farmer networks) more likely to have positive food security & nutrition outcomes

- Rachel's field research has focused on whether agroecological methods can improve food security, nutrition, livelihoods, and well-being of smallholder African households
- Has led three main studies
 - 400 households in Malawi, highly food insecure, 20 villages, pre-post design
 - 6,000 households in Malawi, pre-post/control
 - 588 households in Tanzania, pre/post and delayed intervention, cluster randomized trials
- Typical strategies used by farmers included:
 - Agroforestry (fruit & leguminous trees)
 - Intercropping different kinds of nitrogen-fixing legumes (pigeon pea, groundnuts)
 - Compost and intensive animal manure application
 - Crop diversification e.g. sorghum, finger millet, cowpea
 - Farmer-to-farmer learning, exchange, and experimentation
- Incorporated ways of addressing gender and other social inequities
 - Developed integrated curriculum (agroecology, climate change, nutrition, social equity) aimed at farmers in southern Africa
 - Theatre, hands-on activities, storytelling, small group discussions.
 - Developed by farmers, scientists, NGO staff
- Research demonstrated that this approach to agroecology significantly improved food security and dietary diversity
 - Crop diversity, compost application and participation in agroecology project significantly improved food security
 - A household was 32% less likely to be severely food insecure per additional food crop grown
- Found farmers using many different ways to increase their food security
 - Farmers reported that increased crop diversity reduced labor in weeding
 - More crop diversity increased dietary diversity
 - Saved money on foods previously purchased & fertilizer, invested in animals as a source of savings
 - Significantly higher but modest farm income reported (average \$59 vs \$21 on average);
 - No longer had to work on other people's farms, instead could invest in own farm and dry season vegetable gardens
 - Increased food security allowed more food and seed sharing – community-wide benefits from crop diversity
- Gender relations matter for agroecology impacts
 - In Malawi, farmers who discussed farming with their spouse were 2.4 times more likely to be food secure & have diverse diets
 - In Tanzania participation in peer-to-peer agroecology intervention increased men's help in household tasks and reduced odds of women's probable depression
- Women and children's dietary diversity improved
 - In Malawi women's dietary diversity higher for those in participatory agroecology intervention
 - In Tanzania those in participatory agroecology intervention: 1.48x odds of child having minimum acceptable diet
- Longer term change: Agroecology improves food security, income, & land use
 - Significant link between # of agroecology practices and likelihood of becoming food secure and with higher income
 - Farmers participating in farmer-to-farmer learning activities significantly more likely to practice agroforestry, composting, mulching and legume intercrops;
 - Two years after project ended, 90% of surveyed participants (n=600) still using agroecological practices
- Agroecology led to stronger social connections
 - Longitudinal study found households practicing agroecology had an increase in social capital
 - Bidirectional relationship – increased social capital more likely to increase the number of agroecological practices

Q&A

- Peter asked Rachel how she got started in this field – before her undergraduate studies, she traveled in Mexico and Guatemala – became very interested in food security and social justice issues
- Did undergraduate degree in international development studies – loved soil science

- For undergraduate thesis lived in Guatemala for year working with nonprofit – studied soil conservation methods with smallholders
- Ingrid Zabel: What are best ways to persuade people and businesses to protect ecosystems if we can't count on regulations?
- Rachel: Making impact seem relevant to people you're trying to motivate – but we shouldn't give up on regulation and should continue to push for it
- Chuck Geisler: Over last decade land greater than size of France has been transferred from local producers to large corporations and investors – doing so has diminished social interconnections and made it more difficult to address equity and social justice issues as well as connection with climate change – to what extent do you see land tenure as an issue in your work and work of others?
- Land tenure is addressed in our chapter on climate and food systems in 6th IPCC assessment – looked at how land acquisition can have harmful impact on food systems and climate adaptation and mitigation
- Climate adaptation and mitigation strategies need to take marginalized groups into account
- Peter: What kind of assistance did you have in your research, especially in Malawi?
- Rachel: Worked with great teams in Malawi – farmers, soil scientists, epidemiologists, geographers, public health experts, and nonprofits
- Long-term partnership with nonprofit in Malawi, Soils, Food, and Healthy Communities – also had undergraduate and graduate students helping out
- IPCC assessment all volunteer effort – drew on willingness of scientists to put in time
- Dawn Montanye: Have you seen any signs of gathering momentum regarding agroecology that indicates it can take place on scale needed to deal with global threat of climate change to agriculture?
- Rachel: Rising food prices have raised alarm in many different parts of world – could perhaps become tipping point and provide opening for alternative approaches other than intensified agriculture
- Aaron Fernando: Could you say more about how theatre and drama were used to drive behavioral change around land use practices and addressing social inequities
- Rachel: Allows for presentation of difficult ideas such as gender inequity or changing farming practices in way that brings in humor and is very engaging and less threatening
- Peter: Empowering women crucial to strengthening climate resilience and food security
- What's next for you in your research?
- Rachel: Working on securing funding to do larger scale project on climate change adaptation in Malawi – also working on several smaller research projects looking at impacts on biodiversity from landscape-scale adoption of agroecology practices and another on developing forest inventory and exploring natural forest regeneration
- Peter: To what extent does your research involve undergraduates?
- Rachel: Working with undergraduates for many years as research assistants and on undergraduate thesis projects – developing course that will bring undergraduates to Malawi for intensive study of agroecology – often three or four students accompany her in Malawi
- David Kay: How have climate-induced floods in Malawi affected farmer response to that risk?
- Rachel: Hits very close to home – people in Malawi very heavily affected by flooding – requires more landscape-scale planning – can there be forest regeneration in places where deforestation has taken place? Are there places where you have to engage in soil rehabilitation? Also looking at ways to set up warning system using mobile phones

Current Climate and Clean Energy Legislation in Albany– Anna Kelles

Assemblymember Anna Kelles represents the 125th District, including Cortland and Tompkins Counties. She is a force to be reckoned with on environmental issues in the General Assembly and has been hard at work this session, which will be winding down in the next couple of weeks. She provided her assessment of the progress made this session—what she saw as the biggest victories as well as the areas that need continued attention going forward.

- Anna opened up with comments on important team effort undertaken in this year's legislative session, emphasizing how important it was for TCCPI members and others to stay involved in advocating for climate and clean energy policies
- Budget five weeks late this year – held up by debate on bail reform rollback – cap and invest, as result, did not get time and attention it should have – incorporated into budget without any guardrails whatsoever

- Essentially place holder for governor, giving her authority to establish cap and invest program – only requirement was that 35% of revenue raised must go for rebates to LMI households and small businesses
- Needed to be more like 65-70%, at least for first few years
- Just Energy Transition Act would compensate at least to some degree for what's lacking in cap and invest program as adopted
- No language that made sure cap and invest didn't just become trade system – important that there's no trading of allowances, as happened in California
- Also DEC should've been given much more power to put floor and ceiling on price of allowances – also should've been required that DEC hold back some of allowances so energy intensive industries could be better supported through transition to non-fossil fuels and risk of job losses could be minimized – no definition of “energy intensive industry” included
- Public comment period this summer or fall – important to watch closely – will be including her public comment in her newsletter
- Waiting for governor to put out her version, then come back in January and fix it if necessary – already have draft bill in place
- Build Public Renewables Act one of two big wins in approved budget
 - Currently NYPA cannot build solar and wind projects in market, only private sector can – not happening fast enough to meet state's climate goals – NYPA will not be required to fill in gap to make sure 2030 target reached
 - Language to democratize NYPA board not included – members handpicked by governor
 - NYPA has authority to place solar and wind on state-owned land but is not doing any of that – this bill will require NYPA to become part of solution
- Other big win was All Electric New Buildings Act – oil and gas industry, including utilities, formed front group and spread disinformation about this act, saying state is trying to take gas stoves away – simply not true
 - People can still replace their gas stove with another gas stove In existing buildings – only prohibited in new construction
 - Beginning in 2026 all new buildings up to seven stories will have to be all electric, and starting in 2029 requirement will be extended to new buildings above seven stories
 - State currently adopts international building code with NY overlay – next three-year cycle will come out in December 2025, which is why 2026 date was adopted – means that legislation can be incorporated into next round of NYS updated building code
- Biggest threat was Parker-Barrett bill, which included gas and oil industry wish list aimed at rolling back CLCPA
 - Ended up not being included in governor's budget but will still have to be pushed back against – will surface again
 - Biggest component was changing calculation of methane emissions from 20-year timescale to 100-year timescale – would've artificially deflated impact of methane emissions and reduced need for renewable energy infrastructure to meet climate law targets
 - Peter: Inspiring to see groundswell of opposition from grassroots organizations across state that forced governor to withdraw this move
 - Anna agreed that public pressure was key – governor reserved option, however, of reintroducing bill
 - Provisions in Parker-Barrett bill regarding biofuels was equally problematic – would've underestimated impact of biofuel GHG emissions, too
 - Linked to effort to make biofuels exempt from cap on GHGs in NYS – agriculture lobbyists joined fossil fuel advocates in pushing for this change
 - CLCPA allows use of biodigesters on farms, but energy produced has to be used onsite – bill tried to remove onsite requirement – effort to create LNG export from farms to domestic and international markets
 - Bill also adds trash incinerators to list of renewable energy generators – need to keep close eye on this bill and make sure it gets killed
- Climate and Community Protection Fund Act (Glick and Harkham) one of initiatives Anna strongly supported – ensures we invest in transition of workforce, and no one falls through cracks

- Also would guarantee that significant portion of funds raised would be used for community-driven renewable energy projects and makes sure funds invested in environmental justice communities
- Very little chance, though, this bill will get to floor in this session because it's budget bill – need to push governor hard over summer and fall to include bill in her executive budget
- If not, then need to push General Assembly and Senate to include it in their one-house budgets next year
- Gap fund another bill Anna hopes to get passed – would take NYSERDA funds and help LMI families carry out necessary repairs and weatherization so they can, for example, qualify for solar system incentives and other NYSERDA programs
 - Anna hopes to get this included in governor's executive budget – again, need to push this over summer and fall – even by October governor is starting to wind down budget for introduction in January – very front-loaded process
- Anna supports effort to keep policy out of budget process due to disproportionate influence governor wields over budget process – have to be careful, though, in making this change not to put governor on defensive
- Would make it less likely that process would get hung up on policy issues and budget would be approved on time – also would help reduce extent to which policy gets negotiated behind closed doors
- Would need to be constitutional amendment so important that education effort takes place for general public since they would be voting on it at ballot box – last time amendment was successfully adopted was in 1938 – that's when it became possible to include policy in budget

Q&A

- David Kay: Any ideas about creating new roles for municipally owned utilities?
- Anna: Strongly supports idea and is on her radar – came up too late in this session – was able to get community broadband in last year's budget – this year was able to secure support for enabling municipalities to issue bonds for community broadband for duration of system's life instead of just ten years
- Third stage would make it possible for municipalities to join together and create communication union districts so they can leverage their collective bargaining power – modeled after system created in Vermont
- Dave Bradley: What is NYS going to do to dramatically ramp up renewable electricity generation?
- Anna: No magic bullet – need to chip away at it from every angle – was able to get \$1M approved for agrovoltaic research center at Cornell
- Lot of resistance at local level to solar farms – legitimate in cases where solar farms are taking over prime agricultural land
- Need to find ways to carry out large-scale food production combined with solar power