Global Biodiversity Assessment: Section 10

(In the final, published version [ISBN#0 521 56481 6],

this section became Section 13, found on pages 915-1062.)

INTRODUCTION

On September 30, 1994, Jon Margolis reported in the *Chicago Tribune* that the Global Biodiversity Assessment did not exist: "There is no such document, said a member of the staff of the UN Environmental Program. `We have a biodiversity treaty and a secretariat,' she said. The Global Biodiversity Assessment is a process, just beginning, in which scientists from all over the world will monitor the world's biological diversity."

The Global Biodiversity Assessment (GBA) is, in fact, being developed at the behest of the United Nations Environment Programme (UNEP) with funding provided by the Global Environment Facility (GEF). The published deadline for the first draft was July, 1994. Deadline for the second "peer review" draft was November 1994. The third draft is scheduled to be finalized in April of 1995, and published in May, 1995.

Here follows an outline of the 12 sections covered by the GBA document, along with the designated coordinators for each section, and a summary of Section 10. The appended glossary of terms was prepared by Dr. Michael S. Coffman, President, Environmental Perspectives, Inc., and author of *Saviors of the Earth*.

The complete GBA document is 1140 pages, but is not available for review outside UNEP circles. UNEP denies the existence of the document, even though the process was begun several months ago and has obviously reached the "peer review" stage.

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GLOBAL BIODIVERSITY ASSESSMENT

SECTION 10

Measures for Conservation of Biodiversity

and Sustainable Use of Its Components

Peer Review Draft, September 2, 1994

(In the final published version, this Section became Section 13)

A Summary

By Henry Lamb, and

Dr. Michael S. Coffman

Chapter 10.1 - A Conceptual Framework for the Conservation and Sustainable Use of Biodiversity

"The wide range of responses required to sustainably use and conserve biodiversity include, among others: protected areas. seed banks, an array of practices in forestry,

fisheries, rangelands, and agriculture, botanical gardens, legislation, and on-farm conservation areas. This chapter does not propose any specific conceptual framework. Rather, several sets of issues are presented that relate to the interaction and effectiveness of conservation and sustainable use measures."

10.1.2 - The Need For An Integrated Approach

The issues discussed include "The Need for an Integrated Approach," because "biodiversity is complex," because "different types of values (biological/ecological, economic, cultural and religious, aesthetic, etc.) are associated with biodiversity," and because of a "...multitude of threats to biodiversity -- from widespread pollution and habitat destruction and fragmentation to localized overharvesting of individual species. The integrated approach must include off-site **ex situ**, as well as on-site **in-situ** measures, to address the multiple values of biodiversity."Conservation measures may or may not protect a certain set of values associated with biodiversity, or may or may not be consistent with those values."

Human influences on biodiversity are addressed comprehensively in Section 9 (unavailable for analysis), but are said to constitute a "compelling argument" for using an array of integrated conservation measures. Human influences include: "Overexploitation by hunting, fishing, gathering or collecting, deforestation, road construction, agricultural expansion, urban growth, coastal development," all of which "imperil the persistence of particular habitats or ecosystems." Species introduced by humans "wreak havoc on native species," and "Human-induced climate change may alter the boundaries of the world's biomes more rapidly than many species can change distributions."

There are six fundamental causes of biodiversity loss set forth in "The Global Biodiversity Strategy developed by the World Resources Institute (WRI), International Union for the Conservation of Nature (IUCN) and UNEP in 1992." They are:

1. Unsustainably high rate of human population growth and natural resource consumption;

2. Steadily narrowing spectrum of traded products from agriculture, forestry, and fisheries;

3. Economic systems and policies that fail to value the environment and its resources;

4. Inequity in ownership and access to natural resources, including benefits from use and conservation of biodiversity;

5. Inadequate knowledge and inefficient use of information;

6. Legal and institutional systems that promote unsustainable exploitation.

Ultimate success of conservation measures will depend upon their application across the "**overall landscape**" which includes "farms, forests, grazing areas, fisheries, villages, and urban areas - not just in natural and semi-natural ecosystems.

"In many cases, traditional knowledge is the most advanced knowledge available and deserves respect in the development and use of conservation measures. Apart from practical knowledge, traditional communities may also have much to teach modern communities about fundamental ethics and attitudes dealing with the natural world. In many areas, traditional ethics, beliefs, myths, and attitudes which have, in effect, linked respect and maintenance of biodiversity with human welfare are disappearing rapidly -- losses which can be as irreversible as species extinction."

10.1.3 - The Social, Cultural and Economic Context for Conservation and Sustainable Use Measures

The social, cultural and economic context for conservation and sustainable use measures require "participation and use of local knowledge," and "curbing the destructive or unsustainable uses by those who are uninterested or uncaring."

10.1.3.3 - Consumption and Growth

"The human ecological niche has been expanding at the expense of other species. Unless human numbers and consumption rates are slowed or stabilized soon, conservation and sustainable use measures in many areas will be overwhelmed. Reforms of those policies that have adverse impacts (development, trade, tax, tenure, education, environmental and other national and international polices) are likely to do more to conserve biodiversity than many of the more narrowly-defined conservation and sustainable use measures."

10.1.4 - Policy and Institutional Context for Conservation and Sustainable Use Measures

Institutions and policies must be "changed" or "established" to provide an integrated framework that recognizes that "Populations, species, habitats and ecosystems have extensions and boundaries that are distinct from the administrative and sectoral boundaries of local and national public agencies, private lands and communal

territories. These factors make it clear that all paths to effective biodiversity conservation cross important legal and institutional ground."

10.1.4.2 - The Convention on Biological Diversity and New Opportunities for Institutional Coordination

The measures called for in the Convention on Biological Diversity "contain nearly all of the components that a conceptual framework for biodiversity conservation should have: inventory and monitoring, **in-situ** and **ex-situ** conservation, sustainable use of biological resources, economic incentives, research and training, education and awareness, impact assessment, access to genetic resources, access and transfer of technology, information management, technical and scientific cooperation, biotechnology, and financial resources."

10.1.5 - Integrating Conservation and Sustainable Use Measures in Practice

Putting the conceptual framework into practice requires an appreciation of appropriate geographic scale. "Biodiversity conservation is not simply a question of establishing parks or reserves as islands of protection in a sea of unregulated agriculture, forestry, fisheries, and urban development.... Rather, the sustainable use and conservation of biodiversity calls for the negotiation of agreements, plans, and action at all levels simultaneously. This integrated approach is here referred to as **bioregional management**. Such an area must be **large** enough to maintain the integrity of the region's biological communities, habitats, and ecosystems (including both natural/semi-natural and cultural ecosystems such as agroecosystems, gardens, etc.), support important ecological processes such as nutrient and waste cycling, migration, and stream flow, and include the human communities involved in the management, use, and understanding of biological resources. It must be**small** enough for local people to consider it home. Innovative forms of institutional integration and social cooperation will characterize effective bioregional management efforts."

Chapter 10.2 - Mechanisms for Defining Conservation Options

"This chapter seeks to present a discussion representative of the spectrum of priority-setting schemes. It may be better to set priorities in an informed and deliberate way than to leave the decisions to chance and opportunity." Three methods of priority setting are (1) species analysis, (2) ecosystem or biogeographic features, and (3) holistic analyses that include biological factors, economic, social and cultural factors."

10.2.2.1 - Species-based Methods

The species analysis method has been institutionalized by The Nature Conservancy and by the IUCN and is appropriate when ecosystems or bioregions have been degraded beyond the point of evaluations. While people are responsive to "charismatic megavertebrates" such as whales and pandas, they are less interested in lower level species.

10.2.2.2 - Ecosystem-based Methods

Shortcomings of the species analysis method have led to ecosystem-based methods. "Clearly, it is inefficient to save selected species while allowing the natural communities and ecosystems that support them (along with myriad inconspicuous species) to deteriorate. It would be wiser, surely, to identify and manage functioning representatives of each ecosystem type for the maintenance of native biodiversity. While very localized species, likely to be missed by a network of biodiversity management areas, would still require individual protection programs, such an integrated conservation strategy would ensure that the vast majority of species never become endangered.""The basic objective of most ecosystem-based approaches is to conserve the range of ecological conditions found within the geographic scale of interest." However, "ecosystem-based methods fail to include all rare or potentially endangered species."

10.2.2.4 - Holistic Approaches

The objectives of holistic approaches "are not only the preservation of biodiversity for its own sake, but maximizing life's capacity to adapt to changing conditions." The limitation to the holistic approaches is that they really are not biologically-based. They tend to de-emphasize biodiversity values to balance other social, economic and political values. "Unfortunately, national and local biodiversity conservation priority setting has not received the same level of attention that international priority setting has received."

10.2.3 - Conclusion

Priority setting is a continuous activity utilizing all of the above methodology. Priority-setting schemes to identify areas or sites of high conservation value based on global or regional analysis have been developed by a number of authors. These schemes have been used by the World Bank, the U.S. Agency for International Development, British Overseas Development Agency, the MacArthur Foundation and others.

Chapter 10.3 - Measures for Sustainable Use of Biodiversity In Natural Resource Management

"This chapter assesses measures that maintain biodiversity within the context of human uses and management of natural resources including agriculture, forestry, fisheries, infrastructure development, and tourism."

10.3.2 - Agriculture

Agriculture occupies more than one-third of the world's land area "and is the leading cause of habitat destruction on a global basis." Two models are discussed: (1) traditional/small scale, and (2) large scale commercial systems.

Most of the world's traditional/small scale agriculture (10.3.2.1) is found in developing countries. "One distinguishing characteristic of these systems is their high degree of plant diversity." These systems also "promote diet diversity and maximize returns under low levels of technology and limited resources. The resulting genetic diversity heightens resistance to diseases."

In-situ, or on-farm management practices are needed in this model. "This allows for continued, dynamic adaptation of plants...in diversified agricultural areas where crops are often enriched by gene exchanges with wild or weedy relatives. Basing a rural development strategy on traditional farming, ethnobotanical knowledge and agroecological techniques not only assures continual use and maintenance of valuable genetic resources but also allows for the diversification of peasant subsistence strategies."

Measures recommended to promote this model:

1. establish tax incentives or government subsidies....

2. restrict the promotion of homogenous cultivars and exotic stock types by government and commercial interests.

3. increase NGO (non-government organization) programs to collect information.

4. establish cultivar registration system and develop a monitoring system.

5. redesign agroforestry systems incorporating ecological insights.

"Traditional agricultural practices...are disappearing rapidly. These farmers have never been compensated for their service to humankind and no international mechanism is in place to secure such compensation. **Funds for the conservation of these resources could be derived from taxes or assessments on the trade and development of genetic resources** in industries that benefit most from biodiversity.

Few disagree that traditional agricultural practices have been responsible for the creation and maintenance of most of the agricultural genetic diversity that exists in the world today."

10.3.2.2 - Measures within Large-scale, Commercial Systems

Large scale commercial systems "are characterized by the use of high-yielding and relatively genetically homogenous plant cultivars and animal breeds, large inputs of chemical fertilizers and pesticides, and relatively little mixing of cultivars and animal breeds in the field.

"Although innovations in modern farming systems have greatly increased agricultural productivity, the biological support system that feeds humanity has narrowed. Four crops (wheat, rice, maize, and potatoes) account for half of the calories consumed by humans.

"**Current agriculture is not sustainable** because there has not been long-term planning for either (1) building up germplasm collections and reserve pools of germplasm to back up existing varieties, or (2) well-developed alternative strategies to genetic uniformity and monoculture such as crop mixtures or multilines which were often found in older traditional forms of agriculture."

Three categories of measures are identified to "preserve the genetic foundation of agriculture:"

1. Conservation of large tracts of natural ecosystems.

2. On-farm, or in-situ conservation of rare or threatened cultivars.

3. Ex-situ conservation measures for the storage and maintenance of agriculturally-relevant germplasm.

"Large-scale agriculture needs a more diverse genetic mosaic of species to reduce genetic vulnerability within and between crops. To feed a growing world population, the grain belts that produce most of the world's cereal, legume, and starchy root crops should be managed in accord with agricultural management strategies and institutional arrangements that ameliorate the negative environmental effects of agricultural practices (e.g. depletion and contamination of soil and water resources, reduction of diversity in soil microfauna and other invertebrate groups) and urban development.

"Measures are needed to restrict the impact of agricultural practices" (10.3.2.3);

1. Encourage use of integrated pest management.

2. Avoid dispersal of fertilizers and herbicides onto any relatively undisturbed habitat.

3. Train extension agents who work with farmers in developing natural habitat conservation strategies.

4. Leave some relatively undisturbed habitat on holdings.

5. Use native woody species when establishing windbreaks or woodlots.

6. Promote the establishment of land-use planning policies and practices that direct expansion to areas where cultivation and grazing can be sustainably practiced.

10.3.3. - Forestry

Measures to sustainably use and manage biodiversity in forestry are discussed using two models: (1) traditional forestry, and (2) commercial forestry. "Traditional practices in community forestry encompass a wide range of forms including agroforestry, sacred groves, forest gardens, collection of non-timber forest products, and highly selective timber felling among others."

10.3.3.1 - Measures to Sustainably Use and Manage Biodiversity in Traditional Forestry

"Small-scale and locally managed traditional forest use has enabled large aboriginal populations to be self-sustaining. Knowledge of plant and animal interactions, use of this knowledge within an ecosystemic context, and cultural taboos and prohibitions against over-exploitation have been developed that result in indefinite resource availability.

"There are several steps that can be taken to reverse the trend of traditional forest management disintegration. They will be entirely ineffective if no attempts at political, social and economic reform surrounding forestry and biodiversity are concurrently taken. Strong political commitment is essential from the government."

Government supported programs are recommended to replace or replicate traditional forestry systems. "Steps to develop a framework for maintaining effective conservation and sustainable use measures in traditional forestry include:"

1. Form national or provincial working groups to guide and monitor program implementation.

2. Conduct inventories on existing community forest management initiatives and territories, active forest field officers and NGOs.

3. Develop strategic regional maps of areas with high social and ecological potential for community protection and natural regeneration.

4. Facilitate exchanges of information between the programs to accelerate learning.

There is a need to develop joint-management programs which "do not seek to replace traditional forest practices but augment them with help in forest management planning, silvicultural practices, and marketing. Successful joint management requires a significant transfer of responsibility from state agencies to villagers."

Steps to develop a joint traditional-forestry sector system include:

1. Projects should be based on practical hands-on decision making by small, single-village social groups that communicate daily and cooperate with each other.

2. Members must be able to carry out the basic functions themselves, including establishment of use rules and regulations, resolutions of disputes and equitable distribution of benefits.

3. Field staff need to develop a different mix of skills and technical expertise to serve as community organizers, forestry extension agents and market analysts.

4. Allow cultural beliefs such as the conviction that old abandoned fields are full of spirits and should therefore be avoided, or that medicinal plants can only be harvested by the medicine man again because of spirits, to be means to restrict over use of forest resources.

10.3.3.2 - Measures to Sustainably Use and Manage Biodiversity in Commercial Forestry

Measures to sustainably use and manage biodiversity in commercial forests include: (1) the maintenance of genetic diversity, (2) minimize the impact of logging, and (3) biodiversity inventory and monitoring.

Protected area systems are the most effective means for genetic conservation. A system of reserves is recommended including enriched genetic reserves, extractive reserves, and garden reserves. "Even the most extensive protected area systems, however, encompass only a small proportion of forest sites, so additional measures...are required. Often the reserve size is too small, limiting the effective

population size of the target species. Distances between adjacent reserves are often large, which can result in problems of isolation and reduced gene flow."

Minimizing the impacts of forestry operations on biodiversity call for management techniques that "resemble natural processes. Environmental damage related to logging and forest management activities is all too often excessive due to lack of planning and absence of control of harvesting activities. The solution to this problem is obvious -- require that ecologically and socially appropriate management plans be drafted and followed.

"Many of the deleterious environmental impacts of commercial logging operations are not due to logging operations themselves, but to hunting and ecologically inappropriate forest colonization and conversion along logging roads. Responsibility for these effects should be borne, at least to a large extent, by the people who most benefit from logging."

Additional measures recommended include:

1. Establish protected areas systems.

2. Leave larger forest patches with complex shapes.

3. Use less intensive harvesting and management practices and leave corridors to nearby protected areas or natural habitat areas.

4. Employ botanists, zoologists, conservation biologists in the development of forest management plans.

5. Involve local people where appropriate.

6. Recover fair timber royalties which include the cost of maintenance of biodiversity.

7. Reduce disturbances that do not mimic natural disturbances.

8. Establish undisturbed riparian forest strips along rivers, streams, lakes, and wetlands.

9. Increase uneven-aged management.

10. Encourage directional felling and planned extraction of logs. Minimize road and log landings, use more efficient and less damaging equipment.

11. Environmental impact studies, registration of natural assets and natural heritage sites, and environmental audits should be conducted.

"The greatest threat to biodiversity is habitat loss." In order to measure habitat loss it is essential to inventory and monitor biodiversity to establish a "baseline" against which measurement can be made. "The Centre for International Forestry Research is presently engaged in developing a generic set of plant functional attributes which will be tested using a range of global benchmark sites as baseline studies for intensive surveys of plant and animal biota."

10.3.4 - Fisheries

Measures to sustainably use and manage biodiversity in fisheries recognize "that such commonly owned resources are overexploited" reaffirming "the tragedy of the commons." Of the 176 major fish populations monitored, 30 percent are said to be overexploited. In North Atlantic waters, 90 percent of the fish stocks are over fished. Measures for sustainable use are discussed in three categories: (1) traditional fishery systems, (2) small-scale systems, and (3) large-scale systems.

10.3.4.1 - Measures for the Sustainable Use and Management of Biodiversity in Traditional Fishery Systems

Traditional fishery systems are not necessarily doomed to overexploitation. "Sustainable management is possible under three general kinds of management regimes: private property, state property and communal property." Communal property requires community-based management which must limit the access of outsiders, and make and enforce rules among members. "Community-based management may break down in the face of such stresses as population increase, social and political disintegration, technology change, commercialization, habitat degradation, and pollution."

"The major problems of coastal and small scale fisheries (10.3.4.2) are overfishing and the degradation of habitats. The failure of many [small-scale] fisheries may be attributed primarily to acute socio-economic pressures that beset many developing tropical countries. There is a growing advocacy for community-based management, as described under 10.3.3.1.

Evolving measures in large-scale fisheries (10.3.4.4) result in "Responsible Fishing," which is a "management regime where the following major requisites are met:"

1. Precise and reliable scientific advice on the current state and development of fish stocks.

2. Total allowable catches for fish stocks are set by the fisheries management agencies.

3. Development of selective capture methods.

4. Fisheries regulations and management control measures.

5. Management of the high seas fisheries.

Tourism - (10.3.6)

"It is a well known fact that many modes of tourism have traditionally exerted a negative impact on the environment, both natural and cultural. Tourism, as well as other human activities, must change many of its negative attitudes and effects, in order to become a truly sustainable endeavor. The big challenges lie with problems caused by tour busses, scuba divers, golf courses, and waste treatment of big resort hotels, etc. Air conditioning should be substituted with natural cross-ventilation or the use of ceiling fans whenever possible.

"Among the many environmental guidelines related to golf course design and construction, these are some of the most important: avoid clearing native forests for new golf course development. Use areas that are already disturbed or have fallen into disuse (e.g. abandoned mines and agricultural or grazing fields); retain old and large standing trees in the design of the site plan; replant only with native trees and shrubs.

"The only way to truly avert environmental harm from waste is to prevent or at least minimize its generation. A good garbage prevention strategy would require that everything brought into a tourism facility be recycled for reuse or recycled back into the environment through biodegradation. The future of tourism lies in the way mass tourism is reoriented, and in general, moves to `alternative' models.

Ecotourism, as defined by the IUCN, is "environmentally responsible for travel and visitation to relatively undisturbed natural areas in order to enjoy, study and appreciate nature (and any cultural features both past and present), that promotes conservation, has low visitor impact, and provides for beneficially active socio-economic involvement of local populations."

"A major issue is how to ensure that local communities earn an appropriate share of the profits from tourism while at the same time conserving their natural and cultural heritage. Ecotourism, as a logical component of ecodevelopment, requires a multidisciplinary approach, careful planning - both physical and managerial - and strict guidelines and regulations that will guarantee sustainable operation."

Chapter 10.4 - Measures to Conserve and Restore Ecosystems Species, Populations, and Genetic Diversity

"This chapter assesses a wide range of measures associated with conservation systems (e.g. protected areas and natural habitat management, restoration ecology, zoos, botanical gardens, museums, and germplasm storage and maintenance facilities) in which the preservation of biodiversity is a principal objective. Such measures include land use planning, geographic or temporal restrictions on certain human activities, captive breeding, reintroduction of species or populations into former habitats, and seed banks.

10.4.2 - Conservation Measures for Ecosystems

"**Ecosystem conservation measures seek to limit human activities** in limited geographic areas where they may adversely impact populations of species or interfere with ecosystem processes. The goal of conservation biologists is to use conservation measures in enough areas to protect a representative array of ecosystems and their constituent biodiversity.

10.4.2.1 - Protected Areas

"Protected areas are defined by the Convention on Biological Diversity as `a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives.' If protected areas are to become more effective in conserving biodiversity, serious obstacles, including inadequate biogeographic distribution, conflicts with local peoples, ineffective management and funding, and a limited appreciation of potential roles in sustainable development, must be overcome."

Table 10.4.1 represents an IUCN survey of protected areas in the world: (represented as percent of total land mass)

1. Australia 12.2%

2. Caribbean 9.5

3. Central America 9.0

4. East Asia 5.8

5. Europe 10.9

6. North Africa 2.8 (includes Middle East)

7. North America 12.6

8. North Eurasia 3.1

9. Pacific 8.4

10. South America 6.3

11. South East Asia 6.0

12. Subsaharan Africa 5.7

A total of 37,000 protected area sites are recorded and in five categories:

1. Strict Nature Reserve

2. National Park

3. National Monument/Natural landscape

4. Managed Nature Reserve/Wildlife Sanctuary

5. Protected Landscapes and Seascapes.

"There is clear evidence that a large proportion of protected areas have yet to be implemented on the ground. Inadequate legal and institutional support, and insufficient manpower and financial resources result in many areas receiving a less than satisfactory level of protection."

10.4.2.1.2 - Measures for Conserving Biodiversity in Protected Areas

Measures for conserving biodiversity in protected areas include the designation of land in one of the above categories. "Strict Nature Reserve, for example, is employed where objectives focus upon the maintenance of relatively wild habitats and ecosystems.... Assigning a site to this category makes explicit that the government intends to maintain biodiversity, and to promote knowledge and understanding about nature of the area. It also makes explicit that other possible uses of the same area for agriculture or timber extraction, for example, will be foregone."

Ten guidelines are listed for the "replanning" of protected areas:

1. Number of areas. A larger number of sites will provide coverage of the diversity of habitats and transition areas in the country...and protect from anthropomorphic disturbances.

2. Size. Ideally, each area should be as large as needed to embrace the biota of concern, together with the related habitats and ecosystem factors.

3. Interconnectedness (corridors) should permit the flow of biota from site to site.

4. Zoning. Within the selected area, various zones can be identified by which to denote the various uses and purposes to which the space is to be put. Areas key for their genetic materials may well be zoned out of human visitation.

5. Location of facilities. Among the decisions that most affect biodiversity in a protected area are those that design trails and roads, buildings and infrastructure.

6. Research and monitoring. Designing an approach to land-use planning for protected areas based upon ecological value, including uniqueness of vegetation type, its representativity, its succession-disturbance degree, plant species richness, etc.

7. Biological resource management to provide for restoration, eradication of alien species and other interventions.

8. Education is the best protection against human despoliation of nature through raising the awareness about nature, how it works and the relationship between nature and people. Intellectual development is one of the primary goals of the protected area system.

9. Use Management program. The degree to which biodiversity can be conserved at the genetic, species and landscape/ecosystem levels will depend upon how these use regimes are managed. Depending upon the particular aspect or feature of biodiversity that is to be conserved, other uses will need to be limited and controlled accordingly.

10. Bioregional management program. Protected areas are components of a larger landscape. Protected areas cannot function ecologically or serve society if they are treated as islands within regions of land/water use conflicts. Protected area management, where biodiversity lies as a major objective, will succeed to the extent that cooperative arrangements among public agencies and with rural inhabitants and industry, permit developing collaborative programs at the bioregional scale.

"People situated in or near biologically-diverse ecosystems often capture little economic benefit from conservation or sustainable resource use. In contrast, the costs

incurred as a result of conservation measures - especially the establishment of protected areas - tend to be felt most severely at local levels.

"A large proportion of the funds available for biodiversity conservation are now being committed to a variety of Integrated Conservation-Development Projects (ICDPs) throughout the developing world, and even more money is potentially available from GEF II (Global Environment Facility), and possibly through the Biodiversity Convention."

Since the mid-1980s, NGOs have devoted increasing efforts and financial resources to ICDPs, but successful and convincing examples where local peoples' needs have been effectively reconciled with biodiversity conservation remain difficult to find. "ICDPs therefore represent an extremely challenging approach which has so far generated few clear successes."

10.4.2.2.2 - Corridors in Fragmented Landscapes

"Biotic movement in a fragmented landscape requires movements between individual fragments (protected areas). Corridors of native vegetation linking fragments are commonly seen as a solution to this. Corridors thus act as additional habitat and as representatives of the native ecosystems in their own right."

10.4.2.2.3 - Protection and Management of Fragments

"The protection and management of fragments requires a reduction in the deleterious effects of matrix-derived influences on remnants and an increase in the area and connectivity of habitat. This means that representative areas of all major ecosystems in a region need to be reserved, that blocks should be as large as possible, that buffer zones should be established around core areas, and that corridors should connect these areas. **This basic design is central to the recently-proposed `Wildlands Project' in the United States.**" (Reed F. Noss, The Wildlands Project land conservation strategy. Wild Earth, Special issue, 1992).

"Many areas are already extensively fragmented. In these cases, retroactive action is required, which involves the protection of existing fragments and the enhancement of the existing network. Protection must adequately deal with the threats from the external matrix, and thus includes fencing against stock, prevention of weed invasion and prevention of degradation by human populations. This is a distinct departure from traditional conservation management. A broader perspective is needed which encompasses the entire landscape, including the conservation and production components. This approach is not easy since it involves an additional layer of responsibility over and above the traditional responsibility for one's own land."

10.4.4 - Restoration and Rehabilitation

"Widespread degradation of natural ecosystems is occurring worldwide as a result of human-induced activities such as fragmentation, livestock grazing, logging, invasions by feral animals and plants. Rehabilitation involves the repair of damaged ecosystems, while restoration usually involves the reconstruction of a natural or semi-natural ecosystem. Rehabilitation involves two components: first, the factors leading to degradation must be treated. Second, components of the ecosystem which have disappeared have to be replaced.

"The only solution to extensively fragmented landscapes is the large scale restoration as a whole, rather than at the scale of individual fragments. This involves treatment of the non-conservation sectors of the landscape, and modification of production practices so that conservation issues are considered. Revegetation could be used to provide buffer zones around remnant areas, cor

ridors between remnants, or as additional habitat. Landscape restoration aims at improving the design of the existing system of fragments by increasing habi-tat area and connectivity, and by providing buffer zones around existing fragments to protect them from external influences.

Chapter 10.5 - Social and Economic Measures for Conservation And Sustainable Use of Biodiversity

"Some of the more prominent socio-economic factors contributing to the loss of biodiversity include: inequalities in access to resources; concentration of land and capital; policies that provide perverse incentives to deforest, degrade, or otherwise transform diverse ecosystems; lack of respect for the rights of cultural minorities; market failures to recognize the value of biological resources; population growth and consumption; and human migration.

"During the initial stages of park and reserve establishment, there may be a transition phase while local inhabitants are provided with options for relocation outside of the area. In many cases this phase can be 20 to 50 years where residents are given life tenancy, that is, where following purchase of and payment for their valuable buildings, livestock, crops and other items, they may remain and work the land (under certain restrictions) for the remainder of their lives." Park and reserve establishment should: "provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible (IUCN, 1994)."

One option for dealing with the obstacle of human populations is the creation of "extractive reserves" and "indigenous reserves." Both types provide human inhabitants with limited rights of resource use under certain conditions. "These include: low population densities; low consumption levels; use of low-impact technologies; limited contact with outside markets; and a relative absence of uncontrolled external demographic, political, social, and economic pressures that could rapidly upset existing cultural and social structures. The successful implementation of such strategies often takes years - even a decade or more. This time must be included in calculations for the allocation of financial resources and in the general policy framework."

Chapter 10.6 - Legal Measures for Conservation and Sustainable Use of Biodiversity

"Conservation often requires that the activities of human beings be regulated. As consensus evolved around the need to preserve wild species and areas for their intrinsic value and for future generations, so did the number of laws enacted to preserve elements of

biodiversity." Nature has always been perceived as "a free gift." "Its destruction was not considered to affect any recognized human interest, whereas restrictions established for its conservation impinge on rights which are often enshrined in constitutional provisions, such as free enterprise, property ownership and economic development."

Legislation is essential to:

1. Confer jurisdiction and powers on public bodies and local communities for conservation;

2. Instruct public bodies to carry out conservation measures;

3. Establish and enforce procedures;

4. Provide for public participation;

5. Permit NGOs or other organizations to sue;

6. Provide incentives for conservation and disincentives to destruction;

7. Provide a legal basis for conservation contracts and management agreements.

"Treaties are contracts between States, whereby the latter voluntarily accept restrictions on their sovereign rights in the interest of broader concerns. Although such restrictions are sometimes hard to accept, States have nevertheless concluded many treaties restricting their sovereign rights. The implementation of these obligations remains, unsurprisingly, somewhat patchy in the absence of proper incentives. The new Convention on Biological Diversity, however, attempts to address this gap.

10.6.2.1 - The Nature of Customary Law

"Most customary societies are structured by a single, integrated hierarchy of law, behavior, and authority. The same web of rules, authority, and authority figures governs all aspects of life, from tenure to marriage, from spiritual matters to hunting restrictions."

Common characteristics of customary laws are that:

1. Land, water territories, and their biotic resources have socio-religious significance, and cannot easily be separated from matters of kinship, authority, leadership, subsistence, ritual, and supernatural.

2. Individual, heritable rights in land (or water territories) exist, but most individual rights are either rights of use subsidiary to a superior group right, or rights to particular resources. Thus land tenure and resources tenure are not necessarily the same, and one parcel of land is often encumbered with a variety of rights held by different persons and groups.

3. Rights in land, waters, and their resources are rarely recorded in maps or written records. Borders are determined on the basis of natural features, such as rivers and by mutual unwritten understandings.

4. Limits are frequently set on the exploitation of particular resources. There is little conceptual or practical separation between concepts of "use" and "conservation" of living resources.

People live under one of two hierarchies: "**ecosystem people**," or "**biosphere people**. Ecosystem people are those...who obtain most of the resources they use from a restricted catchment either by gathering or through low-input agriculture and animal husbandry. Biosphere people are those who participate in the global market economy which gives them access to resources from all over the earth. To these two groups...must be added a third group of "ecological refugees," most of whom are ecosystem people who have been deprived of their resource base."

Customary law is in transition (10.6.2.3). "Customary systems of resource-management and resource law work best under low population/and ratios, without significant external market involvements, with traditional technologies, and where traditional systems of authority - and authority figures - remain strong. Everywhere customary societies are breaking down because of discrimination and oppression by dominant governments, usurpation of natural resources by governments, corporations, and migrants, and the seemingly inevitable assimilation into the global economy and culture that is felt in virtually every corner of the planet."

10.6.3 - National Legislation

National legislation gives States "police powers to control human activities in the general interest. The concept of processes or activities which are potentially damaging to biodiversity, and which must therefore be regulated and managed, has only just begun to emerge. This concept appears in the Biodiversity Convention and will probably be incorporated into many national laws in the future."

Legal measures to regulate use of conventional protected areas

"Within these areas, most activities are prohibited or restricted to ensure the long-lasting conservation of the ecosystems concerned. **The integrity of a protected area may be achieved through public ownership or regulatory measures**. State or land-holding agencies may prohibit or restrict activities by third parties on its lands and carry out necessary management measures. Further legislation is necessary to dedicate public lands exclusively to conservation, to bind government agencies to respect the integrity of the areas and to penalize illegal activities by third parties.

"Legislation should facilitate land acquisition for conservation purpose by the government, by instituting a right of preemption over land coming on the market, a right of compulsory purchase, and tax incentives for vendors. However, exclusive reliance on the public purchase of land for protected areas, as happens in several countries, has the disadvantage of being expensive.

"Regulatory measures applicable to both public and private lands are used elsewhere to establish protected areas, particularly in Europe where publicly-owned land is scarce. However, landowners cannot be forced to take active management measures.

"Beyond the boundaries of protected areas, damaging activities must also be regulated to conserve those areas effectively. Buffer zones, in which specified activities are prohibited or restricted, are frequently established for this purpose, but are insufficient if harmful processes are carried out further afield.

"The management of protected areas and the determination of powers conferred on their managing bodies is also a matter for legislation. Centralized management is characteristic of countries where parks and reserves are established on public lands. Protected area directors are appointed by the national administration and local interests are ususally not represented in park management.

"Decentralized management is more usual where protected areas are established on private or municipally-owned land. Management boards aim to represent all interests concerned and are composed of government officials and representatives of local authorities, scientific institutions, conservation NGOs, landowners and local economic interests. Legislation must make it possible to establish different zones within protected areas and to lay down basic rules and activity limitations applicable to each zone."

10.6.3.4 - Legal Institutions and Procedures

"The Preamble to the Convention on Biological Diversity requires Parties `to anticipate, prevent and attack the causes of significant reduction or loss of biological diversity at source.' Environmental impact assessments (EIAs) are the most important legal procedure for achieving this objective.

"The law should clearly establish conditions of participation in the decision-making process and should cover consultation of scientific bodies and conservation NGOs. Conservation NGOs in a few countries have standing to sue for breach of the law, a particularly valuable procedure where government has violated its own regulations." Legal standing is necessary for NGOs.

10.6.4 - International Law

"It is an established and binding principle of law that states are responsible for ensuring that activities within their boundaries or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction. Any further sovereignty restriction must be voluntarily accepted by treaty.

10.6.4.2 - The Convention on Biological Diversity

"A world biodiversity convention was proposed by IUCN in 1981. The Convention was adopted at the Rio Summit in 1992 and signed by almost all states. It entered into force on 29 December, 1993. The Convention affirms that the conservation of biodiversity is a common concern of humankind. States have sovereign rights over their biological resources, but also responsibilities for conserving their biodiversity

and using their biological resources sustainably. Emphasis is placed on the importance of preventive measures and precautionary principle.

"Biodiversity is defined as `diversity within species, between species and of ecoysytems.' Parties must promote the conservation of ecosystems, natural habitats and the maintenance of viable populations of species in their natural surroundings.

"The Convention requires the creation of a system of protected areas, or areas where special measures need to be taken to conserve biodiversity, together with the identification, regulation, and management of processes and activities which have or are likely to have significant adverse impact on biodiversity. Parties must enact legislation for the protection of threatened species and populations.

"Parties must adopt national strategies, plans or programmes for the conservation and sustainable use of biodiversity. They are also required to prepare environmental assessments of proposed projects likely to have significant adverse impacts on biodiversity and to ensure that the environmental consequences of programmes and policies likely to have such impacts are taken into account.

"For the first time in international law, conservation obligations are balanced in the Convention by certain rights, as a matter of equity and as an incentive to conserve biodiversity.

Access to genetic resources by foreign collectors is no longer free, but is now subject to the prior informed consent of the Party providing the resource. Conditions of access must be mutually agreed.

The results of research and development, and the benefits arising from the commercial and other utilization of genetic resources, must be shared in a fair and equitable way with the Party providing the resource, again on mutually agreed terms.

All Parties are required to provide access to and transfer of technologies relevant to the conservation of genetic resources or which make use of these resources, such provisions to be on fair and most favorable terms where made to developing countries.

Although these provisions do not affect intellectual property rights, such as patents, Parties must facilitate through proper incentives the transfer of technologies even where protected by such rights. The Convention's success will be largely determined by the willingness of the international community to finance conservation in poorer countries which are rich in biodiversity.

The Convention provides for a financial mechanism based on the Parties' contributions, the level of which will depend on the incremental costs incurred by developing countries when implementing measures to fulfil their obligations.

Any financial transfer made

through this mechanism must be additional to any other development assistance. If payments are not made, developing countries are no longer bound by their conservation obligations. This represents another important element of reciprocity.

The definitive mechanism will be established by the Conference of the Parties. It is now provided on an interim basis by the Global Environmental Facility (UNDP, World Bank and UNEP).

10.6.4.3 - Implementation and Compliance

"Implementation is almost impossible where a treaty does not provide for adequate institutions (Conference of the Parties, Secretariat, budget) to support and monitor its implementation, make recommendations to the Parties and adopt the budget and a scale of contributions." Compliance with treaty obligations is enhanced by NGOs which can point out deficiencies in implementation."

Chapter 10.7 - Integration of Use and Conservation Measures

"The capacity to protect, understand and utilize biodiversity and biological resources, and to establish practical means for the equitable sharing of costs and benefits, can be developed through governmental and private sector policies and investments." The annual cost for appropriate management and conservation of the world's biodiversity for the years 1993 - 2000 will be US $3.5 billion. The GEF has to date allocated $313 million and has also promised another $2 billion over a three-year period.

"Government should exert normative control over natural resources management while leaving day-to-day management to local public and private institutions. Biodiversity objectives require that field programmes shift from individual sites to region-wide scales of management (bioregion or ecosystem) that nest protected-area core sites within human-dominated landscapes.

"The critical issue is, can established public agencies, educational programmes and the private sector change their approaches to resource administration and use, governance, education, and information flow to effectively take on the challenges set forth in the Biodiversity Convention?

"Academic schools continue to educate generations within traditional intellectual fields, most notably lacking appreciation of complex ecosystems, trade relations, the implication of consumption patterns, and sustainability. Public agencies, educational institutions and private sector entities have often been at the forefront in promoting technological packages that ultimately foster intensive use of chemical pesticides across whole agro-landscapes, clear felling of large forest areas, substitution of exotic tree species for native forests, the loss of habitat diversity by large scale development schemes, and the depreciation and loss of local knowledge and biotic materials. Existing sectoral policies continue to promote... unsustainable practices."

10.7.2.4 - Funding

The Convention includes a commitment on the part of the Parties to share in the investment costs needed to help other nations to protect their biodiversity and to shift to sustainable use practices. Where expenditures to protect a biodiversity-rich site for "global benefit" are greater than the expenditures considered appropriate in relation to benefits derived for local people and markets, then the marginal difference between the two levels of investment should be covered by international sources.

10.7.3.4 - Management at Bioregional Scales

"An idealized bioregional management programme will feature three components: Ecological - one or more protected areas or sites of high biodiversity value that are interconnected where possible by corridors of relatively wild land; Economic - a matrix of farms, grazing lands, managed forests, villages and infrastructure; Social/Cultural resident and settled communities of people that manage resources (on their own lands, communally, through industrial employment, or nomadically for subsistence). "The lands will be administered under a mixture of central or local government, private, community and communal tenurial rights. An idealized bioregion covers a reasonably self-contained ecological entity (e.g. watershed, a mountain chain, a coastal wetland system, etc.), that embraces a large block of wild land/water and a series of scattered fragments of wild or impoverished habitat in various seral stages of growth, and significant area devoted to agriculture, forestry, fisheries, and wildlife management.

"As compelling as the argument for applying bioregional management is, there are nevertheless an array of important conflicts and issues to be noted. The most complex issue...is that of overlapping jurisdictions among public agencies."

Biodiversity conservation has cost consequences that must be borne. "Experience with mechanisms that compensate those who claim damage show that the key limiting factor is the continuing flow of funds for this purpose."

Bioregional management "can assist public agencies and local residents to address the critical biological, social and economic issues of their region, and initiate a programme that tends towards sustainability and equity. Biodiversity is essentially the concern of individual nationstates as enshrined in the Biodiversity Convention."

Chapter 10.8 - Executive Summary

Chapter 8 concludes with a brief recap of each of the seven preceding chapters.

[Reutrn to Land Use Control Menu](#)