

POVERTY, HEALTH, GOVERNANCE, AND ECOSYSTEMS: A SYNTHESIS OF CASE STUDY FINDINGS

Paul Steele, Gonzalo Oviedo, and David McCauley

The case studies reviewed in this report were chosen to shed light on remaining gaps in our knowledge of poverty–health–environment linkages in rural Asia. This final chapter attempts to present a comparative analysis to test, expand, and improve a general framework for understanding how ecosystems and poor people interact as mediated through institutions, which are influenced by processes often characterized by an unequal distribution of political influence. The overarching question examined is: Can poverty be reduced and health outcomes improved by reversing the loss of ecosystems and environmental resources?

As noted in Chapter 1, a series of 22 key questions were posed to the case study authors. The case studies have been presented according to four groupings relating to: (i) poverty, livelihoods, and ecosystems; (ii) poverty, human health, and ecosystems; (iii) pro-poor biodiversity conservation and sustainable use; and (iv) response strategies. This chapter uses these questions and the four categories of case studies as an approach for organizing lessons that may be drawn from a comparative analysis of the case studies.

Poverty, Livelihoods, and Ecosystems

Which poor people depend on ecosystems for their livelihoods?

POOREST HOUSEHOLDS MOST DEPENDENT IN RELATIVE TERMS

The poorest rural households typically depend most on ecosystems as a direct source of subsistence and as a share of their income. The case studies demon-

strate how natural resources are especially important to these households:

- In the Indian state of Tamil Nadu, 90% of poor households were found to depend solely on customary property reservoirs or water tanks for irrigation, while only 66% of nonpoor households depended solely on tank water, with private wells also providing water supply.
- In the Attapeu Province of the Lao PDR, the three sample villages surveyed showed that poorer households depend on collecting aquatic animals, while better-off households do not. These aquatic resources include fish, eels, frogs, crabs, freshwater shrimps, snakes, snails, and turtles.

HIGH RESOURCE DEPENDENCE OF LESS-POOR HOUSEHOLDS IN ABSOLUTE TERMS

In many cases, better-off households consume a larger share of ecosystem resources than the poorest. Despite the high importance of natural resources to the poorest, less poor households often draw disproportionately more benefits from natural resources. Natural resources are more important for the total incomes of the poor but, in many cases, the nonpoor seem to consume a larger share of the resources.

- In South India, the rich dig more wells than the poor to tap groundwater, so they use up a larger share of the groundwater resource.
- In Nepal, richer households benefit more from community forests. They also have more assets, livestock, bigger houses, larger farms, and use more water for irrigation and more leaf litter for fertilizing their fields.

DEPENDENCE OF WOMEN

In poor households, natural resources are especially important for women, and yet women often have

the least access to these resources. In this context, improvements in ecosystem management can be particularly beneficial for women. In the Nepal interventions providing greater access to community forests, the time needed by women to collect fodder leaves was demonstrated to have been reduced to 2.5 hours per day, and the income disparity between male- and female-headed households was reduced. Lease certificates provided to women by community forestry committees contributed to their empowerment.

DEPENDENCE OF MINORITY GROUPS

Natural resources also can be particularly important to marginalized ethnic minorities and other groups. For example, the Sanjiang Plain in Heilongjiang Province, PRC is home to several minorities. Among them, the Hezhe are the smallest minority group in the PRC, with only 4,000–5,000 members. The case study has documented how the Hezhe people are struggling to maintain their own language, culture, and lifestyle based primarily on fishing in the face of changing land-use patterns and other outside influences. The Indian agro-biodiversity case study has shown that, according to the most recent census, Orissa had a population of just over 30 million, of which over 22% are tribal peoples (i.e., disproportionately higher than the India-wide 8% figure). Case studies from Southeast Asia—Attapeu Province in the Lao PDR and the forested regions of Viet Nam—also demonstrate a particularly high dependence of ethnic minorities on the natural resource base. The same factors, which have kept remote ecosystems relatively protected and have contributed to economic marginalization, have sometimes allowed ethnic peoples to preserve their cultures and traditional human–ecosystem interactions.

What dimensions of poverty are most positively affected by ecosystem changes?

Ecosystem changes can affect incomes, but they also can strongly influence non-income dimensions of poverty, which include: (i) lack of capacity through low health and education status; (ii) lack of opportunity and access to resources and services; (iii) insecurity and vulnerability; and (iv) powerlessness.

This section particularly focuses on the positive ways that changes in ecosystems and resource rights can contribute to poverty reduction. The case studies reviewed also offer examples of how inappropriately

designed or implemented environmental interventions can negatively impact the poor, though these are primarily covered in later sections.

IMPROVING THE CAPACITY OF THE POOR

The case studies include several examples of relationships between the health of poor people and natural resources, particularly the importance of resources for diet and food security. There are also more complex linkages demonstrated between resource-use patterns and health and education, as exemplified by the case study of Deqin County, PRC, where increased access to natural resources reduced the student dropout rate, and increased incomes for women from medicinal plant collection-generated funds used for children's education, health care, and ritual activities.

EXPANDING OPPORTUNITIES AND INCREASING INCOMES

In many of the cases, ecosystem improvements are shown to increase the incomes of the poor. Several case studies document how this was achieved by improving the quality and productivity of the natural resource base, as well as improving access to ecosystems for the sustainable harvest of products. In the case of agro-biodiversity, this also can be achieved through increasing yields. For example in Thalli, near Bangalore, Indian farmers and the markets they serve value a number of traditional cultivars including finger millet. However, grains grown from existing seeds were poor and unstable. The MS Swamianathan Research Foundation helped farmers sort and purify the seeds and improve their planting techniques, and farmers observed a doubling of yields.

The case study from Bangladesh documents how environmental interventions sought to increase incomes as well as funds for collective investment. Under this scheme, 60% of the income from the sale of pollarded branches was equally distributed among all households of the village, with 25% saved for generating a reserve fund for the village committee. The resulting fund was designated for social or pro-poor development purposes.

Several environmental interventions documented in the cases placed a special emphasis on improving women's incomes by creating new livelihood options and strengthening their user rights to natural resources. The Pred Nai community project in Thailand created new income-generating opportunities for women through the processing of crackers from mangroves and the sale of wine. The

Community-based Haor and Floodplain Management Project in Bangladesh created employment for women in agricultural projects.

Ecosystem improvements not only can enhance incomes but they can also save time, which is very valuable to the poor who must provide most of their own services. In Pred Nai, the introduction of management strategies for mangroves led to an increase in the average daily harvest of the grapsoid crab from 8–16 kg per collector per day. This is despite an increase in the number of collector households from 6 in 1998 to 30 in 2003. The time taken to collect crabs also decreased, providing even more time for other income-generating activities.

REDUCING INSECURITY AND VULNERABILITY

Several case studies explore the importance of ecosystems to livelihood and dietary security. In Pakistan, changes in ecosystems and climate have significantly affected the poor through both growing cyclical and long-term vulnerability. Poor Punjabi households face two seasonal periods of stress—i.e., during winter, when livestock deaths are more common, as exacerbated by shortages of fodder; and during summer, when human illness is worsened by water and food shortages. Over the long term, the declining availability of water, linked to an increased frequency of droughts, is making poor people even more vulnerable.

Another aspect of vulnerability highlighted by the case studies is the relationship between ecosystem change and increased exposure to natural shocks. This is of increasing significance as climate change adaptation needs become more apparent. For example, in Bangladesh, the deterioration of the Haor swamp forests that previously served as a natural barrier against monsoon floods and typhoon waves, has led to increased vulnerability of the poor and more severe erosion. Poor households have been compelled to increase spending on dikes and other measures to protect their tiny homesteads yearly.

Finally, security can also refer to safety from physical conflicts and violence. Conflicts over natural resources arise when too many people chase a finite amount of resources, which may be exacerbated when one group seeks to take a larger share. This conflict can arise both in situations of resource scarcity and secondly where, despite absolute resource abundance, excess demand leads to overexploitation (e.g., through open access). The Sri Lanka case study of Puttalam Lagoon illustrates these complex relationships. During high tide, a

large number of fishers from all parts of Puttalam come to fish. According to the police, conflicts can be so intense—in the absence of an agreed set of resource rights—that there have been instances of killings over control of fishing territories. This situation is particularly tense during peak seasons for the highly valued prawn harvest.

The civil conflict in Nepal illustrates how competition over natural resources can play a role in exacerbating and financing conflict. Yarsa gumba (*Cordyceps sinensis*) is a valuable medicinal herb with purported aphrodisiac properties that grows wild in the western highlands. It is highly sought in the international market and can be sold for as much as \$2,500/kg. The herb is being smuggled out of Nepal to India and the PRC in large quantities, and the Maoists rebels are reportedly benefiting from this trade. In addition, merchants who transport the herb pay tax to whomever is the controlling force in a particular region, be they Maoist or the Government.

OVERCOMING POWERLESSNESS

These relationships also carry lessons for the design of interventions. When a poor group or set of individuals targeted for assistance lacks any ability to make or influence resource management decisions that directly affect their lives, severe constraints are obviously placed on development and poverty alleviation efforts. In several parts of Pakistan, declining access to natural resources contributes to a growing powerlessness of the poor. For example, in the province of Sindh, landlords can exert a very high degree of control over poorer farmers by their control and unequal distribution of irrigation and drinking water.

Many environmental interventions reported in the case studies illustrate approaches to addressing gender-based power disparities. Several documented environmental projects have attempted to build women's leadership, negotiation, and entrepreneurial skills within mixed groups and for a variety of activities. Participatory plant breeding in India enlisted the participation of women alongside men, focusing on their traditional roles in agriculture (transplanting, weeding, and seed selection). The project highlights the importance of women's contributions, efforts to make work less hazardous to their health, and the encouragement of women as entrepreneurs. The Indian case shows how women were enabled to make more decisions related to their traditional areas of expertise and to interact more with outside markets in the sale of their products.

What types of ecosystems and ecosystem services can contribute to poverty reduction?

TYPES OF ECOSYSTEMS THAT MATTER TO POOR PEOPLE

A significant portion of the research on links between poverty and natural resource systems has focused on forests. In this publication, relationships between forest management and poverty is reviewed in Nepal, Yunnan Province of the PRC, and Viet Nam. An attempt has been made to look more broadly at a fuller range of natural and agricultural ecosystems that matter to the poor, including marine, coastal and inland water ecosystems, deserts, and cultivation systems. Special emphasis has been given to marine, coastal, and inland water ecosystems through the case studies from Sanjiang Plains, PRC; Bangladesh; tank systems in India; Lao PDR; and Puttalam Lagoon, Sri Lanka. This emphasis is for three reasons. Aquatic ecosystems are vital to poor people worldwide, particularly in Asia. Both the consumption and production of aquatic resources by Asia's poor is extremely important to their incomes and other sources of social and economic security—probably more significant in terms of the number of the poor affected than forest-based resources. Second, there is still a surprisingly limited literature on the relationships between aquatic resources management and poor people. Finally, aquatic ecosystems are among the most threatened globally, especially in densely populated Asia. Indeed, the UN Millennium Ecosystem Assessment identifies marine and freshwater ecosystems as those ecosystems have been most significantly altered by human activity—even more, for example, than tropical forests, which have been the subject of considerable research and public debate.

The links between coastal, marine, and inland water ecosystems are epitomized by the situation in Bangladesh, where three mighty rivers—Ganges (Padma), Meghna, and Brahmaputra—flow in volumes that are second only to that of the Amazon Basin. These rivers form wetland ecosystems, including mangrove forests, peat lands, haor, baor, beel, seasonally inundated floodplains, and estuaries. The wetlands support more than 100 million people, and many of its ecosystems are highly biodiverse, including the Sundarbans—the last remaining habitat of the Bengal tiger. Wetland and inland water ecosystems supporting the livelihoods of poor households in the PRC, Lao PDR, Sri Lanka, and Thailand also are covered by case studies in this report.

In terms of terrestrial ecosystems, this volume has given particular attention to agroecosystems, including pasturelands. As in the case of aquatic systems, the importance of livestock and fodder for poor people is under-researched. The case study that most highlights these relationships is from Mongolia, which contains the earth's largest remaining example of an essentially intact temperate grassland ecosystem. Mongolia's pastoralists remain directly dependent upon the fragile and degrading natural resource base. Only 1% of Mongolia's land is considered arable, while about 34% of Mongolia's people are directly dependent on livestock production (most as traditional nomadic pastoralists), with another 26% indirectly so. Forty percent of the 2.7 million citizens live at or below the poverty line.

ECOSYSTEM SERVICES THAT CONTRIBUTE TO POVERTY REDUCTION

The typology of the Millennium Ecosystem Assessment divides ecosystem services into those associated with provisioning, regulating, cultural, and supporting services; this categorization provides a useful perspective on the lessons that may be drawn from the case studies, as explained in Chapter 2:

Provisioning services. Many case studies document the products derived from ecosystems—such as food, fiber, fodder, fuel, and fresh water—by poor households. In Nepal, ecosystem services from fodder were shown to provide a major benefit to poor households when they increased their access to land and forests. As a result, 53% of the households in the case study were able to earn cash income from goats and 20% from buffalo. In older leasehold forestry groups, the earnings from goats increased to 88%, 41% from buffalo, and 16% from the sale of fodder from restored lands. This is an important finding consistent with other research, which shows that fodder is often one of the key services provided by ecosystems to poorer households, and yet it is often overlooked in economic decisions about the use of forests and other resources.

Regulating services. Several case studies, especially those relating to agriculture, show the regulating benefits ecosystems can play. The Tamil Nadu case study demonstrates the role of small-scale tanks and associated constructed wetlands can play in regulating water through aquifer recharge and how this is being undermined by social and environmental change. Several case studies highlight the role of ecosystems in disease regulation, and what

happens when these services are disrupted. For example, the Malaysia case shows how ecosystem changes in Indonesia were linked to the Nipah virus outbreak and subsequent collapse of pig production in Malaysia.

Cultural services. The Indian agro-biodiversity case study highlights how traditional crop varieties are sometimes preferred to higher-yielding varieties because of taste and quality (and thus market price) and how planting is timed to allow their harvesting for festivals and family rituals. The Bangladesh case documents how many people revere and cherish the wetlands, that shape, influence, and mold their existence and culture. Most of their social and recreational activities—such as boat races, swimming competitions, and monsoon folk culture norms—are centered on the wetlands. Likewise, in the Baimaxueshan Reserve of Yunnan Province, PRC, Tibetan Buddhist prayer rites are considered important to the process of improving local natural resource management practices.

Supporting services. Ecosystem services, such as soil formation and nutrient and water recycling, often have direct and long-term impacts on those dependent on natural resources for their livelihood. An example is provided by the case study documenting the high soil quality of the Sanjiang Plain. Mainly wet black clays comprise the only black-soil region in the PRC, characterized by high concentrations of organic matter and nutrients that lead to high ecological and agricultural productivity.

Can sustainable use of natural resources help poor people escape poverty, or does it cause them to remain at subsistence income levels?

ECONOMIC GAINS FROM NATURAL RESOURCE-BASED ACTIVITIES

Several case studies highlighted the potential for economic gain from improved productivity of natural resource systems. It is important to shift attention from short-term economic exploitation to a long-term stream of sustainable benefits from resource management. For example, in Sanjiang Plains, PRC, the wetland environment has the potential to underpin resource-based development. A clear illustration of this is the growing importance of black-bee apiculture in sustaining the livelihood of the poor in Rao He county. In this small rural county alone, over 4,500 people depend

directly on black-bee apiculture for their livelihood—generating a staggering 28% of the district's total agricultural output value.

CHALLENGE OF ENSURING THAT THE POOR RECEIVE ECONOMIC BENEFITS

One of the challenges of increasing economic gains from natural resource-based activities to benefit the poor is that it is often the very low-value nature of the returns from natural resources which allows the poor access to them. When some activities become profitable, those with capital and greater power may displace the poor in exploiting the resource. In Nepal, some forest areas have been provided to forestry user groups to manage as common property. However, while this has benefited rural households, a number of factors—i.e., heterogeneity among group members; asymmetrical power relationships based on gender, caste, and income; and disparities in terms of land resources, capital assets under private ownership, and human capital—have conspired to hinder the equitable distribution of benefits.

DIVERSIFYING AWAY FROM NATURAL RESOURCE DEPENDENCE

There are also examples available in the case studies in which households have sought to escape from a perceived poverty trap of natural resource dependence. In Puttalam Lagoon, Sri Lanka, most of the youth engaged in fishing expressed dissatisfaction and frustration with their economic opportunities, emphasizing that they continued their fishing activities only because they did not have any other livelihood options. This can be expected where a limited resource is in decline because of overexploitation under open access conditions.

A similar attitude was documented in the case of those dependent upon some tank irrigation systems in Tamil Nadu, where farmers there are already starting to vote with their feet by abandoning this type of agriculture. When the physical and institutional structures of tank use have reached the point of no return, farmers move to other economic activities. A significant proportion of tanks in the very poor region in East Ramanathapuram District face uncertainty of rainfall and increase in saline aquifers, which have forced farmers to look for coping strategies away from irrigated agriculture, such as charcoal making using local bushes or out-migration to seek nonfarm employment.

How does escaping from poverty affect biodiversity?

Several case studies review the broader policy and institutional relationships between environmental improvement and poverty alleviation efforts. One case study from Viet Nam challenges the premise that a region or country can simultaneously move toward both environmental improvement and a decline in poverty. Linkages between deforestation, afforestation, and forest protection have varying connections to poverty reduction. It concludes that for poor people to escape from poverty some initial ecosystem damage may be inevitable—based on the example of deforestation. Data from many countries suggest that until per capita incomes reach about \$4,000–6,000, natural forest area tends to decline. The case study finds that conversion of forests into agriculture has been a key factor in enabling population growth and rising average incomes through the establishment of perennial crops on formerly forested lands (e.g., coffee, tea, rubber, and cashew nut). The area of cropland in Viet Nam grew 3.4% per year during the 1990s and reached a total of 12.3 million hectares (ha), although it is not clear exactly how much of this agricultural expansion took place at the expense of forest cover. Viet Nam's forested area fell from 47 million ha or 55% of the total land area in the late 1960s to only 14.4 million ha or 17% of the total land area in the late 1980s—the fastest rate of deforestation in Southeast Asia. Protecting the remaining forests of Viet Nam, and elsewhere, may be important not only for conserving what is left of the country's forest biodiversity but also for reducing the poverty of ethnic minorities who inhabit remaining forested areas—and for whom physical remoteness and other barriers may limit the opportunities for some economic activities.

There are both similarities and differences with the situation in Nepal, where forests are located both in the three quarters of the land covered by mountains and the remaining one quarter of land in the plains, known respectively as Siwalik and Terai. In 1964, forest cover in Nepal was estimated at about 47%, falling to about 27% by 1992—mostly due to the conversion of gentler slopes into agricultural use. However, contrary to fears expressed in the early 1990s, deforestation has halted and even reversed slightly according to national data. Indeed

by 2003, forests stood at about 29% of total land area. One of the reasons for this reforestation is the community forest program, which covers about 1.1 million ha or 26% of the forest area.³⁸

The Viet Nam and Nepal examples show that some initial deforestation associated with agricultural expansion may generate agricultural growth and reduce poverty (though at the cost of reduced forest biodiversity and other ecosystem services). However, beyond a certain level—and depending on the suitability of certain land for agriculture—this relationship no longer holds. These examples illustrate changes both in ecosystem/biodiversity status and in poverty status, and show that there is no universal causal relationship between biodiversity and poverty. What matters is how poor people are able to manage their ecosystem dependencies and what share of the benefits and cost of environmental change accrue to the poor. This ultimately depends on the interaction between ecological, political, and institutional parameters.

Poverty, Health, and Ecosystems

How does natural resource dependence affect poor people's health?

One unique aspect of this analysis has been the explicit attempt to examine relationships between rural ecosystem management and human health. These issues include the dependence of poor rural populations on ecosystems for their nutritional and even medicinal needs as well as emerging concerns over the sources of zoonotic diseases.

A number of case studies document the negative impacts on women's health of their searching for and carrying heavy loads of water, wood, and fodder. In Yunnan Province, PRC and Pakistan, it was found that poor health among rural women resulted from the increasing burden of work resulting from resource degradation, as more time and effort were spent in activities such as collecting water, firewood, and NTFPs (Spencer et al., 2005). Traditionally in Dequin County of Yunnan Province, one family will consume 50–60 kg fuelwood per day for cooking. This means one adult woman should carry around 75 kg fuel wood everyday from the mountain. On the average, this will take 2–3 hours, and it can be done twice a day. The same situation occurs for water and fodder.

³⁸The more recent leasehold forest program covers only about 10,000 ha or 0.2% of the total forest area.

It is therefore common for women to have fertility problems because of the effects of a life spent carrying heavy loads (Yusong, 2005).

On the positive side, medicinal plants collected from the wilds can provide poor people—especially women—with benefits from both sale and consumption. In Viet Nam, medicinal plants are particularly important to ethnic minority communities in the highlands, where 70% of medicinal plants in the Vietnamese market originate. Traders along the entire market chain are largely women. Herbal medicine is important in Viet Nam, where the largely rural population has limited access to modern medicine and the Government has promoted traditional medicine. Demand for herbal medicines has further increased with the reduction of government subsidies for modern health care. However, there is a risk that the increased demand will lead to an overexploitation of medicinal plants (Reichrath, 2005).

How do natural resources contribute to food security and nutrition for poor households?

Natural resources, particularly fish and other aquatic resources, are often a key source of protein for poor households in Asia. The case studies offer several good examples. In Bangladesh, fisheries provide nearly 80% of dietary protein requirement for rural households. In Attapeu, Lao PDR, aquatic biodiversity constitute the main source of animal protein in protein poor local diets and the main coping strategy for dealing with periods of rice shortage. However, no coping strategies for dealing with shortages of aquatic resources were identified. Any degradation of these resources is therefore likely to have very significant impacts on the already fragile health and nutritional status particularly of the poorest. In the evaluation of the Nepal forestry program, those participating were found to have had their food security increased by 16% through increased and more stable incomes from the introduction of sustainable community forestry practices.

What is the link between ecosystem change and diseases, including emerging diseases such as SARS and avian bird flu?

There are complex linkages between ecosystem change and the spread of certain diseases. The links between animal health and human health are grow-

ing as people move into new areas, alter the landscape and intensify agricultural production. Wildlife plays a key role in the emergence of zoonotic diseases, as they constitute a “pool” from which pathogens can emerge as in the case of avian bird flu, and possibly severe acute respiratory syndrome (SARS) and HIV/AIDS (Hammill et al., 2005). This situation may now be further complicated by the impacts of climate change. This section highlights three aspects of the linkages: (i) effect of human disruption of ecosystems; (ii) people and livestock moving into close contact with wildlife; and (iii) implications of trade in wild animals.

DISEASE SPREAD BY HUMAN DISRUPTION OF ECOSYSTEMS

The Malaysian case study on the spread of the Nipah virus shows how often complex relationships can exist between ecosystem change and the increased risk of disease. Over the last 2 decades, the forest habitat of pteropid fruit bats in Southeast Asia, including peninsular Malaysia, has been substantially reduced by deforestation and the establishment of plantations for pulpwood and oil palm. In 1997–1998, deforestation and drought in Indonesia led to forest fires and severe haze that blanketed much of Southeast Asia. In turn, this led to an acute reduction in the availability of flowering and fruiting forest trees for foraging by fruitbats. As a result, the bats encroached into cultivated fruit orchards, that in Malaysia are often located adjacent to piggeries. This led to the transmission of the Nipah virus from bats to pigs. Eventually, up to 100 people died and a million pigs had to be culled at great economic cost.

RISK FROM WILDLIFE CONTACT WITH PEOPLE AND LIVESTOCK

Another link between disease risks and ecosystems may be formed when diseases are spread by the contact of people and livestock with wildlife. This has been a possible cause of several zoonotic disease outbreaks in Asian countries. In Mongolia, for example, the aridity and latitude create high variability of intra- and inter-annual microclimates and associated resource availabilities. Both pastoralists and wildlife respond to this variability by moving opportunistically across long distances to track ephemeral foraging resources, often sharing the same pastures and leading to contacts between wild and domesticated animals. A wide range of animal diseases, such as bovine tuberculosis, brucellosis, and foot-and-mouth disease can be transmitted

among livestock, wildlife, and potentially humans—depending on the disease in question.

DISEASE SPREAD BY TRADE IN WILD ANIMALS

A third potential link between disease and ecosystems is where contact with wild animals is exacerbated by their commercial sale. A possible example is the severe acute respiratory syndrome (SARS). Despite SARS' relatively low death toll of 750 worldwide in 2002–2003, it caused widespread public fear that had a major negative impact on the economy of the PRC and Southeast Asia. Much evidence suggests that SARS originated in animals and was subsequently transmitted to humans through contact with infected species. Similar genetic links were discovered between the SARS corona virus and other corona viruses in the masked palm civet and raccoon dog, which are sold in the animal markets of Guangdong Province, PRC. The World Health Organization and the PRC authorities responded by improving regulation of the wild animal trade.

Poverty and Biodiversity

How does conserving biodiversity reduce poverty?

Biodiversity was defined in the first section of this paper as the variability among living organisms and the ecological complexes of which they are part. While previous sections have highlighted the general relationships between ecosystems and the poor, this section explores how conserving biodiversity may lead to poverty reduction or, alternatively, have negative impacts on the poor.

The case studies include several examples of how the poor may gain from maintaining or restoring high biological diversity in the ecosystems upon which they depend. For example, the Lao PDR case highlights the major contribution to food security—and especially protein intake—made by access to a rich diversity of aquatic species. Although rural people themselves find it difficult to calculate aquatic resource production, they are consistently able to identify a wide range of species upon which they depend. In Attapeu, this included fish, eels, frogs, freshwater shrimps, snakes, snails, and turtles (102 species were identified in one village).

In Pred Nai, Thailand, the situation is different, where local residents have helped restore biodiversity

by replanting mangroves. One of the most valuable local species is the mud crab, especially prized due to its rarity, because so little of its mangrove habitat remains. Villagers interested in increasing mud crab production formed a group to explore habitat restoration as well as aquarium breeding.

In the Indian case study on the significance of agro-biodiversity, some poor households were shown to prefer traditional varieties of rice and other crops to introduced ones due to their greater resilience to climate fluctuations and other factors. The region is subject to cyclonic conditions, long spells of drought, and very high temperature variation within a single cropping season, resulting in a range of crop stresses. Local rice varieties are genetically more resilient and withstand the harsh weather, while introduced high-yielding varieties in nearby areas proved far less resilient.

How can biodiversity conservation efforts negatively affect poor people?

The case studies present several instances where poorly designed and implemented attempts to protect biodiversity have negatively affected the poor. For example, in Yunnan Province, PRC, there have been significant adverse impacts on the poor from the establishment of a protected area combined with the existing logging ban. In an extreme case, it was reported in one village that after the establishment of the nature reserve, every family has had at least one person fined or arrested for timber or fuel wood cutting. Additionally, compensation for wildlife damage to crops or property was only one tenth of the true market value. The case study demonstrates that such negative impacts can be overcome by ensuring that the benefits of conservation are more equitably shared with poor households living in or adjacent to protected areas.

Is poverty causally related to ecosystem decline?

Many of the case studies show how poor people often depend on ecosystems for their incomes, health, security, and a variety of ecosystem services. However, this does not necessarily mean that these dependencies are environmentally sustainable and will not ultimately be detrimental to the ecosystem.

Several case studies analyze environmentally unsustainable dependence of the poor on a specific ecosystem and how the resource management system

can be made sustainable. Some case studies conclude that current dependencies of the poor on the ecosystems are harmful. In the Puttalam Lagoon of Sri Lanka, for example, the use of harmful (and illegal) nets is common under minimal law enforcement conditions. A sizable number of families depend on fishing with push nets and chain nets, as they are of low cost and readily acquired by the poor. While they provide subsistence income, damage to the resource base is high. The case study documents that the poor would prefer to move to less damaging but more expensive fishing methods if they could afford them, but it shows how lack of capital and collateral constrains such changes towards sustainable harvesting methods.

The example of medicinal plants collection in Baimaxueshan Reserve of Yunnan Province, PRC provides another case of how resource extraction practices of the poor can prove harmful. The case study also explains how sustainable management and better incomes were achieved through community action.

It should be borne in mind, however, that unsustainable exploitation by the nonpoor is typically greater than by the poor. This is because the nonpoor generally use a larger absolute amount of natural resources than the poor do.

Response Strategies

Policies and institutions can be used to mediate the links between humans and ecosystems, particularly those that matter to poor people. Policies are taken to mean primarily decisions by governing authorities regarding rights and responsibilities of the state, individuals, communities, and the private sector with regard to resource management. As such, policies are inextricably tied to institutions, which refer to the rules of the game or constraints that shape human–ecosystem interaction. These rules often emerge out of an inequitable society in which some groups and organizations have more power than others. This section presents a range of response strategies to these interactions that emerge from the case studies, still organized according to the key questions posed by the study.

What barriers prevent poor people from managing ecosystems to reduce poverty?

Several key barriers can be identified as facing poor men and particularly women in establishing and main-

taining effective ecosystem management strategies: (i) problems of managing open access ecosystems; (ii) nonpoor people controlling resource access and resource use; (iii) men controlling resource access and resource use over women; and (iv) state policies that penalize resource use by the poor.

PROBLEMS OF MANAGING OPEN-ACCESS ECOSYSTEMS

Many ecosystems are inherently complex to manage as they have open-access characteristics—that is where, it is physically or institutionally difficult or costly to impose property rights that limit their use. Many natural resources are mobile and hence, spread over large areas (water, fish, and wild animals), are not easily visible (underground, underwater, or in remote areas) or are difficult to bring within well-defined borders (fisheries, forest, many pastures). This makes these resources hard to measure, technically complex to manage, and difficult to monitor and control in their use (Saxena, 2005). The result of open access is that often no one “owns” them, and so overuse occurs, leading to reduced incomes among users and a decline (sometimes irreversible) in the resource.³⁹ This applies to many ecosystems covered in this study’s case studies—the aquatic resources and wetlands of the Lao PDR and Sri Lanka, tank systems of India, the rivers of Mongolia, the forestry resources of the PRC, and the pasturelands of Mongolia.

A number of approaches have been developed to deal with the problems of managing such resources, usually centering on bringing resource users together as a group to limit access and extraction within ecologically sustainable levels and to manage the resource collectively (also sometimes known as “common property” management). Examples of this approach may be found in the case studies of Pred Nai, Thailand; Baimaxueshan Nature Reserve, PRC; and the forestry user groups of Nepal. This collective approach requires strong mechanisms to control access and to both prevent outsiders from coming in and to stop group members from breaking or shirking their collective agreements.

CONTROL OF RESOURCE ACCESS AND RESOURCE USE BY THE NONPOOR

Unfortunately, it is very common to find the better-off in rural areas damaging the resources upon which

³⁹ Legally, some resources may be owned by the state, but because of weak enforcement, they are often de facto in open-access status.

the poor depend, for example, by undermining collective management or limiting access of the poor to these resources by controlling the inputs and markets needed to process and sell resource products.

There are many cases where the nonpoor have damaged the natural resource base used by the poor. This can happen by reducing the quantity of the resource base available or negatively affecting its quality. In Mongolia, mining—including gold and platinum—is the largest and fastest growing industry, but present trends raise concerns that few benefits will accrue to local populations who will nonetheless bear many of the deleterious effects on health and environment, including sediment loading, heavy metal poisoning, and drying up of river courses. In South India, many tank systems have developed collective management regimes. However, these regimes are being eroded by richer farmers who sink wells and encroach on the tank feeder channels and catchments. This turns the common property management regime back into an open-access resource. Initially, because of the complex linkages between ground and surface water, private well use can encourage concern with tank maintenance. But once too many wells are sunk, the tank reaches a point of no return and tank maintenance collapses—leaving the poorest farmers in a worse position with neither a private well nor reliable water from the tank.

In many cases, the nonpoor control the natural resources. In Pakistan, two of the key resources for the poor are water and land—but these are often controlled by the nonpoor. In the Pakistan case study, this was highlighted by evidence from a recent participatory poverty assessment (PPA). The concentration of landholdings in the hands of powerful landlords was seen as being directly responsible for restricting the poor's access to resources, increasing their poverty, and making them vulnerable to exploitation and risks. In many areas, the rural labor force is landless and lives on the margins in extreme poverty dependent on the vagaries of local landlords. The prevalent social structures prevent development and democratization and curtail fundamental rights.

In Bangladesh, water bodies for fishing are often as important and productive as land. Some fisheries are so productive that during the dry season, the Ministry of Lands leases out segments of rivers and large water bodies as a *Jalmahal* or fishery water estate. However, instead of collective management, water bodies are generally leased to the highest bidder for a tenure of 3 years. This short

time-frame encourages overfishing and maximizing of profit by the lessees—known as water lords—who charge others to fish. The water lords' profits are sufficient to cover private armed guards to limit access and enforce payment. But poor fishers often cannot afford the fees, and so must choose between working for the lessee for very low wages and migrating to seek other livelihood options. Some poor fishers might still try fishing in the rare, shallow ditches lying outside the leased-out prime fisheries. The 3-year lease arrangement has been detrimental to the fishery resource and has exacerbated poverty by benefiting the better-off and influential.

Even when resources are more evenly distributed or not owned by any one group, the nonpoor can exert their control through greater access to the inputs required for resource use and value added—such as credit, technology, and market linkages. In the open access Puttalam Lagoon in Sri Lanka, poor fishers often transact on a barter system in which the fish catch is negotiated to meet their short- and long-term financial needs. In particular, fishers depend heavily on informal credit to purchase fishing gear. This credit is often provided by the net or boat vendor, or by moneylenders and traders, with the money often paid back in kind as fishing catch. Obviously, the terms of trade become extremely unfavorable to the boatman or the fisher in such arrangements, as they are expected to trade the catch at a price determined by the creditor. This relationship is informal but it allows the creditor to maintain a monopoly over purchasing, storage, and fish marketing.

MEN OFTEN DOMINATE RESOURCE CONTROL AND DECISION MAKING

One widespread example of inequity in control over resources is the greater role of men in resource access and decision making. Even within relatively homogeneous villages of rural Asia, female-headed households generally have fewer user rights and within poor households, men can wield greater power over resource decisions. This is highlighted by the regional case study reviewing gender and natural resources in Asia. Resources managed under customary property regimes hold a particular significance for women. Women tend to be the primary gatherers since they are responsible to supply household needs for food, fuel, fodder, and medicine. At the same time, they are less likely to own private land on which to cultivate these resources. They also tend to be overrepresented among the poor, especially if they are heads of

households; belong to ethnic minorities, indigenous groups, or scheduled caste; and/or live in remote hilly, mountainous, dryland, or coastal areas. Women from these social groups and in these disadvantaged geographic locations are more dependent on natural resources than their wealthier counterparts in more favorable locations and from majority social groups because they lack easy access to alternative livelihood through education, employment, markets, and government services.

POLICIES AND WEAK COORDINATION INHIBIT SUSTAINABLE RESOURCE USE BY THE POOR

Often the ineffectiveness or biases of state policies and institutions undermine ecosystem management that benefits the poor. Lack of government coordination can arise both horizontally (between agencies for different subjects) and vertically (between the center and subnational entities). Due to their complex spatial and temporal boundaries, and multiple uses, ecosystems are invariably controlled by many different central and local agencies. This often leads to a lack of coordination between different natural resource authorities and reduces their ability to achieve effective management.

In the PRC, this lack of coordination is a particularly prevalent issue and is highlighted by all three Chinese case studies. Fragmentation in the management of the Sanjiang wetland is typical of wetland protection and management. Although the State Environmental Protection Agency has a clear national mandate for ecological conservation, sectoral ministries—notably those covering water resources and forestry—are also increasingly responsible for conservation. The Sanjiang Plain is controlled by a variety of agencies at different levels of government. Some of these administrative units operate under the provincial government, while others are located at lower levels of government. Land-use patterns in the Sanjiang Plains are determined by decisions taken at the center, with little regard for development of the region. Local government in the Sanjiang Plains depends on financial transfers from the center, but these transfers are unpredictable—reinforcing short-termism in local government and a focus on unsustainable economic growth. Finally, poor provinces often lack financial support from central government to undertake key environmental protection functions.

In South India, tanks are under the control of either *panchayat* or the irrigation department of the state government, while the fishery is controlled by

the panchayats and the fishery department of the state government. The local panchayats, and both the revenue and forest departments of the state government, have stakes in tank forestry. The case study documents extremely weak coordination among these departments that not only causes underutilization of the productive potential of tanks (fishery, forestry, silt, and grasses) but also undermines their power to protect these usufructs from misuse.

Viet Nam's institutional arrangements for the forestry sector also exhibit a lack of coordination that undermines pro-poor resource management. Responsibility for poverty and forestry tends to be compartmentalized. The Ministry of Labor, Invalids, and Social Affairs has lead responsibility for poverty alleviation and gives virtually no attention to forestry issues. Conversely, the Forest Department of the Ministry for Agriculture and Development has responsibility for forests but gives almost no explicit attention to poverty alleviation. Coordination and information exchange between the central and provincial levels are also limited. On the positive side, steps are now being taken toward increased integration of poverty reduction goals into sectoral plans and across ministries at the national level through the government-led poverty strategy.

Government agencies are often influenced by the nonpoor (through what is referred to as “elite capture”) who then benefit disproportionately from resources management at the expense of the poor. For example, in Mongolia's mining sector, with a weak regulatory structure and lax taxation laws, exploitation of minerals largely benefits Mongolia's wealthiest citizens and foreign nationals affiliated with mining corporations. Residents in the mining areas generally receive low-paying jobs and a decreased quality of life due to pollution and loss of traditional jobs. During the last decade, gold has been exploited in the most accessible areas. However, recent mining activities have expanded into pristine and even protected areas. The Ministry of Nature and Environment has recently produced proposals to degazette over 10% of Mongolia's existing protected areas to allow greater access by the mining sector.

In Viet Nam, the Government has also implemented policies that have negatively affected resource access by poorer ethnic minorities. In the 1950s, when the war against the French had begun, the Government of Viet Nam restricted timber and NTFPs exploitation by local people to assure that forest resources could be used to support the war

effort. Ethnic minorities are said to have suffered as a consequence of this prohibition. More recently, the Government launched the 5-Million Hectare Reforestation Programme, in which the national Government has set its sights on reforesting vast areas that are said to be “empty lands.” Often, these are lands where ethnic minority people have maintained an elaborate and largely sustainable system of resource use based on swidden agriculture and the collection of forest products.

Not just poor households but entire poor regions can lose from policies that favor wealthy, more politically powerful regions. For example, in the Sanjiang Plains, the political and economic structures work to transfer the benefits or economic rents out of the region from exploitation of the rich natural environment, without adequate compensation to local residents. These transfers represent significant losses in terms of what could be reinvested to develop the potential of the region.

How do population growth and economic growth contribute to environmental problems that face the poor?

In addition to political and institutional constraints, environmental change is influenced by rapidly changing demographic and economic process. These are especially dramatic in Asia which has the world’s fastest growing economies and highest rate of urbanization. This places huge pressures on the natural resource base as highlighted by the case studies and can be seen in the loss of pasturelands in Mongolia, of forests in Viet Nam, and of wetlands in Bangladesh and the PRC. In northern Tamil Nadu, pollution of tank water and tank bed soil is a common phenomenon in many tanks located near cities and tannery-intensive villages.

The pressure on ecosystems from other economic activities is particularly strong in the PRC, whose economy is the fastest growing in the world. As a country, the PRC faces formidable resource constraints, having to feed a fifth of the world’s population with only 7% of its farmland, and available per capita water resources are of only one quarter of the world’s average. National food security is therefore always a paramount concern. The soils of the Sanjiang Plains are highly fertile and, as a result, the region has long been designated as a national base for grain production. Consequently, over the past 4 decades, central and provincial governments as well as donors

have invested heavily in the development of agriculture in the Sanjiang Plains. The area of croplands reached 4.02 million ha by 1997 from merely 820,000 ha in 1949. About 2.46 million ha of the original wetlands have been converted into monocrop agriculture. The environmental costs of this growth are such that they are now receiving increased political attention from both national and provincial leadership, and efforts are being made to rationalize land use and restore certain wetlands.

Rapid development in the PRC is also having environmental repercussions on many of her Asian neighbors. For example, with a population nearly 500 times that of Mongolia, the PRC threatens to overwhelm Mongolia’s own efforts to determine its economic and environmental future. For instance, illegal international trade threatens a number of species in Mongolia and evidence suggests that this threat is growing and spreading to new species. For example, the Mongolian saiga antelope is a distinct subspecies found in the southwestern part of the country. But the population of this subspecies catastrophically declined from 2000 to 2005, from over 5,000 to less than 800 individuals. The driver in this collapse is the lucrative Chinese medicinal market for saiga horn and the inability of Mongolian authorities to control this illegal trade. Mongolia is also struggling with its own rapid economic transformation from a relatively strong Soviet-dominated economy with strict controls on a free-market economy. This transition—combined with a faltering economy, increased reliance on trade with the PRC, porous borders, and little revenue and will for enforcement—has led to rapid declines in a range of wildlife species.

Indirect influences of population growth are also alluded to in several case studies. In the case study covering Yunnan Province, PRC, villagers described how increased population reduces per capita landholding and places pressure on natural resources, particularly fuelwood, animal fodder, and non-timber forest products. The Tamil Nadu case in South India suggests that population pressure is one of the more important factors hastening the process of tank degradation through increased pressure on the resource in the form of encroachments into catchments and feeder channels. In Nepal, a growing population and harsh economic conditions in the mountains—combined with the eradication of malaria and infrastructure development in the Terai—led to large-scale migration from the mountain regions to the Terai zone. This has resulted in greatly increased deforesta-

tion in the Terai, while the mountainous areas have generally experienced decreased pressures and reforestation. Migration and increased population densities have also played a significant role in the increased risk of transmission of zoonotic pathogens, such as SARS and avian influenza as described by the case study on this phenomenon. In Southeast Asia, rapidly growing and more concentrated human and farm populations are bringing people and animals into closer contact. Moreover, many industrial farms are located beside or within rapidly growing cities especially in Asia, which has the fastest-developing livestock sector in the world, fuelled by the steady increase in meat consumption in the region.

What examples of coalitions for change are there in overcoming political challenges to pro-poor environmental outcomes?

As previous examples have illustrated, increasing the environmental rights of the poor is an inherently political act, and it requires a process of change. The case studies suggest that this change process needs to alter the power relationships that govern access to resources between different groups and individuals. Only by understanding and addressing these dynamics of change and identifying the agents of change is lasting poverty reduction possible. However, these changes are not straightforward as they require challenging powerful vested interests. The sections below illustrate some ways through which changes were achieved including action initiated by the poor and local groups themselves, forming alliances with civil society and donor agencies and engaging government, and scaling up from the local level.

ACTION INITIATED BY THE POOR AND LOCAL GROUPS

The case studies illustrate the importance of action initiated by the poor and local groups. In Pred Nai, Thailand, a mangrove forest was placed under a logging concession in 1941. By 1985, villagers became concerned because logging concessionaires overharvested the mangrove and prohibited villagers from harvesting crabs, shellfish, fish, and other products in the concession areas. Other local interests converted degraded mangrove areas into shrimp farms and built a gate to block seawater, which further damaged the mangrove ecosystem. In 1986, the villagers formed a group to stop logging and shrimp farming. Their efforts were successful, and commercial logging was

halted in 1987 and the company ousted from the mangrove—although it was only legally terminated in 2000. However, as the case study concludes:

Community-based initiatives in general, and Pred Nai in particular, should not be romanticized. Within Pred Nai, differences of opinion and conflict have arisen regarding mangrove management, including a debate about conservation versus sustainable use. What is important is that the community members have managed the conflicts themselves through negotiation and dialogue.

Tamil Nadu has several examples of local level institutions led by poor farmers which have effectively solved the open-access problems of managing tank irrigation. Feeder channels were maintained, water diverted from rivers, common irrigators appointed for water distribution, and sedimentation removed. In a few tanks, such as Parambur tank in Pudukkottai District and Kedar tank in Villuppuram District, the tank institutions are able to minimize local political differences. They have devised clear rules and strategies for exploiting and sharing tank user rights. During tank water scarcity, institutional arrangements such as acreage restriction, rotational water supply, and prohibiting well owners from using tank water are some of the strategies followed.

FORMING ALLIANCES WITH CIVIL SOCIETY AND DONOR AGENCIES

External agencies such as civil society groups and donors can act as important allies for advocacy, technical support, and funds. However, these agencies need to play a careful role to avoid undermining the process. Some examples include:

- In Pred Nai, Thailand, the villagers requested support for design of a management plan from the Bangkok-based Regional Community Forestry Training Centre for Asia and the Pacific, which proved beneficial.
- The WWF PRC program worked with the villages near the Baimaxueshan Nature Reserve to improve protected area management.
- International assistance agencies in Nepal helped the Forest Department and forest dependent households to introduce leasehold and community forestry.
- Development assistance agencies in Pakistan played a catalytic role in ensuring that environmental issues identified by the poor were not forgotten in debates over the poverty reduction strategy.

- IUCN in Bangladesh and the Lao PDR became involved in providing technical support to people dependent on aquatic livelihoods.

ENGAGING GOVERNMENT AND SCALING UP FROM THE LOCAL LEVEL

The environmental literature includes a growing body of pro-poor environmental microprojects and interventions—“islands of success.” The challenge is to adapt, spread, and upscale these approaches so that they reach many more potential applications and become self-sustaining as demonstrated in some of the case studies.⁴⁰

ENGAGING WITH GOVERNMENT AND POLITICIANS

One approach for scaling up is to engage senior level decision makers and politicians. Comanagement in Baimaxueshan Nature Reserve in Western PRC faced the challenge that a pilot site is in essence an island for experimentation—and it remains just that unless its successes are repeated in other areas. This problem is acute in Yunnan Province. The achievements in villages within the Baimaxueshan Reserve are commendable, but over 166 different nature reserves now exist in Yunnan Province alone, with more being established every year. Oddly, it seems that although many officials—for example, in the Yunnan Forestry Office—are now aware of and understand the issues raised for local people when a nature reserve is established, this does not always transfer to implementation. To try to address this, WWF-PRC assisted the 2003 Yunnan annual provincial conservation meeting to focus on the topic of comanagement. The meeting was held at the reserve in Deqin County to provide hands-on experience. To engage national decision-makers, WWF-PRC held an international conference in Beijing on experiences and policy implications of comanagement of natural resources in the country. The discussion on comanagement issues inspired very valuable ideas for future legislation to establish the PRC’s first Reserve Law.

The most appropriate level of government for interventions to engage with has to be decided on a case-by-case basis. In several case studies, local governments proved most amenable to change. The DFID-funded Yunnan Environment and Development Project, for example, has been able to exert the most

tangible influence on county and township government institutions. This may be partly due to the less complex institutional arrangements at the local level and the pragmatic approach adopted by local government officials. In Pred Nai, Thailand, the interventions taken benefited from the strong support of the provincial governor.

IMPORTANCE OF PUBLICITY AND INFORMATION

Pred Nai’s efforts also have been helped by effectively generating publicity. The group was awarded a national award by the Forestry Department in 2002 and an international award by the Equator Initiative in 2004. However, attempts at the national level to ally with other such initiatives to support the passage of a Community Forestry Bill have faced strong resistance.

A slightly different example of the role of information and publicity comes from Pakistan where donors and civil society groups use PPAs to work with the federal government to challenge the dominant view that poor people damage and degrade the environment. The findings of the assessments surprised many in both the environment and development communities when they showed that the poor highly prioritized environmental conditions.

FORMING NETWORKS

In Nepal, scaling up has been achieved through the Federation of Community Forest Users of Nepal (FECOFUN) which was formed in 1998 to lobby for the promotion of community forestry in Nepal. It has district and zonal units, which work for the benefit of forest user groups and community forests. About 70% of forest user groups are members of this federation. FECOFUN participates in national community forestry debates and runs programs to empower user groups. Other federations such as Nepal Forest Users group and Himalayan Grassroot Women Natural Resources Management Association have been formed to cater to the various needs of user groups in Nepal. In Thailand, Pred Nai residents realized they could not increase crab harvests without working with neighboring villages. A mangrove network developed with other villages and became the Community Coastal Resource Management Network of Trat Province.

⁴⁰ See the website www.povertyenvironment.net for examples.

CRISIS LEADING TO ACTION BY THE NONPOOR

In addition to the poor initiating action, often with the support of civil society and external agencies, national governments may be catalyzed to take action due to a crisis. This has been one of the key driving forces in the PRC where the disastrous floods of the 1990s, especially 1998, as well as dust storms in Beijing have served as wake-up calls. It was concern over the impacts of these disasters on the cities, rather than the need to address long-standing poverty in rural areas, that led to the change of attitude of the government toward the environment. Likewise, it was the crisis over SARS that led to greater control of the wildlife trade in the PRC.

What political and institutional changes are required to achieve pro-poor environmental outcomes? Can these be supported?

The case studies presented have highlighted the role of political and institutional relationships—now often referred to as “governance” issues. As the case study of Baimaxueshan, PRC concludes:

Poverty is... a social relationship of competition among individuals, social groups, and the Government in the pursuit of wealth and political power. This definition has significant policy and operational implications because it requires not only economic growth to overcome poverty, but also a transformation of the social relations at the root of poverty.

This section reviews the extent to which environmental activities have stimulated broader governance changes contributing to the transformation of social relations, which are at the root of poverty. Three main developments precipitated by environmental interventions are highlighted: (i) poor people learning to organize for change; (ii) legal redress and civil society groups to challenge the state; and (iii) promoting gender equity.

POOR PEOPLE LEARNING TO ORGANIZE FOR CHANGE

One of the challenges for pro-poor ecosystem improvements, as with many forms of pro-poor change, is the problems poor people face in organizing to overcome the many constraints that face them. In several documented cases, external groups, such as NGOs, have facilitated this social mobilization. However, there are also examples such as in Pred Nai where villagers

drew upon the strengths of local traditions and village elders. For example, the Pred Nai mangrove activities involved support from a respected monk. There are also examples where ecosystem decline can be the catalyst for the poor to organize themselves more broadly. Again, this happened in Pred Nai, where local structures were developed for managing the resources.

LEGAL REDRESS AND CIVIL SOCIETY GROUPS TO CHALLENGE STATE POLICIES

After initial organization, groups representing the poor may need to develop more formal mechanisms to challenge state policies—for example, through legal means or forming NGOs to lobby and advocate change. In some settings, natural resource issues provide the impetus for these important governance developments. For example, in Mongolia, poor households acted against mining interests that had caused major damages to the headwaters of the Onggi River. In an unprecedented response, 3,000 rural citizens—many of them nomadic herder families—created one of the country’s first locally driven environmental NGOs: the Onggi River Movement (ORM) supporting restoration of the River. They successfully halted operations of three gold mines harming the river and Red Lake. In a Mongolian first, ORM filed court cases against the companies involved, which in turn has been a key factor in increasing national awareness about this and other environmental matters.

PROMOTING GENDER EQUITY

The case studies also include several examples of how ecosystem interventions can lead to broader empowerment of women and support for gender equity. For example, in Nepal, 2,213 leasehold forestry groups formed with 5–10 poor households in each group. The decision-making capacity of women is reported to have substantially improved through the activities of these groups, based on a comparison of the decision-making characteristics of the households before and after leasehold forestry formation. Before the leasehold forestry groups were established, only 10% of the women could decide on forest management approaches for themselves, while 30% made joint decisions, and 60% depended on a male member. Five years later, 25% of women could decide for themselves, while 55% made joint decisions, and only 20% depended on a male household member for help. This indicates the wider potential for gender empowerment through greater resource decision making by women.

How can pro-poor environmental management be supported by development agencies?

Several key implications for the organization and delivery of development assistance programs emerge from analysis of these 16 case studies in the context of the wider literature on this subject. Most economic development policies and poverty reduction programs pay scant attention to the relationships among poverty, health, and the environment. The cases have amply demonstrated the nuanced range of linkages between natural resource systems and the rural poor—including their health—showing the importance of attention to these relationships, whether the primary interest is poverty alleviation or environmental management.

The cases also identify opportunities to promote pro-poor environmental change as well as examples of where external assistance agencies have played positive roles in such efforts. Development funding agencies in Nepal, for example, played a key role in supporting the country's community forestry program with strong social as well as environmental benefits. In this case, external assistance helped build local institutions and enhance the capacity of forest officials and users for management and sustainable use of forest resources. Today, these approaches to forest management in Nepal are so well established that they can continue with much less support from these agencies.

However, care must be taken to avoid inappropriate interventions that undermine national and local efforts at pro-poor environmental management. This is amply illustrated by the externally supported tank modernization in South India. External assistance could make little headway in reversing the process of tank degradation, despite 1,300 tanks out of 39,000 tanks in the state of Tamil Nadu being “modernized” with an outlay of about Rs5 billion over 20 years. More than 75% of this was funded by external funding agencies. There was remarkable uniformity imposed on this modernization process, in spite of the vast differences in the problems faced by tank irrigators across different agro-climatic and socioeconomic localities. In most targeted tanks, the institutions as well as the infrastructure created have collapsed. These projects failed to view the tanks from the standpoint of the households whose livelihood strategies depended upon them. Modernization of physical infrastructure was overemphasized, while little attention was given to ensuring the active participation of

farmers in decision making. There also was a nearly complete neglect of secondary stakeholders (such as fisherfolk, agricultural labor households, pastoralists, and nonagricultural households) who could have been included in forming an alliance against vested interests and encroachers and built a broader community of tank users. Such lessons would seem to have significant implications for a variety of infrastructure-driven development projects in rural areas.

Another recurring lesson from the cases is that local context matters. The key consideration often is the need for a clear identification of the underlying sources of pressure driving environmental change. This means also that there is a need to avoid simplistic crisis narratives concerning environmental degradation, despite the attraction they hold for mobilizing funds and the support of senior managers and stakeholders.

A consistent message also is that politics matters, and one of the toughest lessons for the traditional development practitioner is the need to deal directly with often difficult political issues affecting the ability of poor communities to gain the benefits of improved resources management. The political status quo may sometimes need to be changed for an intervention to be successful. In such cases, if an approach for achieving necessary policy and/or institutional change cannot be built into the intervention strategy, then the program or project should probably not be undertaken. Indeed, there is the possibility of counterproductive actions in the absence of an adequate understanding of the political forces at work, lest an external intervention strengthen anti-poor processes rather than to promote pro-poor change.

Such understanding does not come easily. International organizations and their staff find themselves in very different contexts than the rural poor whose problems they often seek to resolve. They sometimes face conflicting incentives within their own organizations and resistance from domestic political elites that may constrain attempts to address some of the underlying political challenges identified in this synthesis and accompanying case studies, including:

- *Institutional inertia and institutional focus* – There is a temptation for all organizations to be focused on sustaining their existence. This can be particularly challenging for development assistance agencies, which, by definition, are trying to put themselves out of job. Second, there sometimes is too much attention given to taking credit for

gains achieved (and results-based management processes can reinforce such biases), even though successful programs almost inevitably involve numerous players and influences.

- *Funding imperatives* – Financial expenditures are often seen as the most important measure of success, which tends to encourage a hardware approach to problems rather than the sometimes more complicated process-oriented approaches.
- *Rapid time frame* – The rapid time frame for project preparation, and especially supervision of implementation, limits the ability to conduct proper analysis and longer-term engagement with poor households that are the targets of interventions. Further, the staff of development assistance organizations lead very different lifestyles to poor households, which acts as a constraint to really understanding the ground realities that poor people face.

Conclusion

This publication has highlighted a diversity of challenges and opportunities for pro-poor environmental management in Asia. The case studies have demonstrated the many challenges, and the structural and

often political nature of the problems. On top of these factors are massive economic and demographic forces as Asian economies grow and urbanize. The complexity and deep-rooted nature of these challenges can help explain why, in many cases, natural resources are being managed unsustainably across Asia.

However, the conclusion of these case studies should not be pessimistic. For too long, natural resource issues have been approached superficially as an issue of awareness raising, capacity building, technical know-how, or improved technology. These approaches may be useful in some cases, but they often fail to address the underlying causes of environmental decline. Not surprisingly environmental projects with these approaches have a mixed record of success.

The case studies identify possible ways forward. Many cases point to the positive results possible when a more complex, multifaceted, and politically nuanced approach is adopted. By building on these successes, and with increased understanding of how environmental change is part of larger economic and political changes, it is possible to be hopeful and proactive. This approach may appear more complex and demanding, requiring greater attention to local context and institutional dynamics, but the case studies suggest that it is ultimately more likely to succeed.

