
Introduction: Tailoring Collaborative Conservation in Bangladesh

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Common-Pool Resources And Collective Action

Despite a wealth of intellectual and practical engagement, natural resource conservation is an issue that remains unsettled for communities, governments, and non-governmental organizations (NGOs) the world over. While there are success stories from which to gain insights and inspiration (Acheson 2003, Lejano and Ingram 2007, McKean 1992), conflict and contention continue to mark many conservation projects (Pimbert and Pretty 1995). Causes of conflicts are numerous and varied, but are nearly always rooted in inappropriate fits among assemblages of user groups, institutions, and resources. The logic follows, therefore, that finding appropriate matches between management entities and stakeholders will ensure proper conservation. However, an increasing amount of research and practice have made it clear that generating successful conservation arrangements across differing socio-natural environments is exceedingly difficult. It is becoming evident that in order for natural resource management to be effective it must be tailor fit.

Ostrom (2008) cites a lack of fit between the characteristics of particular natural resources and management institutions to explain why resource conservation is so often laden with conflict and failure. Natural resources and the environments in which they are located vary both in quantity and quality, meaning that attempts to uniformly apply institutional arrangements of conservation and management tend to be unsuccessful. In other words, there is no such thing as a single "magic bullet" when it comes to using and caring for natural resources. The challenge of common-pool resources, in Ostrom's opinion, lies in designing institutions at multiple levels that are appropriate at various scales to the types of resource involved. She suggests a series of requirements for achieving this, including: relevant and accurate information gathering; conflict resolution mechanisms; enforcement of rules; suitable infrastructure; and the ability to adapt to changes. While these proposed requirements offer a foundation from which to think about institutional arrangements of resource conservation, they offer few insights into the broader socio-cultural contexts in which both institutions and resources are enmeshed.

Agrawal (2001, 2003) too has addressed at length the need to examine why institutional arrangements are so often unsuccessful in the task of managing and conserving resources. He contends that through localized studies researchers have identified an overabundance of factors that may contribute to effective governance

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and conservation. This, he argues, draws us away from effective analysis of the issue.

Along with a shift towards comparative studies, Agrawal prescribes research that is more attentive to historical processes of subject formation and positionality in relation to resource management and conservation, rather than research focused exclusively on the mechanics of governance. Resources, resource users, and institutions of conservation exist in webs of power and meaning woven through the historical movements and ideas of social actors. No matter the level of fit between natural resources and institutions they are bound to fail lest we recognize the broader social meanings they embody and produce. At the same time, we should also bear in mind that subjective formations always take place in and in reference to the biophysical world of cause and effect relationships (Agrawal and Chhatre 2006).

As these and other scholars have noted, conflicts surrounding natural resource management and conservation have something to do with tensions among stakeholders who have some investment in resources; institutions and organizations; and resources themselves, as well as the environments they are located in. Increasingly, collaboration has been laid as the keystone for conservation projects in an attempt to deal with conflicts between stakeholders. Collaboration occurs (or does not occur) at a variety of scales and through a variety of mechanisms involving often vast assemblages of actors, organizations, and institutions. Therefore, at the same time that collaboration eases some tensions it creates new ones. Thus, we must recognize natural resource conservation as fundamentally social in nature.

Protected Areas

Protected areas have fomented post-WWII as a globalized institutional framework for conservation. The number of protected areas began to increase rapidly around 1970, peaking between 1985 and 1995. Currently there are an estimated 105,000 protected areas worldwide covering approximately eleven percent of the Earth's terrestrial land (West, Igoe, and Brockington 2006). In name, protected areas are intended to be areas ascribed a protection status through which the environment can be conserved. However, anthropologists such as West (2006) also remind us that protected areas are not only sites of environmental conservation, but also sites of social practice. They are constructed spaces nested within existing forms and patterns of social activity.

Given the social nature of protected areas it is not surprising that they are often the source of conflict. Individuals and communities located in or near protected areas often depend on local resources for their livelihoods (Bahuguna 2000). Thus, though conflicts vary greatly in quality, they usually occur when the needs of individuals and communities living in or near protected areas do not correlate with the needs of conservation as defined by management entities (Badola 1998, Brosius, Tsing, and Zerner 2005). An increasingly prevalent answer to protected area related conflicts is governmental decentralization and the creation of community-based conservation (CBC) programs with the goal of involving local community members as active stakeholders in conservation.

In addition to local residents and governmental entities and agents, international governmental and/or non-governmental agencies also frequently participate in CBC programs. CBC arrangements are therefore complex and involve a wide variety of stakeholders and institutions operating at various scales, often with differing goals and techniques. Accordingly, collaboration in CBC programs is highly political, with power distributed unevenly among entities and agents. This does not mean that successful CBC arrangements are unattainable, but that attention to unequal relations of power is fundamental. Agrawal and Gupta (2005), for example, provide evidence from Nepal to illustrate how "collaboration" has the potential to recreate existing relations of power, allowing some in the local community to monopolize access to resources (both natural and economic) through their social and physical proximity to conservation entities. Adhikari *et al* (2004), also in Nepal, show similar inequalities related to access to forest resources based on socio-economic variables.

In a similar vein, Balint (2006) makes a convincing argument that failures in CBC often stem from a lack of recognition of community development needs. He states that in the case of protected areas the focus of government, non-government, and other actors is on environmental needs and variables, rather than those related to local communities. He prescribes a re-focusing of conservation efforts on variables that have been identified as being important in international development studies-human rights, community capacities, ability to govern, and sources of revenue. In conservation schemes it is essential, in other words, to ensure the healthy development of human communities in order to develop healthy resources. Based on a global survey of changes in the governance of protected areas Dearden *et al* (2005) report that the majority of respondents felt that protected area governance had improved over the decade since 1992. Meanwhile, Naughton-Treves *et al* (2005) argue that globally while protected area status has worked to conserve biodiversity in protected areas themselves, deforestation has increased in adjacent areas, which suggests that the livelihood concerns of local residents are not being appropriately addressed.

Protected areas and the resources located within are thought of and conceptualized in different ways, which influences how they are cared for. In the United States, for instance, different ideas of conservation and management, debated since the time of John Muir and Gifford Pinchot (Meyer 1997), have resulted in different types of protected areas and conservation regimes. For example, while national parks and national forests in the U.S. are both seen as entities for managing resources, the former are intended to conserve natural beauty and the later are intended to regulate wise use of resources. Recognition of "success" or "failure" in terms of resource management, therefore, depends largely on what the expected outcomes are in relation to specific resources, as well as on whose expectations take precedence.

Conceptions of Unlike Environments and Natural Resources

In Bangladesh institutional arrangements for conserving and managing natural resources differ in form depending on the way those resources and the environments in which they are located are conceptualized. In turn, governing arrangements for conservation have evolved distinctly in each of these environment types. Though it is beyond the scope of this introduction to explore in detail, it is reasonable to assume that ideas about the nature of resources are linked to broader global discourses and apparatuses of conservation (i.e. international governmental and non-governmental organizations). Papers in this volume focus on two environment types and their associated natural resources: wetlands and forests. Defining the ways that forest and wetland are differentially conceptualized as resources in Bangladesh adds an important perspective for understanding issues related to local human communities in those areas.

Wetlands

Wetland environments and the resources therein resist definition as static entities; they are fluid in a literal sense and as such persistently flout boundaries placed on them. The dynamic nature of wetlands is particularly evident in Bangladesh where flows of water from seasonal rains constantly redefine the size and hydrology of large wetland areas comprised of *haors*, *beels*, and other depressions that are linked through networks of streams and canals. The "illegibility" of wetland areas is also due to the qualities of their resources, namely fish. Fish are mobile and for the most part unseen until harvested. Therefore, even with refined scientific methods and sophisticated technologies, estimating movements and sizes of fish stocks is a risky proposition (Acheson 2006). In addition to fish, other wetland resources in Bangladesh, such as plant and tree leaves and stems, are difficult to quantify and keep account of in terms of the ecosystem as a whole.

The indefinable and unknowable characteristics of wetlands and wetland resources influence the ways in which they are managed. In Bangladesh wetlands tend to be perceived of as being open, which means that the harvesting of resources should be regulated. Therefore, rather than focusing on the conservation of wetland environments as a whole, both traditional and contemporary institutions have often developed around the regulation of access to and use of resources. For example, in this volume both Sarker and Haque examine economic systems of moneylending that have evolved in relation to, and in large part control, the exploitation of fish resources in wetland areas. This is not to say that the traditional economic system is the only institution of governance of wetlands, but it has co-evolved with these environments to the extent that it has developed regulative functions that exist alongside, or at times in place of, governmental institutions. Put differently, wetland areas in Bangladesh tend to be thought of as environments that contain resources which ought to be regulated. This is in contrast to forest areas that are themselves often conceived of as resources to be bounded, locked up, and conserved.

Forests

It is arguable that of all the natural resources the earth bestows, forest resources are the most visible to us as human actors. Forests are comprised of trees that stand in groups up and apart from other elements in an environment, according them a visual quality of boundedness. Given this characteristic, forests have throughout history been made "legible" and claimed by elites through cartographic techniques of state-making (Scott 1998, Vandergeest and Peluso 1995); more recently, local peoples employing similar techniques have also mapped forests (Fox 2002, Peluso 1995). Through processes of mapping, forests around the world have come to be conceptualized by governmental officials and organizations as resources in and of themselves. In turn, changes in the quality of forest resources are defined by changes in quantity-forest loss and gain-with less attention paid to more inconspicuous resources that lay beneath forest canopies. However, it are these less visible resources-various non-timber forest products (NTFPs)-that local people living in or near forests regularly rely on to support their livelihoods. For these people the forest itself is not perceived as a bounded resource, but rather as a bounty of resources that are located throughout a forested area.

One way to think about conflicts over forests in Bangladesh between Forest Department officials and local communities is as conceptual misunderstandings. Operating under conceptions of forests as standing resources the logical approach to conservation and management for the FD has been to simply "lock up" forests. This approach, however, has proven problematic because implicit within it are over-simplifications of complex and diverse forest resources; ignorance of the porous qualities of forest boundaries; and denials of the role that forests and their resources play in the lives of local people. As a result, the activities of local actors within reserved forests come to be labeled by government officials as "intrusions" or "encroachments" (Muhammed *et al.* 2008, Mukul *et al.* 2008). On the other hand, forest-dependent people perceive limits on access to forests and the resources found there as being equivalent to limits on their ability to make a living. Due to this lack of conceptual fit, common solutions to conflicts around forest protected areas can be generally categorized as either removing local people or getting them to cooperate. However, local people's dependence on forest resources coupled with poverty and a lack of alternative livelihood options continue to thwart efforts by NGOs and the Bangladeshi government to create sustainable co-management arrangements for forest protected areas.

Markets and Resources

The presence of markets also significantly influences the ways in which natural resources are used, managed, and/or conserved. By changing values associated with particular resources, markets can modify relations of power and threaten the operations of local governing institutions. As with styles of management, the impacts that markets and commoditization have on patterns of resource use have much to do with the characteristics of the resource itself.

Wetland fish resources in Bangladesh are readily accessible, easily transportable, and quickly regenerate. In a governmental sense, wetlands are generally considered open, with rights of usufruct leased to private citizens (Ahmed, Capistrano, and Hossain 1992, Thompson, Sultana, and Islam 2003). Therefore, markets for fish in Bangladesh have evolved in a relatively localized manner around separate wetland areas, with many local residents involved in fishing as an occupation. However, the local nature of markets has not prevented the development of inequalities between local fishers on the one hand and moneylenders, buyers, and wholesalers on the other. In this volume both Sarker and Haque note the extreme poverty of fisher households and their reliance on unequal systems of moneylending and marketing to meet livelihood needs. Poverty and inequality have implications for the health of wetland areas because these are conditions that create vulnerable situations for local residents, which often lead to exploitative activities that may compromise management goals.

In the case of forests, timber markets tend to move forest management into the domains of governments and/or powerful elites who have (or at least purport to have) access to capital, technologies, and personnel for dealing with the time scales and transportation costs associated with the cultivation of trees (Rangan 1997, Ribot, Agrawal, and Larson 2006). In Bangladesh as elsewhere, groups that depend on forests, and are more often than not poor and socially marginalized, are said to lack the capacity to engage in timber markets. Forest-dependent peoples tend to engage in subsistence activities, either modifying the forest to plant crops (*jhum*) or collecting NTFPs. Though some NTFPs and cultivated products may be sold, markets for these items tend to be small. Forest-dependent groups are often perceived as threats or nuisances to conservation and management goals because of their subsistence activities in forests. Therefore, as noted in several papers in this volume, providing economic alternatives that forest-dependent groups are capable of participating in has become a key feature of forest conservation arrangements in Bangladesh.

Market values of resources have much to do with both resource characteristics and perceptions of resources. Markets influence power relationships and dictate in part the ways that different resources are governed and the roles that local community members play in governance. In Bangladesh the high value of forest resources (whether related to timber markets or conservation) has led to largely top-down management approaches where the goal is to wean local residents off of forest resources through the introduction of AIG activities. In contrast, the status of fish and other wetland products as resources, and of residents as resource users, has resulted in approaches to wetland management that are framed in terms of sustainable use of resources through regulations and improved markets.

Resource Management in Bangladesh

In Bangladesh protected areas account for only about 243 thousand hectares (2,420 square kilometers), or roughly 1.7 percent, of the country's total land area (Mukul *et al.* 2008). The country, however, is the world's seventh most populous, with approximately 160 million people, and one of its most densely populated with 1,142

people per square kilometer (United Nations Population Division 2008). These geographic and demographic realities have several implications for resource conservation and management in Bangladesh. First, bounded protected areas without human presence do not exist in any real sense. Instead, most protected areas have porous boundaries (physical, social, and legal), which humans move across in various manners. Second, the number of stakeholders in relation to sets of natural resources, whether protected or not, is likely to be high. Furthermore, stakeholders operate at a variety of social levels and spatial scales in relation to resources. Given these realities, consideration of human communities is an inseparable part of natural resource conservation and management in Bangladesh.

Wetlands management

Bangladesh is a nation of wetlands. Floodplains comprise the majority of the country, with most being inundated on a seasonal basis between June and October with the coming of monsoonal rains and heavy flows from Himalayan snowmelt. Wetlands are rich in aquatic resources, particularly fish, which accounts for eighty percent of the animal protein consumed in the country. Estimates for annual fish yields range from 750,000 to 1,500,000 tons, 97 percent of which is consumed domestically (Craig *et al.* 2004). In addition to these pressures on fish resources, wetland environments in Bangladesh are threatened by the competing needs of agriculture and industry; wetlands continue to be converted for these purposes through hydrological engineering projects (see Akter, this volume).

Present-day management and conservation of wetlands in Bangladesh has been shaped by a history of elite control and overexploitation of aquatic resources. Due to their wealth of fish resources, wetlands have for a long time been managed, for all intents and purposes, as private property through the leasing of fishing rights to the wealthy (Ahmed, Capistrano, and Hossain 1992). Thus this approach has proven costly not only in environmental terms, but also human terms. The capture of fishing rights by elites has created in Bangladesh a system by which middlemen and moneylenders benefit from the labor of poor fishers by securing access to both fish resources and fish markets (Deb 2008, Hossain *et al.* 2006, Sultana and Thompson 2007).

The consequences of past wetland (mis)management in Bangladesh for the socio-natural environment are difficult to fully ascertain. However, there is a general consensus of overall decline in fish stocks (Ahmed, Capistrano, and Hossain 1992, Craig *et al.* 2004, Murshed-e-Jahan, Salayo, and Kanagaratnam 2009, Thompson, Sultana, and Islam 2003). Drawing on FAO data from 2002, Hossain *et al.* (2006) suggest that of 260 inland fish species found in Bangladesh 54 face varying categories of threat from critically endangered to vulnerable. Also, as a result of elite control over fish resources and markets many local fishers in Bangladesh continue to live at levels of extreme poverty (see Haque; Sarker; and Bishwajit, this volume).

In 1998 the Management of Aquatic Ecosystems through Community Husbandry (MACH) project was launched in Bangladesh as a response to these socio-natural environmental concerns. The project, which was designed and implemented by the

Bangladeshi government with the support of USAID, included activities focusing on community-based participatory approaches to wetland management. Through the MACH project CBC was accomplished by securing access rights to several key inland fisheries across Bangladesh and enlisting the help of local fishers and others to design and implement conservation schemes. The project continued until 2005 and during that time officials worked with partners to secure dry season water; establish sanctuaries; reduce fishing pressure by exploring AIG activities; promote policy-level coordination; link resource users; and improve local wetland habitats (USAID 2007). However, now that the MACH project has concluded, there are questions as to what will happen to the community controlled leases that were part of the project.

Forests management

Forests comprise about 2.53 million hectares of Bangladesh's land area, or approximately 17.5% of the country. The existence of large tracts of reserved forest, controlled by the ruling class or the government, is a phenomenon that stretches back to ancient times (Millat-e-Mustafa 2002). Presently, the government of Bangladesh directly controls over half (about 1.53 million hectares) of the nation's total forested area (Muhammed *et al.* 2008). Both prior to and after Bangladesh became independent in 1971 forest policies were formulated that tended to be utilitarian in scope, with little thought to the livelihood needs of local communities. This began to change in 1994 when the government of Bangladesh, with assistance from the Asian Development Bank and the United Nations Development Program, presented the twenty year Forestry Master Plan which contained explicit provisions for participatory forestry (Millat-e-Mustafa 2002). In the ensuing years participatory forestry existed in Bangladesh in name, though not always in practice. As is true in other locations around the world (Few 2001, Jim and Xu 2002, Johnson and Forsyth 2002), Fox (2007) points out that, "Many past efforts to incorporate local people into the management of protected areas proceeded on the basis of simple and incorrect assumptions about the nature of the dependence of poor local people on natural resources systems."

Building off the MACH model, in 2004 the Bangladesh Forest Department created a new protected areas management program, known as "Nishorgo." Financial assistance for this program also comes from USAID via the Nishorgo Support Project. The goals of the Nishorgo program were to improve conservation and management of protected areas by building cooperative partnerships between the Forest Department and stakeholders at local, regional, and national levels (Nishorgo 2010). The focus of much of the activities of the Nishorgo program were development of alternative income generating activities among resource users who live in or near forest protected areas in order to reduce pressure on forest resources, namely non-timber forest products (NTFPs).

Integrated protected area co-management

Currently, management of protect areas in Bangladesh, both wetland and forest, is being carried out under the Integrated Protected Area Co-management (IPAC)

program. IPAC began in 2008 with support from a variety of international organizations, including USAID, East-West Center, WorldFish Center, and World Wildlife Fund-U.S. The program's goal is to scale-up natural resource co-management at both the policy and operational levels. Components of the program have been designed to meet the needs of co-management arrangements at national, regional, and local levels; these include policy development, institutional capacity building, and support for site-specific implementation. The IPAC program is a continuation of the CBC programs that were developed under MACH and Nishorgo and operates under the Government of Bangladesh's Nishorgo Network, which is a national network of protected areas.

Papers in this volume are based on research funded as part of the Nishorgo Network's IPAC program with the hope of overcoming the "simple and incorrect assumptions" that have hindered past attempts at CBC. Research funds were allotted to government officers from various departments, as well as to one graduate student, to support site-specific research pertaining to issues of CBC. It is expected that the research findings reported in this book will illuminate new directions for policy and implementation strategies for creating arrangements that meet the goals conservation while not hindering the livelihoods of local community members. Spending time to investigate the realities of local resource users in both wetland and forest environments will help in tailoring conservation programs to the site-specific variables of socio-natural environments.

Overview of Papers in this Volume

Collaborative management in wetland environments

Unlike forests, wetland areas in Bangladesh are not governmentally recognized as protected areas, meaning that the involvement of government agencies is comparatively limited. Rather, collaborative management arrangements in wetland areas tend to be more localized and involve resource users, NGOs, and market actors such as moneylenders, wholesalers, and industry owners. Due to this multiplicity of stakeholders, the challenge in developing collaborative management arrangements for wetland areas is dealing effectively with the economic and social inequalities that are implicit in relations between various actors.

In her paper focusing on co-management projects in Alua Beel, **Masud Ara Momi** argues the need for participation of resource users in all facets of management. While pointing out that co-management projects have been successful in bringing economic benefits to poor resource users in Alua Beel, she suggests that these are limited due to the low number of fishers who participate in decision-making. It is non-fishers in conjunction with government officials, points out Momi, who make decisions regarding the management of Alua Beel. Fishers, for the most part, participate only in implementation phases through technical activities. In other words, management of the beel is top-down, rather than collaborative. Momi suggests that the IPAC project currently being implemented should work to increase information sharing among stakeholders and to empower fishers to participate in decision-making regarding management.

Through an analysis of the existing fish-market chains in the Sherpur District of north-central Bangladesh, **Md. Aminul Haque** argues that poor fishers are often exploited by middlemen due to their isolation and a lack of adequate transportation and communication infrastructure. Furthermore, he points out that inequalities and exploitation are amplified through the process of high-value fish traveling through the market chain because of their popularity among consumers who are geographically farther away. Citing a nearly exclusive control of fish-market chains by the private sector, Haque suggests greater government intervention on the behalf of poor fishers.

Khalekuzzaman Sarker looks at the livelihood strategies of fishers and shrimp farmers in the mangrove forest wetlands of the Sundarbans. His findings suggest that fishing is the primary occupation for many households in the area, but that it appears to be insufficient to support these households. Poor health and sanitation, lack of adequate drinking water, exploitation by moneylenders, and vulnerability to natural disasters are among the problems that Sarker identifies among fisher households in the Sundarbans. He concludes that the livelihoods of fishers will only improve with a focus on practical issues and notes, as Haque does, systems of moneylending as a major hindrance to bettering the welfare of fisher households.

In his paper on the livelihood status of fishers in Baikka Beel, **Bishwajit Kumar Dev** focuses on differences between fishers who are participants in the MACH program and those who are not. He finds that according to indicators such as type of housing, level of education, occupational variability, and dependency of household members fishers who participate in the MACH program are much better off than those who do not. Bishwajit argues that the livelihood conditions of local resource users are linked to biodiversity conservation and natural resource management in Baikka Beel. He suggests, therefore, that the Bangladeshi government, NGOs, and local government officials should support institutional development related to community co-management of natural resources.

Afrin Akter shows how participatory programs can end up missing the mark in her paper examining people's perceptions of environmental pollution in Mokosh Beel. She suggests that though local community members are happy with ongoing projects that have, among other things, helped empower women, they wish for additional interventions to address pollution. Afrin shows how the delegation of various regulatory functions among government agencies (in this case the Department of Environment) can undermine the health of socio-natural environments through a process of de-localization and a moving away from participatory approaches. She concludes that co-management arrangements are a viable option for addressing pollution concerns in Mokosh Beel.

Collaborative management in forest environments

People who live in or near forests use forest resources for a variety of purposes. Plants are used for food and medicine; animals are hunted for consumption or sale; and wood materials are used for fire and building. However, incursions into forests

and the use of forest resources by local people are taboo activities within broader governmental frameworks in which forests are envisioned as resources to be protected. In Bangladesh this has created conflict between Forest Department officials, whose task it is to enact policies meant to protect forests, and local people who see the resources they obtain from the forest as vital to their livelihoods.

Fatima Tuz Zohora's paper in which she examines the livelihoods of wood and honey harvesters in the mangrove forests of the Sundarbans is an exception to the model of forest governance that we have laid out in this introduction. Zohora notes that in the Sundarbans the government's strategy for conservation and management is focused on regulating the harvesting of NTFPs by local people. This strategic difference is perhaps due in part to the inability of the Forest Department to effectively monitor the wetland forest environments that dominate the Sundarbans; or perhaps it is due to the presence of traditional markets that have evolved around the exploitation of NTFPs (wood and honey in particular).

Whatever the reasons for this strategic difference may be, Zohora examines the livelihoods of resource harvesters in the context of governmental regulations. She argues that because of regulatory frameworks that make harvesting a tenuous livelihood strategy harvesters are forced to rely on systems of moneylending that put them at an economic disadvantage. Regulations on and limited access to forest resources, Zohora concludes, puts harvesters in vulnerable positions and often drive them to break rules in order to meet their livelihood needs. She suggests that the government and NGOs should take the initiative to insure the safety and livelihood security of harvesters in order to prevent rule-breaking that could lead to unsustainable harvesting practices.

Md. Abdur Rahman suggests that a paradigm shift in thinking about the management of protected areas has compelled the Bangladeshi government to develop new approaches to protected area management that integrate the livelihoods of forest dependent people with conservation objectives. In his paper he examines efforts to provide livelihood options to the Tanchangya people who have traditionally practiced *jhum* agriculture and collected various products in the forests that comprise the present-day Teknaf Game Reserve.

Rahman first discusses conflicts that have arisen between Forest Department officials and Tanchangya people over the latter's continued illegal use of reserve forests, particularly their practice of *jhum*. He goes on to argue that because of their dependence on forest resources to provide daily necessities such as food and medicine the Tanchangya too are acutely aware of and concerned about forest degradation issues. However, he insists that the Tanchangya are forced to encroach onto reserved forestlands to maintain their livelihoods in the face of inadequate food security, a lack of formal land rights, high risks of infectious diseases, and a lack of social support. Moreover, Rahman points out that historically the Tanchangya people have contributed little to forest degradation because of their small numbers (less than 4,000 individuals).

Rahman concludes that though the Tanchangya are ideal candidates for conservation partnerships under the IPAC project, their livelihood needs must be addressed if co-management is to be successful. He suggests several steps needed in order to achieve the twin goals of conservation and livelihood improvement; among these are guarantees of rights of usufruct for Tanchangya people, official recognition as forest dwellers, and beneficiary member status within a Forest Department administered Participatory Benefit Sharing Agreement. Lastly, Rahman emphasizes the need for educational opportunities for Tanchangya peoples.

Md. Zahidur Rahman Miah examines the livelihood patterns of residents of villages located in or near Kaptai National Park. He notes that many residents continue to rely on swidden agriculture (*jhum*) for subsistence, something that Forest Department officials have in the past attempted to integrate into the creation of agar (*Aquilaria agallocha*) plantations. However, as plantation forestry has diminished as a management strategy in favor of conservation swidden activities are more and more perceived by Forest Department officials as having negative impacts. Therefore, as Zahidur points out, the focus of the Forest Department, in conjunction with the Integrated Protected Area and Co-management (IPAC) project, is now on generating Alternative Income Generation (AIG) activities that can relieve the pressure put on forest resources by local users. Zahidur argues that local community members are eager to engage in AIG activities such as fish cultivation, eco-tourism, creating fruit orchards, and mushroom cultivation.

In her paper exploring the short-comings of past social forestry projects **Rokeya Begum** notes that forest-dependant people in and near Madhupur National Park have become suspicious of such projects. In particular, she examines the failures of plantation forestry projects to provide community benefits sufficient enough to curtail forest use practices seen as being destructive. By pointing out how in the past participation in and the receiving of benefits from plantation forestry projects tended to follow localized lines of power, Rokeya reveals how well-intentioned projects can have unintended consequences due to insufficient understanding of local socio-political conditions. She concludes that greater understanding of the livelihood needs of residents in and near Madhupur National Park is needed to ensure success for future co-management endeavors.

Even with appropriate implementation, projects that offer alternative income generating (AIG) activities with the goal of easing forest-use by local may lack the scope to produce a positive impact on forest conditions. **Mahmudah Roksenia Sultana** explores this dilemma through a comparison of forest user group (FUG) members and non-members among village residents near Satchari National Park. She found that compared to non-members a significantly smaller percent of FUG members were involved in forestry related activities (49% and 5% respectively) and that this correlated to overall higher incomes for FUG members. In addition, she suggests that involvement in FUG activities has helped raise awareness among members of forest-related issues and the need for conservation. However, Mahmudah points out that only 508 of 17,836 households in her study area belong to

FUGs and argues that this is not sufficient to meet conservation goals. She recommends efforts to expand involvement in FUG initiatives and increases in the financial benefits of AIG activities to ensure greater participation.

In her paper focusing on perceptions of climate change among tribal groups living in Kaptai National Park, Suriya Ferdous reminds us that recognizing vulnerabilities and adaptations to environmental change among local people is another key to designing well-tailored collaborative management arrangements. She notes that there exists among local tribal groups a large body of environmental knowledge that allows people to perceive changes and develop responses. Giving sufficient attention to the perceptions of local tribal groups, argues Suriya, will help policymakers and others in creating novel forms of governance that strengthen livelihoods while meeting the new challenges of climate change.

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