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Devolution of Resource Rights, Poverty, and Natural Resource Management

A Review

Priya Shyamsundar
Eduardo Araral
Suranjan Weeraratne

May 2005

THE WORLD BANK ENVIRONMENT DEPARTMENT

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Abstract

Over the last several years, the rights of local communities over natural resources have been strengthened either through power-sharing agreements with the state, increased legal access to natural resources, or decentralization within national agencies. Understanding the impacts of these institutional changes is important both for governments and other stakeholders. This paper focuses on four questions: (1) What is the scope and scale of decentralized natural resource management in different resource sectors? (2) What do we understand about the impacts of devolution, in terms of poverty reduction, resource conservation, and financial implications for governments and local agencies? (3) What are some conditions that contribute to success? (4) What does the future hold for decentralized resource management; that is, what are some emerging challenges? These questions are addressed in relation to three communal resource-management activities—community-based wildlife management, irrigation management transfer, and community forestry.

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Abbreviations and Acronyms

ADB	Asian Development Bank
AFR	Africa
CAS	Country Assistance Strategy
CEPOMS	Committees on Environmental Policy and Management
CERSGIS	Center for Remote Sensing and GIS
CIDA	Canadian International Development Agency
CIEDP	Committee for Integrating Environment into Development and Planning
DFID	Department for International Development, United Kingdom
EAP	East Asia and Pacific
EC	European Commission
ECA	Eastern Europe and Central Asia
EDP	Environment Department Paper
EIA	Environmental Impact Assessment
ENR	Environment and Natural Resources
EPA	Environmental Protection Agency
GPRS	Ghana Poverty Reduction Strategy
GTZ	German Technical Cooperation
HIPC	Heavily Indebted Poor Countries
IDA	International Development Association
IMF	International Monetary Fund
IPRSP	Interim Poverty Reduction Strategy Paper
JBIC	Japan Bank for International Cooperation
JSA	Joint Staff Assessment
LAC	Latin America and Caribbean
MDAs	Ministries, Departments, and Agencies
MDG	Millennium Development Goals
MNA	Middle East and North Africa
MoE	Ministry of Environment
MTEF	Medium Term Expenditure Framework

1 Devolution of Resource Rights, Poverty, and Natural Resource Management — An Overview[1]

Priya Shyamsundar[2]

Introduction

Within the broad array of issues associated with poverty and natural resources, the decentralization and devolution of resource rights is arguably one of the more important policy issues confronting donors, practitioners, and governments.

In the natural resources area, profound changes are occurring in terms of who has access to and control over resources. Over the last several years, the rights of local communities over natural resources have been strengthened either through power-sharing agreements with the state, increased legal access to natural resources, or decentralization within national agencies. Understanding the impacts of these institutional changes is important both for governments and other stakeholders.

Since decentralization efforts have been a development trend for about two decades, it is appropriate to ask how and in what way decentralized natural resource management has contributed to improved livelihoods and better resource management. There are also useful lessons to be learned from understanding devolution experiences across different resource sectors.

This study focuses on four questions:

- What is the scope and scale of decentralized natural resource management in different resource sectors?
- What do we understand about the impacts of devolution, in terms of poverty reduction, resource conservation, and financial implications for governments and local agencies?
- What are some conditions that contribute to success?
- What does the future hold for decentralized resource management; that is, what are some emerging challenges?

In answering these questions, the study seeks to craft solutions that build on both synergies and trade-offs between poverty reduction goals and natural resource management.

This study is based on a careful review of literature in three sectors: community-based wildlife management, irrigation, and forestry. Chapters 2, 3, and 4 focus on each of these sectors. The review was undertaken as part of a larger project that includes case studies on community conservancies in Namibia, community forestry in India, and irrigation management transfer in the Philippines. Results from the case studies are reported elsewhere.[3]

Methods

The analysis in this paper is based on a review of over 175 articles and reports. We drew primarily on peer-reviewed journal articles and working papers written in the last five years. The articles are from established development journals and the working papers and websites reviewed are generally associated with international research organizations and donor agencies. While we have tried to identify much of the recent work done on community-based natural resource management in three sectors, our review is clearly not exhaustive.

Community-based Natural Resource Management: A Global Phenomenon

Decentralization and devolution (see Box 1) have enjoyed considerable momentum in the last two decades. The most advanced forms of decentralization are arguably in the irrigation sector, but there is significant evolution in each of the other fields.

Much of the experimentation in community-based wildlife management (CBWM) has occurred in Africa. CBWM gained ground in the 1980s and 1990s, partly as a result of increasing local and international resistance to strict protected-area programs. It was also a response to failures in state-run conservation. Decentralization in wildlife management is characterized by two overlapping phases. The first phase is exemplified by Integrated Conservation and Development Programs (ICDPs) and the second phase by what is currently known as community-based natural resource management (CBNRM). Both programs create economic incentives for local communities to conserve natural resources and both involve the participation of local communities in decision-making. However, CBNRM programs further strengthen local communities in two ways: first, there is a greater focus on the sustainable *use* of natural resources, whereas in ICDPs there is often an effort to find substitutes for natural resources-based activities. Second, CBNRM seeks to empower local communities with greater decision-making power. Thus, while ICDPs may not involve any form of decentralization, CBNRM programs are meant to lead to decentralization of management responsibilities. Chapter 2 discusses in detail some of the challenges faced in attempting to devolve authority to local groups.

Box 1
Devolution and Decentralization — Some Definitions

Decentralization has been used to characterize devolution of power within state bureaucracies, privatization, and increased political power to local authorities. Knox and Meinzen-Dick (2000) discuss decentralization as part of a group of policies that are closely related to each other. These different policies include:

- Deconcentration — the transfer of decisionmaking authority to lower-level units of government
- Decentralization — the transfer of decisionmaking and payment responsibility to lower levels of government
- Privatization — the transfer of public sector functions to the private sector or private individuals
- Devolution — the transfer of rights and responsibilities to user groups at the local level.

We understand devolution of resource rights to broadly mean a process by which state control over the use of natural resources is gradually and increasingly shared with local communities. This can happen with or without bureaucratic or political decentralization. It is generally accompanied by the creation or strengthening of a subset of local institutions.

Irrigation management transfer (IMT)—the process of transferring irrigation management from government to farmer organizations—was first undertaken in the United States, France, Colombia, and Taiwan from the 1950s to the 1970s; developing countries followed in the 1980s and 1990s. To date, governments in at least 25 countries in Asia, Latin America, and Africa are reducing their roles in irrigation management, while farmer groups or private organizations are taking them over (Vermillion 1992). Since the mid-1980s, the centerpiece of reforms has been the transfer of management (in rare cases, also ownership) of irrigation systems—wholly or in part—to nongovernmental agencies, combined with a reduced role for government agencies in operation and maintenance (O&M), fee collection, water management, and conflict resolution. Chapter 3 discusses the impacts of these changes on farm productivity, water resources use, and government finances.

Of the 3.9 billion hectares of global forests, it is estimated that some 77 percent are owned by governments, 11 percent are reserved for or owned by community and indigenous groups, and 12 percent are owned by individuals or firms (White and Martin 2002). If only developing countries are considered, Martin and White estimate that communities groups have access to and/or ownership over at least 22 percent of forests. Thus, a sizable tract of the forest estate in poor countries is identified as being controlled by communities. Not surprisingly, over the last two decades, community forestry as a forest management strategy has graduated from being a somewhat experimental strategy to being more integrated into conventional national forestry efforts (Arnold 2001). Decentralized forest management is particularly prominent in South Asia, Sub-Saharan Africa, parts of East Asia, and Central and Latin America. Chapter 4 focuses largely on the different types of experiments under way and the lessons that can be gleaned from these experiences.

Different Forms of Decentralization

Over the last decade, decentralization in natural resource management has typically resulted in the creation of a community user group to manage a common pool resource. In some cases, the links between local government and the decentralized NRM authority are indistinguishable; however, often user groups function with only minimal supervision from the state.

Decentralization in wildlife management is generally characterized by either (a) devolution of management powers to local government agencies; (b) the creation of new local conservation institutions; or (c) greater authority to traditional leaders. In Zimbabwe's, well-known CAMPFIRE[4] program, for example, authority is devolved to lower levels of government known as rural district councils. These councils retain rights over management decisions and revenue distribution. A different type of example is Zambia's ADMADE[5] program, where decentralization is at two levels. First, each wildlife area is managed under a wildlife management authority, which is headed by the district governor. This area is then divided into wildlife management sub-authorities, which are controlled by traditional chiefs. In this model, traditional leaders hold wide-ranging powers. A third type of model is found in Namibia, where communities can establish a conservancy and gain exclusive rights to commercial tourism operations if they define a geographical area, define membership, develop operating rules, and so on (Jones

1999b). Each model comes with its own advantages and disadvantages (see *Box* 2); however, community management with little real authority to communities (as appears to be the case in CAMPFIRE) is likely to result in less long-term change.

In the irrigation sector, a common form of decentralization involves a transfer of responsibilities from public irrigation agencies to water users' associations (WUA) or irrigators' associations. This is the case in many countries such as the Philippines, Indonesia, India, Senegal, and Colombia. Other types of governance structures exist, but these are not the norm. For instance, in Turkey, municipal governments became the new management unit. In Vietnam, parastatal organizations assumed responsibility, while in Sudan and New Zealand, private / mutual companies assumed responsibility. In the United States, Japan, South Korea, Mexico, and Taiwan—countries where irrigation management transfer is deemed successful—post-transfer governance entities tend to be farmer-elected boards of directors, while management entities tend to be cadres of professional staff appointed by the board.

In forestry, devolution of authority to lower levels of government is evident in parts of Latin America, especially Guatemala and Bolivia, where forest laws passed in the mid-1990s delegate authority to municipal councils. In the Bolivian case, decentralization to local government has increased local power and the ability to tax. More commonly, community-based forest management is characterized by the creation of new village-level institutions. Village forest institutions in India, forest user groups in Nepal, and community forest enterprises in Mexico are among the more prominent examples. In many cases, especially in Africa, traditional leaders have also established themselves as important stakeholders. Quite frequently, there is evidence of parallel local authority systems consisting of traditional leaders on the one hand and government-established structures on the other.

Box 2 summarizes some of the different advantages and disadvantages of the three types of commonly found decentralized resource management structures. Different institutional regimes may work better under different political circumstances. The success of a specific regime would also depend on pre-existing capacities and resource constraints.

- Decentralization to local government agencies has distinct advantages. Implementation is likely to be easier because of their ability to build on existing bureaucratic structures and the authority often vested in state organizations. However, collective action problems may not be resolved unless local governments are strongly accountable to communities and there is mutual trust.

- Community-level organizations are typically more likely to result in locals exercising actual control over natural resources. These actions are likely to be sustained over time as norms are internalized. However, community organizations may be handicapped by a lack of resources and capacity. Further, without active state intervention, inter- and intra-community conflicts may negate community efforts. Local government that is accountable to communities can overcome many of the disadvantages faced by user groups that are de-linked from local government. However, local government cannot be assumed to be accountable to

Box 2

Devolution — Three Key Institutional Mechanisms and Their Implications

Devolution to	*Advantages*	*Disadvantages*
Lower levels of Government	▪ Opportunities for raising revenues for the state ▪ Implementation easier because of access to resources, incentives to exercise management control over resources, and reliance on pre-existing bureaucratic structures ▪ Possible opportunities to be more egalitarian in distribution of benefits	▪ Communities may not gain real authority in planning and decisionmaking; open access problems may not be resolved unless local government is strongly accountable to communities ▪ Capacity building at bureaucratic and community levels required ▪ Potential for resentment and conflicts between local government and communities and/or traditional leaders
Community-level Institutions	▪ Communities can exercise direct control over resources ▪ More likely to be sustained over time as norms and rules are internalized	▪ Potential for capture by traditional leadership and hierarchies ▪ Need for rapid capacity building if organizations are new ▪ Inter-community conflicts likely in the short run ▪ Potential for quick collapse in the absence of strong leadership and/or external support ▪ Growth of many issue-specific organizations with associated transaction costs
Traditional Leaders	▪ Implementation may be easier because of reliance on existing systems of communication & rules ▪ Communities can exercise direct control over resources through reciprocal social ties	▪ High potential for capture by traditional leadership and hierarchies ▪ Inter- and intra-community conflicts may arise in the short run ▪ Overlapping authority with local government may be a problem

rural communities or represent them adequately (Ribot 2002).

- Traditional leaders are often critical to the success of community organizations. However, elite capture and favoritism are potential outcomes that can have negative impacts on poverty reduction. Conflicts related to distribution of benefits and sharing of authority can also slow the benefit stream from community action.

Understanding Impacts

There are few carefully undertaken studies that identify impacts of decentralized natural resource management. Measuring impacts is fraught with difficulties associated with differentiating between on-going biophysical changes, the impacts of policy reforms, and between the effects of decentralization and the effects of other overlapping policies (Robot 2002). Further, lack of baseline information and careful quantitative before and after studies

makes it difficult to link specific outcomes to decentralization. The conclusions we draw thus represent *impact observations* and should be treated as a mapping of likely outcomes rather than as definite results. In general, this is an area that needs more careful quantitative analyses.

Impacts of decentralized NRM can be categorized into poverty impacts, natural resource impacts, and empowerment impacts. There are also various impacts on government finances and personnel requirements. Table 1 summarizes some of the impacts of CBNRM.

Table 1. Impacts of Decentralized Natural Resource Management

Issue	*Wildlife*	*Forestry*	*Irrigation*
Poverty Impacts	Public (infrastructural) benefits not directly linked to resource use		Public infrastructural benefits that compliment private farm income and resource use
	Private benefits (jobs, tourism ventures) mainly linked to resource conservation	Private benefits mainly linked to resource use (NTFPs, timber)	Private benefits from additional activities such as extension services and credit services that are not linked to resource use or conservation
	Opportunity costs in terms of loss of land, possible increases in crop predation, and loss of subsistence meat/fodder uses	Opportunity costs mainly linked to current protection of forests and loss of subsistence fuel/fodder/NTFP uses	?
	Transaction costs in terms of time in creating and sustaining new forms of group interaction		
	Significant monitoring costs		Significant costs of infrastructure maintenance
	?	Production costs due to decrease in access to resource inputs used in small-scale enterprises	Production costs in terms of increase in water fees
Empo-werment Impacts	Community's have re-gained limited traditional control over resources		
	Where control remains mostly in the hands of the state or is devolved to local government, community empowerment can be limited		
	Lack of secure tenure, limited rights to punish infractions, lack of bureaucratic support contribute to limited community empowerment		
	Heterogeneity in power, assets, and preferences result in winners and losers		
Natural Resource Impacts	Anecdotal and case study evidence of improvements in resource health and stock		Water use efficiency limited —observed only in cases where other conditions (such as volumetric pricing) are met
	Scale issues remain unresolved		Scale issues less problematic because of government system-wide control
Govern-ment Impacts	Monitoring costs are reduced		
	Some operational costs are reduced		
	Staff costs may be reduced		Reduction in staff a key component of reforms

Poverty impacts

> *CBNRM seeks to economically empower poor people by a) providing access to public goods through development of local infrastructure; b) increasing opportunities to legally use natural resources; and c) increasing private income opportunities through jobs, access to different services, and self-employment possibilities. Decentralization, however, is not costless. It can result in significant transaction and opportunity costs. In certain cases, productions costs also increase.*

Community benefits are a trademark of natural resource management programs. Some of the community benefits are from direct international assistance, while the rest comes from program earnings. Many of the wildlife management programs in Africa, for instance, have resulted in local infrastructure such as roads and schools.[6] Similarly, community forestry has frequently resulted in village-level assets. For example, Bray and others (2002) observe that community forestry in Mexico has enabled communities to build "assets such as potable water networks, schools, clinics, public buildings and social service safety nets …" Similarly, in the irrigation sector, successful transfer of management to farmer groups frequently involves infrastructural investments.

While some studies do suggest that the infrastructural benefits from CBNRM contribute to poverty reduction, this is more often a common assumption — one that underlies much of development assistance for infrastructure. A more pertinent concern is whether community benefits necessarily create the right incentives for sustainable resource use, particularly in forestry and wildlife. Infrastructural benefits (such as schools or community halls) are rarely directly tied to prudent use of resources. They equally benefit households who follow resource conservation rules as well as households that defect.

Household benefits are the most important incentive mechanism for motivating successful natural resource management. Household-specific benefits from community-oriented wildlife management in Africa include wildlife dividends, guide and scouting jobs, employment in lodges and tour agencies, possibilities of selling handicrafts and tourism-related services, and availability of meat from culling operations.[7] Household benefits in community forestry accrue from increased control over timber and non-timber resources and revenue sharing with the government. Employment in forest-related enterprises is another common source of revenue.

In irrigation, management transfer to communities is expected to increase farm productivity and household profits in the long run. However, the relationship between irrigation management transfer and agricultural and economic productivity is indirect and ambiguous. This ambiguity partly stems from the fact that impact evaluations of changes in productivity rarely control for intervening variables such as changes in rainfall or fertilizer application rates, as well as factors such as prices. Further, much of irrigation management transfer focuses on decreasing the burden on government budgets rather than on increasing farm productivity. Evidence of increased farm productivity is found mainly in cases where robust farmers' organizations have earned revenues through diverse sources and by providing better extension services to members.

The poverty impacts of CBNRM are as much a result of the benefit stream that occurs as of the costs that are incurred. The most important costs associated with CBNRM are opportunity

costs stemming from loss of access to land, forests, and wildlife. While estimates of opportunity costs are limited, in specific cases, these costs can be large and result in negative short-term returns. For example, many state-supported community forestry programs result in forest closures or loss of access to non-timber forest products in the short run. This can impose immediate costs on poor households who are dependent on forests for fuel-wood and other subsistence products.[8] However, short-terms costs can be minimized though careful planning as suggested by the examples in Chapter 4. Long-term costs of land loss are more difficult to address given the challenges involved in ensuring judicious compensation.

Another set of costs associated with community-based activities are transaction costs resulting from participation in meetings, monitoring, providing labor for maintenance of infrastructure, and membership fees. Very few studies actually document the burden placed by these costs, but monitoring costs in particular can be significant in wildlife and forest management. In areas with wildlife, animal predation-related costs are another major difficulty.

Community management can increase production costs as well. Participatory irrigation management, for example, can lead to an increase in the cost of irrigated water when significant subsidies existed before IMT and these subsidies are simultaneously dismantled. Further, high-cost systems such as pump irrigation may significantly increase the cost of water to farmers (Vermillion 1997).

The case studies reviewed point to various benefits and costs from community-based natural resource management that can have a huge impact on the poor. What is difficult to conclude is if the aggregate impacts are mainly positive or not. Several factors make careful assessment challenging:

a) Studies often do not distinguish between gross and net benefits
b) Impact evaluations rarely consider before and after program results
c) Programs differ in their distributional implications
d) Trade-offs between short-term and long-term benefits are generally ignored.

Overall, our analysis suggests a need for more careful quantitative impact analyses. We need studies that build on baseline data and undertake before and after comparisons to assess the welfare impacts.

Empowerment impacts

> *Devolution of natural resources creates space for communities to have a "voice" in how forests, water, and wildlife are managed. Voice, however, depends on the contractual agreement between the state and communities. Further, communities are heterogeneous entities, and decentralization can have unequal impacts on different community members.*

There is evidence to suggest that community management has empowered communities by allowing them to regain traditional control over natural resources. This appears to be true in wildlife, forestry, and water management. To the extent that devolution increases access to local government officials, brings management decisions to the local domain, and improves access to information about natural resource changes, CBNRM strengthens community rights. Further, there are a number of non-

financial benefits as well. For example, Ashley (1998) suggests that in Namibia, community management of wildlife has resulted in development of new skills, pride, a sense of control, and experience and confidence in dealing with outsiders—outcomes that go beyond initial development objectives. Examples that counter Ashley's results are found where a) local government agencies are perceived to promote natural resource management instead of economic development; and b) where decentralized structures re-create traditional hierarchies, with some members having more and others less "voice."[9]

An important result of many community-oriented wildlife management and forestry programs is improved relations over time between authorities managing protected areas and local households, and a decrease in conflicts.[10] Some of these changes are a product of strategies that try to empower *both communities and government officials* to work together to meet common goals.

Devolution that delegates management responsibilities to local communities without commensurate rights is unlikely to empower households or provide the right incentives for collective action (Meinzen-Dick and Gregoriao 2004). This is a critical concern in decentralization. For instance, in forest management, two approaches define the role and contribution of communities. The "user-centered" approach, which is predominantly seen in Asia, recognizes local communities as forest users and seeks to secure their co-operation by granting legal access to certain products or a share in forest-derived benefits. The "power-sharing" approach mainly looks to forest communities as potential managers or co-managers and devises arrangements to give them varying degrees of managerial power. The power-sharing mechanism seems most advanced in Tanzania and the Gambia.[11] There are some indications of a gradual trend in community forestry from a user-based to a more manager-oriented system. Such a shift will certainly give communities more authority to make long-term investments in forestry.

Lack of secure tenure, limited rights to punish infractions, and lack of bureaucratic support all contribute to less than effective community control over natural resources. In many small-scale irrigation systems in West and Central Java in Indonesia, for instance, water users' associations have a mandate for operations and maintenance, but they do not have formal rights over water and infrastructure (Samad and others 2002). This makes them powerless to settle disputes and enforce fee collection. They also do not have the political and legal clout to enter into business contracts. This type of situation is not un-common in many cases of community management in all three sectors.

Ribot (2002) suggests that successful decentralization depends on a) how accountable local institutions are to communities; b) whether these institutions have adequate discretionary power; and c) whether the transfer of this power is secure. All of these factors appear to make the difference between whether or not decentralization empowers local communities.

Natural resource impacts

There is some evidence that community-management programs are meeting their conservation goals. Indicators such as the number of animals and signs of poaching are improving, either because of improved monitoring and enforcement or because of changed preferences. Community

forestry also appears to contributing to better forest health. Evidence on participatory irrigation impacts on water- use efficiency or conservation is limited. This assessment, however, is somewhat tentative since biophysical changes at any point in time are a result of multiple policies, actions, and physical changes.

There is some anecdotal evidence of improvements in wildlife numbers associated with CBWM. For example, animal census results from 1991 and 1994 show that the Selous Conservation Program in Tanzania may have increased animal populations (Songorwo 1999). Such evidence is also found in the Kunene region of Namibia, where the community-guard program has resulted in the recovery of flagship species such as the desert elephant and the black rhino (Jones 1999b). Many of the papers reviewed suggest that poaching has been reduced as a result of these programs. However, the results are not always unambiguous. Community management changes the incentives the rural residents face, but does not stem hunting. Small-game hunting is generally through snares (and not firearms) and locals are less likely to be caught (Gibson 1999). Hence, areas with more community scouts may be seeing an increase in snares and small-game hunting, and a decline in large-game hunting.

In quite a few cases, there is demonstrable evidence of community forestry resulting in healthier forests. Tanzania is perhaps the best example of having positive natural resource impacts in Africa. Especially in the miombo woodlands of Duru Haitemba and Mgori, there are visible signs of gain. Charcoal burning, rampant timber harvesting, and unregulated in-forest settlements have all disappeared. This has coincided with a return of understory shrubbery and grasses and the return of bee swarms to forests (Wily, 1999). In the Mwamishali village, "after only three seasons, the area exhibited an almost unbelievable ecological transformation, from desolate landscapes of bare ground and heavily browsed shrubs to impressive vistas of grass and vigorously sprouting shrubs" (Mlenge 2002). There is also evidence from India and Nepal that community forestry is contributing to improved tree cover.

There is little to show that irrigation user groups influence water use or conservation. For example, in a well-known study of the Alto Rio Lerma Irrigation District in Mexico covering over 100,000 hectares, little evidence was found that increasing farmer control over water has led to changes in water allocation or distribution (Kloezen and others 1997). In the case of irrigation, conservation appears to be more closely tied to infrastructural developments and water pricing reform rather than to increases in efficiency as a result of institutional changes.

Government impacts

Devolution of natural resource rights to local user groups invariably changes the roles and functions of government agencies. Overall, for cash-strapped governments in developing countries there are some significant advantages to decentralizing resource management.

Much of the case study literature on wildlife management reports some form of benefit sharing between the state and communities.[12] Increased attention to wildlife management has meant that the state can tax rural communities for a resource (wildlife) that may have been previously untaxed. Some authors suggest that governments have been willing to support CBWM because they can now get communities

to protect wildlife and can share in consequent commercial transactions. In popular parks and protected areas, revenue sharing with communities may actually decrease government revenues in the short run. However, to the extent that community participation results in conservation and better opportunities for tourism, government revenues are likely to increase over time. The state also gains because of reductions in monitoring costs and decreased conflicts between frontline guards and communities.

In community forestry, the impact on the state is somewhat similar. To the extent that community control increases forest cover (as appears to be the case in several countries), devolution results in assets that are then shared between the state and communities. Improved relations between forest departments and communities, a potential decrease in corruption, and decreased monitoring costs are other benefits.

In irrigation management, there is a more direct and significant link between government finances and devolution. As Table 1 in Chapter 3 shows, devolution does seem to lead to a decrease in government subsidies and improves the budget solvency of irrigation agencies. Improvements in government finances result mainly from decreased spending on operations and maintenance, increased fee collection, decreased subsidies, and a gradual decline in staff in national irrigation agencies.

From Devolution to Collective Action

The natural resources under consideration—water, wildlife, and forests—are common pool resources; control over these resources is being devolved from the state to communities. Thus, collective action is at the core of CBNRM programs. In fact, the effectiveness of CBNRM programs is directly related to their ability to foster cooperative behavior. Thus, what are some factors that are most likely to lead to successful cooperative action?

Scholarly discussions identify several group and resource characteristics as necessary for successful cooperative use of natural resources (Ostrom 1990, Baland and Platteau 1996, Agrawal 2001).[13] Included among these conditions are (a) clear boundaries of membership to resource users groups and to the resource in question; (b) a small number of stakeholders or group size; (c) transparency and effective monitoring; (d) homogeneity in stakeholder endowments (such as wealth assets), preferences (end choices), and information; and (e) positive net benefits from cooperating. But do well-established theoretical and empirical conditions identified by scholars explain community-based natural resource management? In other words, do CBNRM programs fulfill the conditions required for successful collective action?

Because of the nature of the material available for this review, we were unable to precisely identify the conditions that underlie different thriving CBNRM programs. Instead, we were able to glean insights into the difficulties faced by CBNRM programs because of the absence of some of these conditions. Thus, we propose that CBNRM programs are probably best started where the governance conditions identified below are fulfilled. However, this is not always politically feasible. As a second best option, efforts to devolve responsibility to communities need to carefully and systematically develop mechanisms that can mimic the functions enabled by these governance conditions.

Clear boundaries. Boundary identification is a first step towards strengthening property rights or control over natural resources. However, the widespread presence of ambiguous and overlapping rights over land, forests, and other resources means that border classification inevitably provokes serious conflicts between stakeholders. Once boundaries are established, management of resources becomes less difficult.

One promising strategy to resolve boundary problems in the beginning of the process is the "incentive" system used in Namibia (Jones 1999). Community Conservancies in Namibia cannot register themselves and avail of associated rights unless they resolve their boundary disputes. There are often serious conflicts over land ownership and control. For example, in the case of the Torra, Khoadi/Hoas, and Dorr Nawas communities, conflicts arose when all three communities claimed certain areas of land, and some individuals in disputed areas registered under more than one conservancy (Jones 1999b). These frictions can result in long delays in conservancy creation. However, in this system, communities are forced to confront, negotiate, and resolve their conflicts in the early stages of conservancy creation. The Namibian model may be a useful one to emulate in other parts of the world. The short-term trade-off is delays in community organization, but this may result in longer lasting solutions.

Small stakeholder size. The broader literature on CPRs suggests that successful cooperative action is often characterized by small group size, which enables members to interact with each other. While this concept is not fully applicable to wildlife management in Africa because of dispersed populations, some successful conservancy programs appear to be linked to low population densities.[14] In such cases, group size impacts community success through high *per capita* revenues rather than through increased group interaction and trust.

In irrigation management, group size can be a significant constraint. It is a lot easier for a small number of large farmers to agree to management rules than for a large number of small farmers, as seen in the experience of smallholders in South Africa and elsewhere (Shah and others 2002). Irrigation systems made up of many subsistence farmers are often the norm in many developing countries. Thus, an important policy question is whether user group management is feasible in such irrigation systems. Given the current interest in participatory irrigation management, this is a question that needs careful consideration.

Resource scarcity and salience. Without some evidence of resource scarcity, there is little incentive to conserve natural resources or to improve the functioning of irrigation systems. For example, if irrigation water is abundant there are few reasons for farmers to invest in organizing themselves and bearing the transaction costs of creating and sustaining user groups. This is what happened with small irrigation systems in Central and West Java, where river water is usually recycled by downstream farmers. Attempts to organize farmers did not succeed as the farmers did not perceive the marginal benefits of joining the group to be more than additional costs of time in meetings and labor contributions. Similarly, in forest communities, scarcity is likely to be an important motivation for putting the time and resources into management activities (Bandyopadhyay and Shyamsundar 2004).

Salience of the resource is directly related to economic benefits from resource management. With irrigation and forestry, practically every

household has a stake in ensuring sustainable use; irrigated water is vitally important to farm households, and firewood and non-timber forest products together serve energy, food, and medicinal needs. Salience may be more problematic for wildlife management. While most households are dependent on wildlife for food, only a smaller number of households directly benefit from eco-tourism and associated commercial ventures that are the mainstay of CBWM. Both scarcity and salience influence net benefits from collective action. Thus, CBNRM programs are sustainable only if they either build on existing perceptions of scarcity and salience of the resource, or develop strategies to increase the value of the resource to households.

Effective monitoring and enforcement. Successful CBNRM programs are invariably associated with improved monitoring and enforcement. In wildlife management, community programs have hired hundreds of local guards who have better information about local hunting, are held responsible for controlling poaching, and are often answerable to local authorities and are thus accountable to users (Gibson 1999). In irrigation management, Araral (2003) finds that successful irrigation associations conduct internal audits at least every two months and external audits regularly. They have a system of checks and balances to avoid nepotism between auditors and treasures. Further, the availability of indicators that farmers can clearly perceive is important. In China, volumetric pricing plays this role and allows farmers to adapt quickly to changes.

The most effective monitoring systems include penalties for failure to cooperate. In Behroonguda's community forestry program in India, patrolling duty is mandatory for everyone in the village and failure to comply results in a penalty and even loss of membership. Monitoring of participation is also an effective way of building confidence in the community. The following chapters provide many examples of effective monitoring and enforcement. This is a governance condition that CBNRM programs have mostly internalized.

Homogeneity in endowments, preferences, and information. There is a large literature on the importance of homogeneity versus heterogeneity and inequality and how they influence collective action (for example, see Baland and Platteau 1996). Our review suggests that communities engaged in natural resource management are rarely homogenous entities that harmoniously agree to undertake resource conservation. Rather, as Leach and others (1999) state, "conflicting values and resource priorities—rather than shared beliefs and interest—pervade social life."

Differences in initial endowments, location, and power relations within communities can lead to unequal costs from institutional change. This was the case in the Maasai Kimana group ranch, where a combination of population pressure, immigration, and privatization of group rights increased the vulnerability of some social groups (Woodhouse 1997). The group ownership system resulted in households without ranch membership. Women (and households) without access to irrigated land were forced to travel increasingly long distances to secure dry season grazing for their cattle. Similarly, joint forest management in India is commonly perceived to exclude women from decisionmaking (Agarwal 2001). Decentralized resource management can lead to winners and losers. Heterogeneity clearly contributes to conflicts over a variety of decisions that need collective agreement. For both these reasons, the state will have to continue to play an important

role in CBNRM. Conflict resolution strategies need to be an intrinsic part of efforts to devolve responsibility to communities.

Positive net benefits from cooperating. Over the last few years, user groups have mushroomed around the world, which reinforces the possibility of positive net benefits from cooperating to manage natural resources. In forestry and irrigation, in particular, there are also many examples of endogenously developed self-governing institutions. Clearly, these groups exist because communities see a net benefit to working together. However, many recent user groups are subsidized by donor agencies or by the state, and there are very few studies that assess the "transaction costs" of such collective action. Thus, the question of whether collective action in natural resource management is sustainable at its current scale remains unresolved. Further, given donor interest in decentralized approaches, and the historical failure of the state to manage resources well, CBNRM is likely to be scaled up. It is thus important to urgently assess options, including policies and household incentives, for increasing net benefits.

Challenges Ahead

Community-based NRM is not a panacea for managing natural resources in developing countries. However, this is an institutional change that can significantly influence the lives of poor people and the resources on which they depend. In order to make CBNRM more effective, donors and policymakers need to recognize and address five key challenges.

Getting household incentives right

Critical to the success of CBNRM programs is that they are incentive-compatible at the household level. CBNRM programs, for obvious reasons, focus on creating community user groups, establishing community rules, and providing community infrastructure. While these are important mechanisms to put in place, they do not necessarily make CBNRM an attractive prospect for the individual household.

In wildlife management, for example, there are several reasons why community investments may not be incentive-compatible at the household level: 1) household benefits from wildlife management are often small relative to agriculture;[15] 2) wildlife related ecotourism benefits are often limited to a small number of residents, while a large number of households are affected by wildlife predation; 3) community benefits are publicly available—they are neither tied to conservation improvements, nor do they deter illegal actions; and, 4) lack of tenure creates limited "ownership" over programs and wildlife. A next step in the evolution of CBNRM has to be to more carefully identify and invest in private incentives for wildlife management.

In irrigation, because of the close connection between water and broad-based household dependence on agriculture, there is a greater incentive to participate in collective management. Nonetheless, it appears that successful irrigation associations in the Philippines provide a host of other incentives to members and officers such as credit, scholarships, health insurance, and transport allowances. These incentives, while un-related to irrigation, are specifically tied to household well-being.

In community forestry, given the dependence of poor households on forests, trade-offs between short-term and long-term benefits can be a major challenge. Our review of cases across the world suggests that there are many examples of

strategies that increase short-term returns. Short-term returns occur mostly as a result of improvements in governance or because of careful compensatory mechanisms that decrease negative impacts of forest closure. Attention to mechanisms that decrease household-level costs and increase household benefits will underscore success in CBNRM.

Strengthening property rights

Rights extended by the state to communities to help manage natural resources cover a broad range and can generally be categorized into rights of access, withdrawal, management, exclusion, and alienation of natural assets (Agrawal and Ostrom 2001). The literature on wildlife management, for example, suggests that communities invariably have access and withdrawal rights, but there is considerable diversity in management rights. In almost all the cases reviewed, the right of alienation or the right to buy and sell natural resources is held by the state.

In many cases, CBNRM programs confer responsibilities on communities without commensurate rights (Meinzen-Dick and Di Gregorio 2004). Clear rights enable communities to respond to local circumstances, creating the right conditions for success. This is the case with irrigation associations in the Philippines that have the right to devise and change operational rules within the ambit of their charters. Such associations are deemed to be among the more successful associations in the country (Araral 2003).

Issues of rights and control are closely tied to legal recognition and land tenure security. The community forestry program in Nepal owes much of its success to the fact that local forest legislation has created a legal basis for forest user groups there. Tanzania and the Gambia are two other countries that have transferred legal ownership of unreserved forest lands to local communities and provide ample testimony of the benefits of legal recognition.

Tenure is important for successful CPR institutions; however, there are also examples worldwide that show that it is not always a sufficient or even necessary condition for success. Tenure needs to backed by certainty that the state will enforce contracts. Thus, strengthening property rights at the local level needs to go hand-in-hand with strengthening the state's ability to arbitrate and enforce contracts.

Addressing heterogeneity and distributional issues

Communities engaged in natural resource management are rarely homogenous entities that harmoniously agree to undertake resource conservation. As previously stated, collective action programs have to deal with distributional impacts from institutional changes. Elite capture and gender discrimination are specific aspects of this problem.

Koppen and others (2002), comparing the differential impacts of irrigation management transfer on poor and non-poor farmers, note that it has often been assumed that the interests of the poor sufficiently overlap with the general interest in the irrigation scheme, and that rich and poor farmers alike have equal access to canal water. However, the evidence from Andhra Pradesh and Gujarat, India, suggests the strong possibility of elite capture of the IMT process, particularly in large-scale canal irrigation where land ownership and locational advantages are skewed in favor of big landlords. Small farmers, who often participate

in repair and rehabilitation work, are often unaware of the existence of the water user association, while large farmers involve themselves in committee work and makes decisions. Thus, the challenge of making participatory irrigation pro-poor still remains. Many such examples of unequal impacts of community management are found in forests and wildlife management as well.

The presence of heterogeneity in communities and the possibility of elite capture do not necessarily argue for scaling down the current enthusiasm for CBNRM. Rather, there may be a case for adopting a more flexible approach that builds on existing conflicts and strategies. This would require many steps, including a) early identification of stakeholder conflicts and needs; b) linking benefits from institutional change directly to conflict resolution; and c) development of conflict resolution mechanisms, including a role for the state to mediate conflicts. Community "public" investments can also counter the inherent inequalities that may be reproduced in CBNRM projects.

Solving the scale problem

Management of fugitive resources, such as wildlife in Africa, suggests a need to focus on a large ecological scale. However, the CPR literature also suggests that social units that are small, in contact with each other, and have a historical connection are better suited to manage commons (Ostrom 1990). Thus, inevitably, decentralization can result in a mis-match between what is required from an ecological perspective and what is known to work better from a social management perspective. The mismatch between social and ecological scale can mean that fugitive resources impose costs on one community and benefits on another. Logan et al. (2002) discuss the case of the Bulima CAMPFIRE district, where elephant forage can cause considerable crop damage in the wet season. By the dry safari hunting season, these elephants migrate to Tsholotsho district and benefit resident communities there. Not surprisingly, such inequitable impacts can lead to tension and overlapping claims.

In irrigation management, the issue of scale plays out in the form of group size, and raises the question of whether user-group management is feasible in irrigation systems characterized by a large number of poor subsistence farmers. In forestry too, it is important to consider issues of upstream and downstream coordination, and what kinds of institutions are required to ensure this within a decentralized context. Ostrom's (1990) design principle of nested enterprises is beginning to emerge with the creation of federated conservancies in Africa and elsewhere.[16]

In the irrigation sector, federations of irrigation associations sometimes form a mid-level link between the state and smaller user groups. Also, partly because of the crucial importance of water resources, and partially because of personnel and infrastructure already invested in irrigation, the state plays a much more significant role as a meta institution that can coordinate between smaller groups. Should intermediate institutions be crafted to complement decentralized user groups and play the role of the "coordinator"? Or should "leaner" government bureaucracies play this role? This question needs further exploration in each of the three sectors reviewed for this paper.

Providing adequate support

It is apparent from the case studies that an enabling policy and legal framework is imperative for more effective decentralized

forest management. Progress has been made, especially in Africa, where new forest laws have been passed in more than 30 countries since 1990 (Wily 2002b). Common changes resulting from these laws include "*changes in the character of central forestry administrations, with wider civil society input in decision-making, sometimes relocation of forestry departments into semi-autonomous institutions, and variant degrees of decentralization to local governments and policy commitment and new legal opportunity for forest-local populations to participate in forest management*" (Wily, 2002a). Tanzania and the Gambia have led the way in creating legal processes support decentralization. Other countries have a longer way to go.

Donors have played a critical role in facilitating decentralized natural resource management and building the capacity of local organizations. Nongovernmental organizations are another important actor. In Namibia, for example, Jones (1999b) argues that the "*'light touch' and high-quality facilitation*" undertaken by Integrated Rural Development and Nature Conservation (IRDNC) has been intrinsic to the success of community conservancies. Further, the donors involved in Namibia provided significant and steady assistance, which was crucial for building the program. Decentralized NRM needs to be equipped with policy and legal changes. Critical to this effort is consistent support and capacity building.

Enhancing sustainability

CBNRM programs are generally not self-sustained. Support for these programs usually come from the state, commercial activities, and from international donors. Community conservation programs are dependent on tourism revenues, which vary depending on economic and political circumstances, while development assistance is often a function of agendas that are far beyond the control of local communities. Further, revenues earned only partly accrue to local communities because of cost-sharing arrangements with the state.

Looking beyond the financial sustainability of current programs, we need to question whether CBNRM promotes future investments in natural resource stocks. In other words, does CBNRM provide the right mix of information, empowerment, and financial incentives to enable households and communities to invest in natural resources? Wildlife investments may only become attractive to farm households if a) revenues from wildlife increase relative to revenues from agriculture; b) insurance schemes can reduce the costs of wildlife predation; and c) wildlife are seen more as private resources over which households have much more control. Until these conditions emerge, local communities may well treat wildlife as an asset that is available to be run down and utilized for greater "development."

In irrigation, the sustainability issue surfaces in two forms. First, without other measures such as volumetric pricing, water-use efficiency may remain unaffected even when irrigation systems are under community management. Second, maintaining irrigation systems remains a pervasive problem. The problem seems to be one of moral hazard and co-dependency—farmers need the irrigation agency for irrigation maintenance, and they know the agency will bail them out because the agency depends, in part, on irrigation fee collections and because dilapidated systems are used as a justification for donor support. One solution is to make user associations assume responsibilities for future rehabilitation as a precondition for current rehabilitation. However, given the financial frailties of most small-scale water user

associations and their very limited capacity to provide for capital expenditures, it is unlikely that this issue will be resolved soon. A more practical approach maybe to bundle management transfer with a package of current and future infrastructure improvements.

Our review suggests that decentralization may reduce some operational and monitoring costs to the state, but long-term investments in restoring capital assets (natural and physical) may remain a government responsibility. There are many examples of current benefit-sharing schemes between the state and resource-dependent communities. Contractual arrangements that outline and enforce long-term sharing of investment costs need further exploration.

Conclusions

Does devolution lead to better natural resource management? The answer appears to be yes. Increased local control motivates local interest in long-term investments, creates space for local decision-making, and can increase accountability and management performance. Devolution also contributes to increased interaction between sector agencies and communities and helps decrease hostility between government officials and local households. All of this enhances environmental outcomes. However, for these outcomes to be fully realized, supra institutions that can play a coordinating role are required.

Does devolution contribute to poverty reduction? Devolution can empower local communities by a) providing access to public goods through development of local infrastructure; b) increasing opportunities to legally use and exercise control over natural assets; and c) increasing private income opportunities. However, as this review shows, the ability of local communities to assert control is circumscribed by various factors. In some cases, households also bear significant costs. Further, institutional changes have unequal effects on different stakeholders. Increasing household returns to CBNRM and resolving problems of unequal impacts of decentralization are perhaps the most urgent practical challenges ahead.

Is devolution good for the government? Sharing responsibilities and control over natural resources reduces some of the fiscal burden on governments. In the irrigation sector, this is clearly the case as national irrigation agencies pass on operations, maintenance, and management responsibilities to water user associations. Government staff reductions also occur. In forestry and wildlife management, financial costs decrease mainly because of decreased monitoring and enforcement costs and possible reduction in hostility between communities and government officials. Decentralized resource management also affects revenue collection. In some cases, the government may gain because of increases in resource stocks and commercial benefits. In other cases, it will lose revenues as a result of benefit sharing. To the extent that local accountability increases, corruption is also likely to decline. Reductions in revenues, staff, and corruption make implementation of devolutionary policies intrinsically challenging. Getting incentives right for bureaucracies is as important as getting them right for households and communities.

Community-based natural resource management has changed the relationship between communities, the state, and natural

assets. In some parts of the world, this change has been profound and communities enjoy extensive control over resources. In other parts of the world, the change has been more gradual, with the state and communities very slowly realizing impacts and implications. Devolution results in the state handing over control of capital assets to local communities—a policy with both economic and political ramifications. This suggests a continued need for reform, experiments, and donor patience.

2 Success, Impacts, and Emerging Challenges in Community-Based Wildlife Management: What Does the Evidence Show?

Priya Shyamsundar

Introduction

Community-oriented conservation gained ground in the 1980s and 90s in response to increasing local and international resistance to strict protected-area programs. These efforts also emerged as a result of greater awareness of the difficulties of implementing state-run conservation. Engagement of communities in natural resource management has occurred in many parts of the developing world. Such changes also permeate Western societies such as Canada, which has increasingly devolved responsibility over local resources to a number of First Nations (Bradshaw 2003). In this paper, we take stock of community-oriented wildlife management programs, and examine their evolution, particularly in Africa. We seek to understand and identify new challenges they face as they continue to meet community and conservation needs.

Decentralization in wildlife and biodiversity management appears to be characterized by two overlapping phases. The first phase is exemplified by Integrated Conservation and Development Programs (ICDPs), and the second phase by what is currently known as community-based natural resource management (CBNRM). Both programs create economic incentives for local communities to conserve natural resources and both involve the participation of local communities in decisionmaking. However, CBNRM programs appear to further strengthen local communities in two ways. First, there is a greater focus on sustainable *use* of natural resources. This differs from what is often an effort in ICDPs to find substitutes for natural resources-based activities. Second, CBNRM seeks to provide local communities with greater decisionmaking power. Thus, while ICDPs may not involve any form of decentralization, CBNRM programs are meant to lead to decentralization of management responsibilities.

While there are many definitions of CBNRM, it is best understood by identifying its main attributes. Kellert and others (2000, p. 706) suggest that CBNRM programs share five distinct characteristics: "a) a *commitment to involve community members and local institutions in the management and conservation of natural resources; b) an interest in devolving authority from central and/or state government to more local and often indigenous institutions and peoples; b) a desire to link and reconcile the objectives of soci economic development and environmental conservation and protection; c) a tendency to defend and legitimize local and/or indigenous resource and property rights; d) a belief in the desirability of including traditional values and ecological knowledge in modern resource management*." These characteristics appear to form the basis of many CBNRM programs reviewed for this study.

Much of the literature on CBNRM is focused on wildlife in Africa. The continent of Africa has

clearly been a fertile area for many successful and not so successful attempts by states, donors, and international NGOs to establish CBNRM programs. Projects such as CAMPFIRE in Zimbabwe and ADMADE in Zambia are well known, and have motivated numerous other similar efforts (Newman and Webster 1993).[17] Interestingly, a wide review of literature resulted in little information on CBNRM in other parts of the world, even though there are ample examples of ICDPs. This suggests that the existence of a rather profitable economic good, wildlife hunting, may partially be responsible for cooperative action to manage natural resources.

Community-based wildlife management (CBWM) programs have grown and evolved over the last two decades. In this paper, we seek to understand the conditions that are most conducive for successful programs. We review evidence of impacts and identify challenges that are likely to stymie further development. The case-study literature, while broad and diverse, does allow us to draw some inferences about CBWM. Our review relies primarily on articles in peer-reviewed journals over the last five years. Where available, we have also reviewed reports from donor agencies and policy think tanks.

We conclude that community-based wildlife management, as a sub-project of community-based natural resource management, has improved perceptions among local communities about wildlife and state representatives who manage wildlife. However, it has yet to solve problems of incentive compatibility. This is largely because opportunity costs to households of accepting conservation goals are high. Benefits from community conservation accrue in the form of public and private goods. Public benefits serve majority needs and are easier to ensure; however, private benefits are required to guarantee individual household interest in wildlife and biodiversity. The case-study literature suggests that finding the balance between public and private benefits will be critical to the success of community conservation.

While a wide array of governance mechanisms fall under CBWM, only some of these cede actual control over wildlife to communities. Further, efforts to manage ecosystems in a decentralized fashion have yet to fully recognize "scale and coordination"-related issues and the need to link upwards from decentralized social units to broader geographic scales. The next stage of CBWM will have to involve institutional experiments that truly empower communities to make management decisions, but within a framework of nested institutions that serve the public-good nature of wildlife and biodiversity.

Universal Features, Local Differences

In order to understand how community-based wildlife management works, it is useful to examine some regularities found across different programs. The two most common features of community management of wildlife are revenue generation and decentralization. Most CBNRM programs are built on the possibility of being able to raise income from conservation activities, and most attempt to devolve some management responsibilities from the state to a lower level organization. A third common feature is that community-oriented programs rarely emerge without the support of external agencies. Wildlife management in Africa is littered with examples of programs that share these features, yet differ from each other in subtle but critical ways.

Income generation and distribution

In nearly all the African cases reviewed, a strong external market and the potential for generating serious surpluses through ecotourism has been important in motivating community management of natural resources. The opportunity costs of conserving nature are high to local communities as well as the government. Without adequate short-term returns, there would be little motivation for bearing the transaction costs of community organization or the opportunity costs of forgoing agriculture. Thus, the existence of market-oriented goods is central to CBNRM programs. The classic example is a park, such as the Mgahinga National Park in Uganda, where gorilla tracking results in sizable profits. In 1998, revenues from gorilla tracking were estimated to be $190,000 per year (Adams and Infield 2003). The possibility of earning such revenues makes it feasible to consider integrating conservation with economic development.

Wildlife is a revenue source for communities and local and national governments. Consequently, CBNRM programs almost always entail benefit-sharing between the state and local communities. For example, in CAMPFIRE in Zimbabwe, authorities retain 15 percent as taxes and up to 35 percent for management, and distribute the remaining 50 percent to wards. This money is then reallocated between dividends to households and administrative expenses (Bond 2001). Another example is the Luangwa Integrated Resource Development Project (LIRDP) in Zambia, where the early 1990s saw approximately 40 percent of revenues being targeted for community projects. This percentage was supposed to increase to 100 percent as Game Management Area ownership was transferred to communities (Wainwright and Wehrmeyer 1998). In general, the state frequently retains a major share of the returns on commercial activities. This may be used as a tax for budget support, or more likely for administering other conservation areas. Thus, wildlife areas that enjoy commercial interests often cross-subsidize the state's larger conservation efforts. This provides a strong motivation for the state to protect its interests in and revenues from such areas.

CBNRM programs generally apportion local benefits into household and community-level profits. Many CBNRM programs create local public goods in the form of schools, community halls, extension services to farmers, and road and bridge improvements. Household benefits include jobs, bush meat, tourism-related services and some household enterprises. CAMPFIRE in Zimbabwe is one of the few examples where households receive a cash dividend for wildlife conservation. These dividends vary considerably across wildlife districts, with districts with low human and high animal populations being the most profitable (Bond 2001). Whatever the form of household benefits, community-level benefits usually dominate household benefits.

An important consideration is that goods marketed through CBNRM frequently serve multiple needs. For instance, in many countries wildlife is a source of crop predation and local bush meat, as well as tourism benefits. Thus, protection of wildlife can result in benefits and costs. Local communities, with strong historical linkages to nature, also have noninstrumental values for nature and associated goods. Therefore, while CBNRM programs are closely tied to marketable economic goods, there are diverse motivations that lead communities to participate and benefit from these

arrangements. This makes program design inherently challenging.

Devolution of responsibilities

A basic tenet of CBNRM is devolution of authority to some local-level organization. Worldwide, there are three different ways in which devolution is undertaken: a) devolution to local government agencies; b) the creation of new local conservation institutions; and c) greater authority to traditional leaders. Each model comes with its own advantages and disadvantages. Box 3 provides some examples of these three types of institutional structures.

In Zimbabwe, CAMPFIRE conferred authority to Rural District Councils (RDCs), which have the authority to collect, retain, and distribute revenues. While this resulted in somewhat rapid growth of CAMPFIRE programs, it appears to have created little empowerment of local communities, since control remained in the hands of the state. Under LIRDP in Zambia, devolution of administration was done differently. Instead of vesting authority at the RDC or chiefdom level, a local leaders subcommittee was set up with six local chiefs, one MP, and four ward chairmen of the ruling party. This original design has since evolved. The new structure includes an elected executive coordinating agency called the Integrated Resource Development Authority, area development committees, and village action groups that will manage 80 percent of all revenues (Wainright and Wehrmeyer 1998). Thus, in the Zambian case, authority is more fully devolved to the local level.

Box 3
Different Institutional Arrangements in CBNRM

Vesting control in the hands of local government agencies in Zimbabwe: In Zimbabwe, CAMPFIRE followed a pre-existing administrative government structure. A 1982 amendment to the Parks and Wild Life Act of 1975 designated Rural District Councils as appropriate authorities for wildlife in communal areas. While the original intention of the policymakers in Zimbabwe was to devolve authority to local self-selected communities, legal and administrative practicalities resulted in devolution of authority to the RDC level (Jones and Murphree 2001). RDCs have the authority to collect, retain, and distribute revenues obtained from CAMPFIRE. Ward Development Councils (WADCOs) and Village Development Councils (VIDCOs) have some limited authority under RDCs. In this system, authority and decisionmaking power is vested in the hands of the state.

Authority to traditional chiefs in Zambia: Under the ADMADE program in Zambia, decentralization occurred at two levels. A Wildlife Management Authority, headed by the District governor, was created for each area with sufficient wildlife. Each such area was divided into chiefdoms. Traditional chiefs head a Wildlife Management Sub-Authority, which is essentially a committee made up of teachers, unit leader, village headman, ward chairmen, and district council representative (Gibson 1999). Under this structure, traditional chiefs have considerable power to allocate community funds and to hire local individuals as guards.

Crafting new institutions in Namibia: Under Namibian law, a group of communal area residents can create a communal conservancy if they are able to meet a set of conditions. They can establish a conservancy and gain exclusive rights to commercial tourism operations within the conservancy borders if they define a geographical area, define membership, develop operating rules and plans for income distribution, elect a representative council, and become a legal entity (Jones 1999b). Under this system, communities are given the space and opportunity to come together and create their own conservancy. If they are able to resolve internal and external (boundary-related) conflicts, then they have considerable power and control over wildlife resource use.

An important caveat to devolution of control and authority is that CBNRN programs generally stop short of any actual transfer of ownership rights over either land or the resources that land supports. In African examples such as CAMPFIRE, ADMADE, or LIRDP, there is no legal ownership enjoyed either by the community or by households within the community. Communities and households, however, do have a variety of usufruct rights. A good example is Namibia. Once a community is able to define the boundaries of a conservancy and register itself (which can occur if there are no boundary conflicts), it then has usufruct rights over the wildlife that is found on its land. Wildlife is mobile between conservancies. However, user rights belong to the conservancy on which wildlife is found (Jones 1999b).

External agents

Community conservation programs that are purely "community-driven" appear to be somewhat rare. In most of the examples we reviewed, we found that either an international or local NGO had an important role to play in creating the community conservation program. Committed leadership from individuals (often associated with an NGO or with the state bureaucracy) led to the initiation of programs. Frequently, successful local models of community conservation are picked up by the state and replicated in other areas. In many cases, external donors influence the process with resources and by putting pressure on the state to devolve authority to local communities. This situation is true, for example, of CAMPFIRE in Zimbabwe and ADMADE programs in Zambia.

In Namibia, the pioneering work undertaken by an NGO—Integrated Rural Development and Nature Conservation—on community game guards and tourism projects influenced post-independence policies that created community conservancies (Jones and Murphree 2001). In fact, Jones (1999b) argues that the "*'light touch' and high-quality facilitation*" undertaken by IRDNC in certain communities needs to be replicated in other conservancies. Further, the donors involved in Namibia provided significant and steady assistance, which was crucial for building the program. USAID, for example, contributed some $14 million to Namibia's CBNRM efforts between 1992 and 1999 (Jones 1999b). Similarly, in 1995, a $4 million trust fund was established with Global Environment Facility resources to support projects in the Bwindi-Mgahinga Park parishes in Uganda (Adams and Infield 2003). This program is largely a product of good interactions among donors, park officials, and NGOs, particularly CARE International (Infield and Adams, 1999).

What Contributes to Effective Community Management?

Collective action is at the core of successful CBNRM programs. It is therefore not surprising that some of the CBNRM programs in Africa have been informed and influenced by the vast literature on collective action and natural resource management (see for example, the work by Elinor Ostrom and colleagues at the Workshop in Political Theory and Policy Analyses, Indiana University). But do the well-established theoretical and empirical conditions identified by scholars explain community-oriented wildlife management? The existing empirical evidence suggests that factors such as low population-to-wildlife ratios, clearly defined boundaries, improved monitoring, and an enabling policy environment can contribute to better results. Economic benefits and the

presence of supportive external agencies have already been identified as important features of CBNRM. Differences in property rights also matter.

Ostrom (1990) makes the case that successful cooperative action is characterized by small group size, which enables members to interact with each other. While this concept does not fully hold for wildlife management in Africa because of dispersed populations, some authors suggest that the more successful conservancy programs may be linked to low population densities (Viratnen 2003, Murombedzi 1999). Murombedzi (1999) argues that CAMPFIRE benefits are highest where human populations are low and animal populations are high. He discusses the case of the Masoka ward in the Zambezi valley, a poster-child for CAMPFIRE because it has one of the highest per capita wildlife revenues. However, this ward also has one of the highest rates of immigration, and ward members encourage new settlers. A common perception among the communities here is that wards need to become less isolated in order to attract development funds. Thus, a growing concern is that CAMPFIRE areas with low population densities may attract new residents as a result of their economic growth and this would dampen wildlife benefits.

The definition and identification of the wildlife conservancy borders in Africa is fraught with conflict between various stakeholder groups, head men, and so on. However, once the boundaries are established, management of resources appears to become a somewhat less difficult task. Conservancies in Namibia have to clearly define boundaries in order to be registered. This has often led to serious conflicts over land ownership and control. In the case of the Torra, Khoadi/Hoas, and Dorr Nawas communities, conflicts arose when all three communities claimed certain areas of land and some individuals in disputed areas registered under more than one conservancy (Jones 1999b). These frictions can sometimes become intractable and result in long delays in conservancy creation. However, in this system, communities have the "local" space and incentive to decide, negotiate, and resolve their conflicts in the early stages of conservancy creation.

Two confounding factors that prevail even after conservancy registration are the movement of wildlife across boundaries and inability to exclude outsiders from moving livestock into conservancies. In Namibia, by law, wildlife belongs to the conservancies where they are found (Jones 1999b). However, the lack of rights to exclude outsiders (especially when traditional user rights conflict with new rights) can create problems. Identification of stakes and conflict resolution is a continuing process. The practical implication is that communities need to be given considerable time to develop their system of management. The larger policy question of security of tenure looms large in all boundary-related decisions.

The issue of property rights is perhaps the most contentious in community management of natural resources. CBNRM programs confer a whole spectrum of rights over natural resources to local communities. Thus, it is useful to understand that property rights come in different forms. Agrawal and Ostrom (2001) provide a useful framework for distinguishing between different types of rights. They suggest that different bundles of rights can be identified in terms of rights of access, withdrawal, management, exclusion, and alienation of natural assets.

The case-study literature reviewed suggests that communities invariably have access and withdrawal rights to some degree. In cases such as CAMPFIRE, most management decisions are made by local government and benefits are conferred upon community members – thus, households have no management rights. In Namibian conservancies, on the other hand, a great deal more management authority is held by communities themselves. Yet, even in this "best practice" case, communities cannot really exclude others from using their lands for grazing purposes (Jones 1999b). In almost all the cases reviewed, the right of alienation or the right to buy and sell natural resources is held by the state. Arguably, the greater the number of rights communities enjoy, the more likely community management will succeed. While it is difficult to draw concrete conclusions in the absence of careful empirical studies of the impact of property rights on CBNRM, it can be argued that the lack of rights create disincentives for long-term sustainable management. In a later section, we discuss some additional challenges associated with tenure and property rights.

Monitoring and enforcement is a problem that frequently comes up in discussions related to CBNRM. Programs that have been successful in strengthening conservation have largely been able to do so because of improved monitoring. Hundreds of guards have been hired as part of community conservation programs. Programs such as the Community Conservancies in Namibia, ADMADE in Zambia, or CAMPFIRE in Zimbabwe hire guards from within the community to control poaching. These guards tend to have better information about local harvesters of wildlife. They can also be held accountable for poaching activities, and are often answerable to local committees. This appears to have led to a decline in poaching, particularly of large mammals (Gibson 1999).

Improved monitoring is also expanding state authority into rural space. Communities are rarely owners of wildlife. Their ability to police themselves thus enhances the conservation and revenue goals of the state. The state gains in the short term through benefit-sharing agreements and if it can decrease its direct monitoring expenses. In general, improved community monitoring increases the effectiveness of the state's ability to implement its conservation agenda.

Community management programs can be successful only if they are backed by either state policies or legislation. Thus, it is first useful to ask why the state or bureaucrats within line ministries are motivated to provide this enabling environment. Many authors argue that CBNRM programs may be acceptable to the state because they enhance the state's ability to tax rural communities for resources that were previously untaxed. As Kevin Hill (1996) suggests, " *CAMPFIRE .. not only is a wildlife program; it is also a rural taxation program.*" While not true for all programs—for example, communal conservancies in Namibia have exclusive rights over revenues from commercial tourism operations (Jones 1999b)—most often the state does share some part of wildlife revenues. Donor pressure is another factor that has helped motivate the state. In others cases, committed staff within state bureaucracies or NGOs have provided the leadership required for CBNRM. Thus, changes have occurred as a result of external pressure and new incentives and information.

Policy changes leading to community-oriented programs have been gradual (see Box 4). In

Zimbabwe and Namibia, successful and well-established *commercial* conservation efforts led the government to consider the possibility of *communal* conservancies (Jones and Murphree 2001). Zimbabwe gained independence in 1980, and a decade later, Namibia obtained its independence. This created a historic opportunity to make changes and equalize opportunities. With independence, new laws were written specifically to allow for the formation of communal conservancies (Jones and Murphree 2001, Jones 1999b). In these cases, the presence of successful private models and new policy space made CBNRM possible.

Barrow and others (2001) argue that policy evolution toward community conservation in East African countries—such as Kenya, Tanzania and Uganda—has been relatively slow. This is partly because of a lack of private commercial conservation models. Centrist governments and a very strong conservation lobby may have also contributed to the slower movement toward decentralization (Barrow and

Box 4
Policy Reform — An Evolutionary Process

Because natural resource policies have historically treated communities as inimical to conservation, policy reforms are vital to CBNRM. Policies do not grow in a linear fashion toward a pre-determined goal. Rather, as our examples below show, they develop when new opportunities arise and are generally preceded by pilot programs.

The Importance of Pilots

Policy rarely develops in the absence of concrete models to pave the way. In Tanzania, a pilot community conservation program was launched in 1987 by the Tanzania National Parks (TANAPA) and the African Wildlife Foundation in northeastern Serengeti (Bergin 2001). By 1991, the program had been expanded to two national parks. Simultaneously, a steering committee was established to consider expanding this program to all national parks. Between 1991 and 1995, TANAPA reformed itself and created a community conservation program that would affect all the parks under its authority. TANAPA was well supported in this effort by external agencies.

Indirect Policy Reform and Tenure Security

In designing communal conservancies, Namibian officials were fully aware of the problems created by the lack of tenure security over conservancies. Thus, even though they were unable to give communities full ownership of conservancies, they included conservancy- and ownership-related clauses in land policy legislation. As a result, a 1998 land policy approved at the Cabinet level made provision for "legally constituted bodies and institutions to exercise joint ownership rights" over land (GRN 1998:3). This policy is seen as a first step that will potentially pave the way for ownership and security of tenure over land in conservancies (Jones 1999b).

Policy Space as a Result of New Opportunities

In Namibia and Zimbabwe, independence enabled the creation of new CBNRM legislation. Pre-existing laws allowed conservation and economic use of wildlife in *private* lands. Based on these models, decisionmakers were able to create communal conservancies, which were viewed as a mechanism to equalize opportunities for users of *communal* lands. However, this opportunity to change laws came during and after independence when a whole host of inequalities were addressed.

others 2001). Protected-area outreach programs, on the other hand, have been far more successful. These programs, which generally involve state authority within protected areas and community activities in buffer zones, may well evolve into community conservation programs.

Welfare and Resource Implications

As previously indicated, benefits in CBNRM programs are generally of two types: community benefits and household benefits. Community benefits include improved protection from wildlife, social benefits such as schools and community halls, and in some cases distribution of tourism revenues to households. Household benefits (which do not accrue to all households) include jobs as scouts or in tourism enterprises, privileged access to game meat from safari hunting or culling, and sale of specific goods and services to tourists or as other forms of development occur.

Some broad generalizations can be made about who benefits most or least in Africa. Women seem to have the least power in local organizations and are often the most negatively affected by restrictions imposed on natural resource use such as fuel-wood and fodder collection. Traditional leaders and older men tend to have decision-making authority, while new jobs created as a result of tourism tend to be oriented toward the young (Virtanen 2003). Further, the individual household benefits tend to be concentrated among a few households (Emerton 2001, Bandyopadhyay and others 2004). Table 2 below provides some examples of benefits from CBNRM to households, communities, and the state. As the table shows, CBNRM almost invariably results in benefit-sharing between local communities and the state.

Benefits through village-level projects

Community benefits are a trademark of conservation programs. In almost all the programs scrutinized, some form of infrastructural benefits accrued as a result of revenue-sharing between the state and local communities. Some of the community benefits are from direct international assistance, while the rest comes from program earnings. Gibson (1999) states that ADMADE in Zambia resulted in approximately 60 projects between 1989 and 1992, including twenty-three teachers' houses, nine maize grinding mills, and seven rural health centers. Under Zambia's LIRDP program, 40 percent of revenues were targeted to community projects, and this was to be increased to 100 percent as ownership changes occurred (Wainwright and Wehrmeyer 1998). In general, the case-study literature suggests that community benefits are more likely to occur relative to household-level benefits.

In Namibia, there is clear evidence that communities and households benefit from conservation programs. Even as early as 1993, Kunene region communities gained from hunting of surplus game, which resulted in meat worth $25,000 and skins worth $3,040. Between 1993 and 1995, the Lianshulu Lodge in Mudumbu National Park collected a levy of $1.25 per tourist per night, which was distributed to five communities. Similarly, the Torra conservancy received approximately $40,000 between 1996 and 1998 from a profit-sharing agreement (Jones 1999b).[18] In a recent paper, Bandyopadhyay and others (2004) evaluate the effect of community conservancies in the Kunene and Caprive regions of Nambia (see Box 5). The study suggests that community-wide benefits may be the reason why conservancies have an overall positive impact on the average household's welfare, while

Table 2. Examples of Benefits from CBNRM to Households, Communities, and the State

Program	*Household benefits*	*Community benefits*	*State benefits and revenue sharing*
CAMPFIRE, Zimbabwe (Bond 01)	Wildlife dividends. Median dividend was approximately $4.50 per household in real terms in 1996. Some 100,000 beneficiary households in 1995. Jobs as guards and in tourism.	Numerous community projects	CAMPFIRE earned approximately $9.3 million between 1989 and 1996. 50 percent of revenues were meant for communities—but this is divided between administrative costs and community dividend.
ADMADE, Zambia (Gibson 1999)	Employment Wildlife scouts Cheap meat	60 projects (mostly infrastructure) between 1989-92	35 percent for communities and 65 percent to Parks and Wildlife Service. Gibson calculates that only 2 percent annual gross sport-hunting revenues reached communities.
LIRDP, Zamiba (Gibson and Marks 1995) (Gibson 1999) (Wainwright and Wehrmeyer 1998)	Employment, Extension and credit services to farmers Cheap meat	Road repairs, infrastructure projects.	40 percent of revenues to communities in early 1990s; to be increased to 100 percent.
Mgahinga Gorilla National Park, Uganda (Infield and Adams 1999 Archbald and Naughton-Treves 2001)	Employment	$10,000 until 2001 used for schools in three parishes. Other livelihood activities and small infrastructure projects.	Park earned approximately $250,000 in 1998–99. New policy of 20 percent of park entry fees for community projects after 1996, not implemented until 2001.
Communal Conservancies, Namibia (Jones 1999a and 1999b)	Employment (between 1996-1998, wages to Torra community members from a tourism lodge amounted to $70,000) Bed Levies (eg. $8,000 distributed to 370 households in Caprivi in 1996) Community Guards Trophy Hunting ($30,000 to a San community from trophy hunting in 1998—not clear what portion was redistributed to households)	Torra conservancy earned nearly $35,000 by August 1998 from an 18-month joint venture with the private sector.[@]	Community has exclusive rights to commercial tourism activities and revenues within conservancy boundaries.
Bwindi Impenetrable Forests (Archbald and Naughton-Treves 2001)	Donor programs included sustainable use of NTFPs and problem-animal control	$70,000 until 2001 for schools, clinics, roads in 19 parishes.	Park earned nearly $700,000 in 1998–99. New policy of 20 percent of park entry fees for community projects after 1996, not implemented until 2001.

conservancy participants themselves do not significantly gain.

Community programs create public goods, but do not specifically create incentives for those who conserve, nor do they punish households that engage in poaching and other illegal activities. Thus, an emerging concern is that communities do not necessarily link these tangible benefits to the decision to conserve nature. Another fear is whether there is transparent accountability of what happens to community resources. Gibson (1999), for example, estimates that only about 2 percent of ADMADE sport–hunting gross revenues reached communities and that many community projects were incomplete because of lack of resources. In Uganda, a new 1996 policy assigned 20 percent of park entry fees for community projects, but this policy had yet to be implemented as of 2001. Thus, while community benefits do occur, the on-the-ground reality probably falls short of actual expectations and intent. As in so many development programs, the money that actually gets to the communities may be a lot less than the amount actually expected or realized in aggregate.

Household benefits

Household benefits include direct payments, guide and scouting jobs, employment in lodges and tour agencies, possibilities of selling handicrafts and tourism-related services, and availability of meat from culling operations. Under ADMADE and LIRDP in Zambia, for example, hundreds of scout jobs were created. However, it appears many of these jobs were acquired by friends of the chief or ward chairmen and projects grouped around the chief's residence (Gibson 1999).Nonetheless, these programs have been a source of local economic development.

Box 5

Evaluating Community Conservancies in Namibia—Community Investments Improve Welfare

In a recent paper, Bandyopadhyay and others (2004) evaluate the effect of community conservancies in the Kunene and Caprive regions of Nambia. The study uses data from over 1,000 households to assess whether conservancies are improving the welfare of households.

Knowledge, Benefits and Costs Associated with Conservancies in Namibia	*Percent*
Households with some knowledge about conservancy plans and constitution	26
Households that report they are conservancy participants	34
Households with conservancy associated cash income	12
Households who perceived meat distribution to be a benefit from conservancies	21
Households who reported crop damage from wildlife	50

Source: Bandyopadhyay and others 2004.

Interestingly, the study finds that while the average household is better off as a result of conservancies, households that report that they are "participants" are not that much better off. The analysis suggests that the welfare benefits from conservancy development may be somewhat evenly distributed between participant and non-participant households. While cash benefits are limited, participants and non-participants also enjoy other non-cash benefits such as meat and community infrastructure. These community-wide benefits may be the reason why the study finds that conservancies have a positive impact on the average household's welfare, but conservancy participants themselves do not significantly gain.

Wages are an important benefit from conservation programs. The Torra conservancy community members in Namibia earned $70,000 in wages from 1996 to1998 through an agreement with a photographic safari company to develop a tourism lodge. Residents received another $6500 from providing other services to the lodge. In Namibia, bed-levies are another source of household income. For example, in 1996, the Etendeka Mountain Lodge in the Kunene region distributed approximately $8,000 to 370 households in communities neighboring the lodge (Jones 1999b).

CAMPFIRE is one of the few programs that offers direct payments for wildlife conservation. In 1995, approximately 102,000 households gained wildlife dividend income. Bond (2001) estimates the median household wildlife dividend income earned to be $4.50 in real terms in 1996. This, however, amounted to less than 10 percent of the average gross income earned by households from agriculture; that is, it did not change the relative returns of wildlife management in comparison to agriculture. Households also earn other income from wildlife management, including salaries from associated jobs.

Legal access to meat is another very important benefit linked to conservation programs. For example, in a 1996 survey of participants in the Selous Conservation Program (SCP) in Tanzania, over 23 percent of participants perceived availability of game meat as a program benefit and said that nutrition had improved because of the occasional availability of game meat. This is an important finding, given that 50 percent of the respondents said that the program brought no benefit at all (Songorwa 1999). Usually meat is either made available through hunting quotas or sold after culling operations at a low cost. Both ADMADE and LIRDP make available less expensive meat from culling operations. However, it appears that this is accompanied by a litany of complaints from households, either stating that the meat price is higher than they can afford or that the quantity available is low (Gibson 1999, Songorwa 1999). Because access to meat is an important historical and cultural benefit from living close to wildlife, it is often perceived as a right that needs to be recognized and respected by CBNRM programs.

Costs related to land loss and wildlife predation

The Gwampa Valley case in Zimbabwe is a classic example of resistance to CBNRM programs as a result of the high opportunity costs of land. In the Gwampa Valley, the colonial government had in the past established a tsetse clearance programs that involved wildlife slaughter. Because of this and other historical factors, communities associated "*game with the primitive and backward, .. and cattle and agricultural production were.. preferred to wildlife management"* (Alexander and McGreggor 2000). When CAMPFIRE was initiated in the Nkyayi and Lupane Districts of the valley, the local council planned to stock wildlife to attract safaris. This, however, meant dislocation of local communities and land, which was steadily opposed. Revenue-starved councils saw the project as a means for economic development. On the other hand, communities viewed CAMPFIRE as a program against modernization and as promoting land losses. As a result, as of 1995, CAMPFIRE in the Gwampa Valley was in a state of deadlock.

Similarly, Infield and Adams (1999) find that communities around the Mgahinga Gorilla

National Park associate significant opportunity costs with the park. Adams and Infield (2003) identify thirteen subsistence products (from farmland to fruits and seeds) that households may have sacrificed for conservation. The most important opportunity cost is a result of approximately 1000 hectares of productive agricultural land that was incorporated into the Park. Adams and Infield (2003) estimate that the resulting yield losses cost communities some $850,000 per year. If these estimates are accurate, this is a huge sum of money. It is not surprising that local communities view the park as a source of either "past or future" agricultural operations.

Wildlife predation-related costs are another major problem for communities that live around conservation areas. To the extent that conservation occurs, predation may also increase. Sonogorwa (1999), studying villages in the SCP in Tanzania, found that villagers and program personnel perceived an increase in wildlife predation. He describes how conservation programs try to make available blank and flare cartridges to communities to counter predation, but animals, particularly elephants, learn and adapt to such measures.

In a CAMPFIRE ward in Binga District, villagers are estimated to lose 8.25 percent of their maize, sorghum, and millet annually, mainly from hippo and elephant predation (Wunder 1997, in Logan and others 2002). Based partly on these numbers, Logan and others (2002) estimate that the ratio of household benefits to predation cost in Binga is about 6:16 (Logan et al. 2002). The possibility of such large predation costs is reinforced by Mayaka (2002), who discusses communities and hunting zones in the Benoue National Park complex in Cameroon. Based on a survey of 239 households, he estimates that benefits, which are in the form of land royalty, only amount to 0.2 to 0.6 percent of predation plus guarding costs. Further, as of the time of the survey, the households had yet to receive any royalties. In all the case studies reviewed that estimated benefits and predation costs, the costs appear to be far higher than benefits.

Even without conservation efforts, there would likely be predation costs simply because of geographic proximity to wildlife. However, investments in conservation are perceived by households to increase these costs. The lack of a compensation policy or insurance against wildlife predation invariably contributes to community resistance to wildlife conservation schemes. Further, the loss of meat protein from hunting restrictions further increases the costs of wildlife management programs. Logan and others (2002) suggest that many CAMPFIRE households forfeit some 25 percent of animal protein due to hunting restrictions.

Community management of natural resources involves transaction costs in addition to opportunity costs. We understand little about transactions costs, even though they are likely to contribute significantly to the success of CBNRM. One study that does estimate transaction costs is Mburu and others (2003) (see Box 6).

Reduced poaching and better resource conservation

There is some evidence that community management programs are meeting their conservation goals. Indicators such as number of animals and signs of poaching are improving, either because of improved monitoring and enforcement or because of changed preferences. For instance, animal census results from 1991

Box 6

Transaction Costs Associated with Community Management in Kenya

Community management of natural resources involves production and transaction costs. We understand little about transactions costs associated with community management, even though they are likely to contribute significantly to the success of CBNRM. Transaction costs can be classified into search and information costs; bargaining and decision or contracting costs; and monitoring, enforcement, and compliance costs (Mburu and others 2003).

Very few studies estimate transaction costs and compare them with "production costs," such as opportunity costs of land, costs of infrastructure, or costs associated with animal predation. One study that does is by Mburu and others (2003), who estimate transaction costs associated with community management of the Kimana Community Wildlife Sanctuary and the Golini-Mwaluganje Community Wildlife Sanctuary in Kenya.

Comparison of Production and Transaction Costs in two Community Projects in Kenya

	Ex-ante stage costs ($ / household)		*Ex-post stage costs ($ / household / year)*	
	Production	*Transaction*		
Kimana	19	24	44	20
GM	454	184	153	20

Source: Mburu and others (2003).

Ex-ante costs are total costs per participating household, while the post-investment costs are costs per participating household per year. Thus, at least from this one study, we can gather that transaction costs are important but not as significant as other production costs. The study finds that transaction costs can be a significant part of total costs during the stage when the community activity is being planned and investments are being made. Once the initial organization of community activities is undertaken, transaction costs as a proportion of total costs declines. Further, this study shows that a larger proportion of transaction costs are borne by local landowners or stakeholders relative to production costs, which are often picked up by NGOs or the state.

and 1994 show that the Selous Conservation Program in Tanzania may have increased animal populations (Songorwo 1999). Such evidence is also found in the Kunene region of Namibia (see Table 3), where the community guard program has resulted in the recovery of flagship species such as the desert elephant and the black rhino (Jones 1999b).

Many of the papers reviewed suggest that poaching has been reduced as a result of CBNRM programs. The LIRDP program in Zamibia has reported reduced commercial poaching through its game patrols and scout programs (IUCN 1989), and park records in Mgahinga show reduced illegal entry and resource use. In the Mgahinga National Park, data from the park agency suggest that there was a decline in the number of people arrested, snares removed, and

Table 3. Increase in Wildlife Numbers in Kunene Region, Namibia, 1982–97

	1982	*1986*	*1990*	*1992*	*1995*	*1997*
Springbok	650	2000	7500			
Oryx	400	800	1800			
Mountain Zebra	450	900	2200			
Elephant	250			384	415	
Black Rhino	65	93			114	130
Giraffe	220		300			

Source: Durbin and others 1997. Based on ground and air sightings.

encroachment for goat and cattle feeding between 1991 and 1997 (Infield and Adams 1999). Infield and Adams note that these results could be as easily due to tightening of law enforcement as due to actual community conservation activities. Most community conservation programs have an element of law enforcement, and this aspect of the program generally seems to work.

However, the results are not always unambiguous. For example, Gibson (1999) agrees that the LIRDP and ADMADE programs in Zambia have led to a decline in big game poaching, particularly by outsiders. Nevertheless, he argues that small-game hunting with the use of traditional tools may well have increased, both in Zambia and under other similar programs such as Zimbabwe's CAMPFIRE program. Gibson argues that community management changes the incentives the rural residents face, but does not stem hunting. Small-game hunting is generally through snares instead of firearms, and locals are less likely to be caught. Hence, areas with more community scouts are likely to see an increase in snares and small-game hunting, and a decline in large-game hunting.

Improved perceptions, stronger rights and reduced conflicts

To the extent that devolution results in communities having more access to local government officials and brings some decisions related to natural resources to the local level, community conservation presents local communities with stronger rights. To the extent that these decentralized structures re-create "traditional hierarchies," decentralization results in some members having more or less "voice."

People's values toward wildlife are constructed from historical experiences and are not the same everywhere. In the Gwampa Valley of Zimbabwe, views about wildlife were formed by colonial policies to eradicate tsetse by killing thousands of wild animals (Alexander and McGregor 2000). Shaped by a culture of animal hunting, forced migration, and political struggle for land, communities in the valley viewed CAMPFIRE with great resentment and had little desire to use land for wildlife rather than agriculture and livestock rearing. Thus, depending on historical circumstances, management of land for wildlife may be more or less welcomed. This case suggests that devolution to local governments does not automatically result in stronger rights over natural resources. Arguably, communities have a better chance of expressing their objections when schemes are decentralized.

To counter the example of Gwampa Valley, there is evidence from the Kunene region in Namibia that conservancies have empowered communities. Ashley (1998) identifies a number of non-financial benefits of CBNRM, including development of new skills, pride and a sense of control, and experience and confidence in dealing with outsiders. Ashley concludes that community management is resulting in development and empowerment that go beyond initial objectives. There is also evidence from national parks in western Uganda (Mgahinga, Bwindi, and Kibale) that community relations with park authorities have improved as a result of community outreach efforts (Infield and Adams 1999, Archbald and Naughton-Treves 2001). Some of these changes are a result of engaging with communities, even in a fairly centralized system of park management.

An often-made contention is that that rural Africans have great intrinsic interest in

maintaining their traditional connections to wildlife (Jones 1999a). Thus, CBNRM projects, which have allowed rural communities to regain control over their natural assets, have also resulted in "social re-empowerment" (Owen-Smith and Jacobsohn 1991). Proponents of CBNRM programs suggest that this kind of empowerment leads to reduced conflict and improves management of natural areas. The Community Conservation Service (CCS) in Tanzania is a case in point. A program that gradually evolved and grew to cover all the parks under the Tanzania National Parks' authority, CCS has possibly empowered both park managers and local communities to engage in dialogue about park-people relationships. In Tanzania, CCS profited from the fact that many communities viewed national parks as a source of development and income. There was thus little resistance to community conservation once TANAPA was ready to come to the table (Bergin 2001).

New Generation Concerns Resulting from Decentralization

CBNRM, as a tool for sustainable development, is here to stay. However, it faces many challenges that need resolution for effectively meeting its goals of conservation and economic development. Thus, in this section, we discuss some emerging concerns that need to be addressed.

Communities versus households

In most of the examples we have reviewed, property rights are generally vested in some form of communal organization. Benefits also accrue, often at the community level in the form of social infrastructure. These benefits are not insignificant—for example, the Kenya Wildlife Service distributed some $1. 25 million for community activities in protected-area buffer zone areas between 1991 and 1995 (Barrow and others 1996, in Emerton 2001). However, many authors argue that the focus on communities relative to households is a problem for conservation (Emerton 2001, Gibson 1999).

The benefits-based approach to conservation as it currently exists is having a positive effect on household preferences and attitudes toward natural assets. However, there is reason to believe that this may not be sufficient to meet conservation goals. Individual household benefits tend to be small relative to total household income. Bond (2001) shows, for example, that per-household dividends from the CAMPFIRE program have been decreasing since 1989, and, amount to only about 10 percent of income earned from agriculture. Further, except for the case of wildlife dividends, revenues are not broad-based and accrue mostly to a small number of households. Recent data from seven conservancies in Namibia show that only 12 percent of households obtained revenues that they associated with conservancies (Bandyopadhyay and others 2004). Further, each household incurs significant costs. These costs include opportunity costs from loss of access to land or forest resources, costs of animal predation, and transaction costs associated with community management.

The potential negative returns to conservation at the household level lead to—and are probably reinforced by—the community-level investments. As previously stated, many of the community services that are offered contribute to household investments in agriculture rather than wildlife conservation. Moreover,

community infrastructure projects do not change incentives. This is partly because residents do not necessarily associate the creation of a local school with their efforts to conserve wildlife (see Box 7). Community projects also mimic public goods—benefits accrue equally to villagers who illegally hunt and to villagers who truly try to conserve wildlife.

Heterogeneity within and between communities

Communities engaged in natural resource management are rarely homogenous entities that harmoniously agree to undertake resource conservation. Rather, as Leach and others (1999) state, "*conflicting values and resource priorities—rather than shared beliefs and interest—pervade social life*." Communities are characterized by heterogeneity of endowments and interests. Further, whether or not a group of households can be characterized as a community depends on the scale of analyses (Leach and others 1999). Even if there is some agreement about what constitutes a community, there are several specific problems that can arise.

Differences in initial endowments and power relations within communities can lead to unequal costs as a result of institutional change. This was the case in the Maasai Kimana group ranch, where a combination of population pressure, immigration, and privatization of group rights increased the vulnerability of some social groups. The group ownership system created in 1971 resulted in households without ranch membership. Women and households without access to irrigated land had to travel increasingly long distances to secure dry-season grazing for their cattle. Thus, Woodhouse (1997) argues that new markets and devolution of power to local authorities can allow the "*practice of customary hierarchy to be translated into differential advantage in the market,*" leaving certain stakeholders negatively affected.

Differing stakeholder needs can contribute to conflict and impact conservation efforts. In SCP areas in Tanzania, inter-community conflicts occur because of the need to clarify demarcation of village boundaries and new rules. This has meant that farmers in one community cannot open up lands for agriculture in other villages without seeking permission. Anti-poaching

Box 7
Is Community Conservation Incentive Compatible?

There are various reasons why CBNRM may not create the right incentives for conservation. A few are listed below:

- Household benefits are small relative to agriculture.
- Household benefits are limited to a small number of residents, while a large number of households depend on wildlife.
- Community benefits are publicly available—they are neither tied to conservation improvements, nor do they punish detrimental activities.
- Lack of tenure creates limited "ownership" over programs and wildlife.
- Scout programs provide incentives for improved monitoring of big-game hunting, but possibly not for small-game hunting.
- Agricultural crop production may be subsidized, an issue often beyond the control of communities.

units in participating communities that stop outsiders from hunting wildlife in their areas have also added to inter-community conflicts (Songorwa 1999). In the Kunene conservancy in Namibia, there are two distinct groups—the young and old—who have differing needs and perspectives on the use of wildlife incomes. There are also examples of wildlife proponents versus livestock-ranching interests (Jones 1999b). Differences among these stakeholders have contributed to delays in the creation of conservancies.

Community investments can counter the inherent inequalities that can be reproduced in CBNRM projects. Batterby (1998) discusses how differential benefits accruing through the *gestoin des terroirs villageois* (GTV) program in the village of Toega in Burkina Faso are minimized by investments in "social capital" and community projects such as tree plantations, compost pits, and improvements in water supply. Thus, the public investments that CBNRM programs make are equalizing in ways in which private benefits are not. The involvement of an NGO also makes a difference, as evidenced by the increasingly strong role of women in Kunene region conservancies in Namibia in committee meetings and elections. Jones (1999) attributes the successful transition of women from little involvement to a strong presence to facilitation by IRDNC, an NGO, and to benefits perceived by women in participation.

Leach and others (1999) suggest that taking group heterogeneity into account evokes a fundamentally different type of CBNRM. They argue for a more flexible approach that focuses on and takes pointers from ongoing struggles and strategies. This approach recognizes institutions as "rules in use" and does not view the creation of a formal community-level organization as a broad solution to resource degradation.

Competition between institutions

Community management of natural resources generally involves either the creation of a new institution or the assignment of new powers to an existing institution. In either case, competition among institutions is inevitable. Further, any changes made affect both formal and informal institutions (which are more likely to be overlooked). To the extent that changes in rules affect power relationships, this will invariably lead to conflict.

When community conservancies were established in Namibia, it was decided that regional councils would deliberately be left without major control over wild resources. This decision had significant implications when the programs were implemented—regional councilors and governors in Kunene and Caprivi provinces both refused to endorse the program initially, and, there are many instances of bureaucrats slowing the process of conservancy registration (Jones and Murphree 2001, Jones 1999b). However, a variety of strategies seem to have contributed to greater cooperation by regional councilors. Detailed discussions with councilors; technical assistance from Ministry of Environment and Tourism officials at council meetings when conservancy applications are considered; and invitations to councilors to regional conferences to increase awareness about Namibia's successes relative to other countries appear to have helped (Jones 1999b).

Competition among traditional leaders and elected conservancy committees has also been problematic in Namibia (Jones 1999b). There are

several examples of headmen attempting to divert authority from the elected committees. A frequent solution has been to engage the headmen in the committees and to provide them with a role to play. While this strategy has clear benefits, it can also result in the headmen putting undue influence on the conservancy process. As Virtanen (2003) argues, traditional authority may be in-compatible with modern democratic notions of equality. Traditional institutions are likely to treat outsiders or immigrants unequally, and the possibility of favoritism and lack of accountability cannot be ignored (Gibson and Marks 1995).

A lesson that emerges from the review is that an arrangement that involves all major local stakeholders, however fractious initially, is likely to spring returns in the long run. Local government is perhaps the most important stakeholder that needs to be engaged in community conservation efforts. Often, local government is viewed as a source of corruption and rent extraction and is distrusted; but without local government support, long-term sustainability is unlikely.

Tenure over land and resources

Many CBNRM systems vest usufruct rights over wildlife with communities, while ownership rights over wildlife and land remain with the state. There are many reasons why this is done. There are also reasons to be concerned about whether the lack of ownership will weaken community conservation efforts in the long run.

In Namibia, conservancies confer resource rights and not land rights (Jones, 1999a). This practical decision was made to keep the process moving. Further, the tradition of trying to protect wildlife communally started in the early 1980s in the Kunene region of Namibia, when it became obvious that wildlife numbers were decreasing. Communities had little security over rights (this was prior to independence), yet they started a community guard program in Kunene that was later expanded to the Caprivi region. Thus, as Jones (1999a) argues *"people defined 'ownership' in terms of connection to wildlife based on cultural values rather than property rights derived from the state."*

Many authors (including Jones 1999a) speculate that insecure tenure over land will result in migration of human and livestock populations into successful conservancies and negatively affect the long-term sustainability of these programs. In Zimbabwe, as Murombedzi (1999) has argued, lack of tenure security in wildlife-rich areas may be responsible for attracting in-migrants (with potential negative effects on wildlife). It is, of course, not clear if security of tenure would change the migration pattern as long as returns to agriculture are higher than returns to wildlife management.

Mismatch between ecological and social scale of management

Management of fugitive resources, such as wildlife in Africa, suggests a need to focus on a large ecological scale. However, the CPR literature also suggests that social units that are small, in contact with each other, and have a historical connection are better suited to manage commons (Ostrom 1990). Thus, inevitably, decentralization can result in a mismatch between what is required from an ecological perspective and what is known to work better from a social management perspective.

Batterby (1998) discusses how the GTV approach in West Africa, which transfers control over local land use to community groups, is most likely to succeed when disputes over overlapping terrain does not exist; that is, when "*action*" space matches a community's "*geographic*" space. However, while this may be the case for agricultural areas, it is rarely seen in pastoral and conservation areas. In the case of wildlife, one solution to resolve the mismatch between geographic and action space is to assign property rights over wildlife to the space where they are found (as done in Namibia). Thus, fugitive resources can belong to different communities during different periods of time.

Providing rights to communities over wildlife may reduce conflict, but does not fully solve the scale problem. The mismatch between social and ecological scale can mean that fugitive resources impose costs on one community and benefits on another. Logan and others (2002) discuss the case of the Bulima CAMPFIRE district, where elephant forage can cause considerable crop damage in the wet season. By the dry safari hunting season, these elephants migrate to Tsholotsho district and benefit resident communities there. Not surprisingly, such inequitable elephant activities can lead to tension and overlapping claims. Asserting its rights under CAMPFIRE rules, the Tsholotosho RDC in 1991 had ended a quota arrangement between the two districts (Logan and others 2002).

Another confounding problem occurs because long-run fluctuations in wildlife resources are hard to predict, making management of wildlife stocks in decentralized settings rather challenging (Naughton-Treves and Sanderson 1995). Even if the state sets hunting "quotas," the fugitive nature of the wildlife and uncertainty about optimal harvest rates can lead to quota revisions. This can contribute to conflicts between different communities who share this property. The scale issue is further exacerbated by the fact that it is entirely possible to have too many wildlife at one scale and too few at another scale. This problem is not uncommon and has led to the collapse of many fisheries (Naughton-Treves and Sanderson 1995).

A solution presented by Ostrom (1990) for this problem is the creation of nested institutions. This is beginning to emerge with the creation of federated conservancies in Africa. In his example of Cameroon, Mayaka (2002) indicates that a three-institutional setup is proposed for co-management of hunting areas around the Benoue National Park. The proposed framework includes: "*Wildlife Village Committee in each village in the hunting area; Union of Village Committees, a legalized federation of village committees; and, an Area Co-Management Committee, a board formed by representatives of the Union and government official*" (Mayaka 2002). Whether such a structure (when it does get institutionalized) resolves scale issues is yet to be seen. For example, in Namibia, some conservancies have chosen to stay small and opposed attempts toward the creation of super conservancies. At least one conservancy (Sesfontein) has broken up into two. Thus, Jones (1999b) suggests when communities can decide how to manage common areas, new solutions may emerge that even "test" existing theories.

Sustainability

Community conservation programs are generally not self-sustained. Support for these programs usually comes from tourism and from

international donors. Tourism revenues vary depending on economic and political circumstances, while development assistance is often a function of agendas that are far beyond the control of local communities. Further, revenues earned only partly accrue to local communities. This is to some degree because of administrative costs of park management, and, because high-revenue earning parks and protected areas have to support other conservation areas in any country. Thus, financial sustainability is an issue that each conservation area (and communities who depend on these areas) will need to confront.

Barnes and others (2002), in their study of five conservancies in Namibia, explicitly address the impact of donor grants on community conservation. They undertake a careful cost-benefit analysis of community investments in conservancies and show that these investments result in a positive net present value. When donor support to these conservancy projects is removed, the financial returns diminish considerably, but the projects are still viable investments. This study is one of the only studies identified in this review that appraises donor support in the context of community management of natural resources. It shows that donor support is essential. However, CBNRM can thrive, at least in certain Namibian conservancies, with decreased external resources—this is a very positive result for the future of CBNRM.

Looking beyond the financial sustainability of current programs, we need to question whether CBNRM promotes future investments in conservation. In other words, does CBNRM provide the right mix of awareness, empowerment, and financial incentives to sustain the wildlife industry into the future. Wildlife investments may only become attractive to farm households if a) revenues from wildlife increased relative to revenues from agriculture; and b) wildlife are seen more as private resources over which households have much more control. Until these conditions emerge, local communities may well treat wildlife as an asset that is available to be run down and utilized for greater "development."

Conclusions

CBNRM programs are complex constructs that seek to meet multiple objectives of economic development, empowerment, and conservation. They also involve some degree of devolution of property rights (and power) from a bureaucratic state organization to a community organization. As a result, a successful CBNRM program has to meet a triple bottom-line, while simultaneously resolving stakeholder conflicts that are endemic to any shift in property rights regimes. This is particularly difficult in developing countries where rights are typically contested and ambiguous.

Is decentralization sound environmental policy? Our review of wildlife management in Africa suggests that it is certainly a feasible and smart policy. However, CBNRM has a long way to go to achieve its conservation potential. Multiple challenges are posed by the need to create the right incentives for conservation and by the opportunity costs of alternative land-uses. Broader concerns dealing with mismatches between the scale required for ecosystem management and social management, and sustainability remain.

Archbald and Naughton-Treves (2001) recommend a three-tiered strategy for ensuring that stakeholders face the right incentives for

conserving biodiversity and wildlife. Their approach would include (a) public goods delivery programs that bring economic development to the community; (b) compensation or insurance schemes that reduce specific costs at the household level (such as crop damage); and (c) some economic incentives to households (dividends, employment) to change behavior. A fourth arm to this is a strong monitoring program that would both allow the state and local communities to understand changes in natural assets and create disincentives to those who would bend agreed-upon rules. Our review suggests that the least-addressed of these four aspects is compensation for crop predation. This is probably because compensation and insurance schemes are inherently susceptible to moral hazard and adverse selection problems. However, this is an area that requires further exploration and empirical verification.

Is decentralization good social policy? The case-study literature suggests that decentralization can occur in many forms and with varying degrees of empowerment to local communities. In some cases, such as CAMPFIRE, decentralization to local officials does not appear to have facilitated increased community control over natural resources. In other cases, devolution has meant that local communities have some say over what kinds of ecotourism are undertaken and how the benefits of wildlife management are distributed. While devolution has rarely resulted in full management authority over natural assets, it has led to improved interactions between biodiversity managers and communities. As shown in the Kimana case, decentralization undertaken for environmental management may not empower the most vulnerable social groups. In fact, decentralization can reinforce traditional hierarchical structures, and this is the challenge in using environmental decentralization as a means to address social issues.

Does decentralization lead to economic development and poverty reduction? CBNRM programs provide public goods to communities and offer opportunities for income and employment. To the extent that they open up new markets in ecotourism and offer alternatives to subsistence agriculture, they do have a positive impact on rural livelihoods. There is also some evidence that the public goods provided through CBNRM improve the overall welfare of local communities. However, opportunity costs remain and are arguably rather high. Our review, of course, cannot answer the question of whether CBNRM is a better investment for poverty reduction relative to other rural development schemes. While this may be true in some areas that receive high numbers of tourists, it may be less true in others.

Finally, is devolution good for the government? The answer to this question appears to be positive. Most CBNRM schemes involve some revenue-sharing mechanism with the government. Many authors contend, therefore, that CBNRM facilitates a rural wildlife tax. The state, as the "owner" of natural resources, is simply obtaining resource rents on its assets. To the extent that involving the community increases these rents, it is a win-win situation for the state. The state also gains because CBNRM often leads to decreases in the state's monitoring costs and reduces conflicts between forestry authorities and communities.

Community-based wildlife management as a natural resource policy has led to many changes and improvements in the lives of rural peoples. However, it is not clear that it has overcome the incentives problem, which is the basis of much

of current environmental degradation. As Box 7 suggests, there are several reasons to be concerned about whether community investments are compatible with incentives.

The next step in the evolution of CBNRM is to more carefully identify and invest in private incentives for wildlife management. Long-term challenges such as sustainability of CBNRM will depend on the creation of nested institutions and changes in tenure and other land-use policies.

3 Water User Associations and Irrigation Management Transfer: Understanding Impacts and Challenges

Eduardo Araral[19]

Introduction

Irrigation management transfer (IMT)—the process of transferring irrigation management from government to farmer organizations—was first undertaken in the United States, France, Colombia, and Taiwan from the 1950s to the 1970s. Developing countries followed in the 1980s and 1990s. To date, governments in at least 25 countries in Asia, Latin America, and Africa are reducing their roles in irrigation management, while farmer groups or private organizations are taking them over (Vermillion 1992). The countries adopting IMT as a policy include Chile, Peru, Brazil, Mexico, the Dominican Republic, Colombia, Haiti, Senegal, Mauritania, Niger, Zimbabwe, Tanzania, Sudan, Somalia, Madagascar, Turkey, Pakistan, India, Sri Lanka, Bangladesh, Lao PDR, Vietnam, China, Indonesia, and the Philippines.

Since the mid-1980s, the centerpiece of reform invariably has been the transfer of management (in rare cases, along with the ownership) of irrigation systems—wholly or in part—to water user associations (WUAs), private corporations, or parastatal units, combined with the downsizing or withdrawal of the government's role in operation and maintenance (O&M), fee collection, water management, and conflict resolution. Early motivations behind IMT envisaged that farmer management of public irrigation systems would enhance their performance and bring about wide-ranging socioeconomic changes that would enable farmers to substantially improve farm incomes (Shah and others 2002). This was partly based on the reported success with user-managed irrigation, which was documented—at least in Asia)—to be far more productive and financially viable compared to public irrigation systems. These successes—including farmer-managed irrigation schemes (FMIS) in the hills of South Asia, tubewell companies in North Gujarat, lift irrigation schemes built and managed by sugar cooperatives in Maharasthra, and deep tubewell cooperatives in Bangladesh—all showed that well-managed collective irrigation by farmers could play an important role in transforming their livelihoods (Tang 1992; Lam, Lee, and Ostrom 1997).

More recently, a number of researchers (Kloezen and others 1997; Vermillion 1997; Koppen and others 2002; Samad and others 1999; Barker and Molle 2002; Shah and others 2002) have suggested that the IMT discussion has shifted more toward getting irrigation off the backs of government than toward improving the lot of the farmers and the rural poor, the original goal of public irrigation investment over the past 50 years. The driving force behind reforms—the need to reduce the government's recurrent expenditures for irrigation. IMT—is now considered beneficial even if it just saves the government money. However, Shah and others (2002) argue that, at least in Africa, "nowhere is there a significant body of positive experience to

suggest that straightforward IMT will work in smallholder irrigation as it has with large, commercial farmers in the United States, Mexico, South Africa, New Zealand, Columbia, and Turkey."

While IMT is being undertaken worldwide and with growing interest, there is surprisingly little evidence about its results, particularly its impact on poverty reduction. The driving assumption behind this growing interest is that successful IMT is, in principle, viable provided the "process is right" and favorable socio-technical, legal, and political conditions are created. However, it is not well-established in the literature whether IMT can simultaneously save money for the government, bring about more cost-efficient management for the farmers, and achieve financial and infrastructural sustainability. This paper, therefore, attempts to answer the following questions:

- What do we understand about the impacts of IMT in terms of poverty reduction, financial, and personnel implications for the government, O&M, and resource conservation?
- What are the conditions most likely to result in sustainable local resource governance organizations? Are there specific conditions under which irrigation user groups work better in order to address poverty issues?
- What are the emerging challenges in IMT?

To evaluate the evidence on the impacts of irrigation decentralization, a careful review of written literature was undertaken. Literature and data sets came mainly from recent research reports of the International Water Management Institute (IWMI), particularly that of Vermillion (1997), proceedings from the International Conference on Irrigation Management Transfer held in Wuhan, China in 1994, and discussions with Avelino Mejia[20] and his staff at the National Irrigation Administration, Philippines in 2003. Various sector papers from the World Bank, as well as research reports and collections from the Workshop in Political Theory and Policy Analysis at Indiana University, were also reviewed.

This chapter is organized into six sections. The first section deals with the evolution of IMT and the research questions and methodology. The second section discusses various IMT assumptions and models. The third section discusses the impacts of IMT in terms of productivity and poverty, impacts on government finance and personnel, and impacts on O&M and resource use. The fourth section deals with the conditions associated with the emergence and sustainability of self-governing irrigators' associations. The fifth section deals with emerging challenges in IMT, and the last section provides a summary and conclusion.

IMT Assumptions and Models

The underlying logic behind IMT is best summarized by Vermillion (1997). According to him, there are three reasons why IMT is a feasible alternative to centralized irrigation systems:

- While government bureaucracies lack the incentives to maximize management performance, farmers have a direct interest in enhancing irrigation management.
- IMT can increase the profitability of irrigated agriculture sufficiently to offset any increased cost of irrigation to farmers.

- IMT will also save money for the government in terms of decreased responsibilities for routine O&M.

Early models of IMT (1950s to 1970s) focused more on non-poor, market-oriented, large-scale, and business-like agriculture, including large farms in the United States, Mexico, New Zealand, and Turkey. The objective of these early models included saving government money, improving O&M cost efficiency, and maintaining or increasing the productivity of irrigated agriculture. The national government usually initiated the process. The scope included full transfer of O&M and finance functions, but ownership of assets remained with the government (with the exception of New Zealand, which completely privatized ownership).

In contrast, most current models of IMT (1980s and 1990s)—in South and Southeast Asia, Latin America, and Africa—are targeted at poor, small-scale, local-market-oriented agriculture. While the formal objectives remain the same—that is, saving government money, improving O&M cost efficiency, and maintaining or increasing productivity of irrigated agriculture—current IMT is increasingly judged a success even if it just saves government money and improves collection efficiency. Current IMT is also generally undertaken as donor aid-funded projects (Shah and others 2002; Groenfeldt and Svendsen 2000). In general, the scope of O&M and finance-transferred functions is partial, and the process is time bound. In particular, current models of IMT differ from previous ones: there is greater variability in terms of (a) transfer units and their size; (b) the new management unit responsible after IMT; (c) the extent of functions transferred; (d) ownership of assets; and (e) implementation and financing modalities adopted by donors.

For some models, such as those in the Philippines (for communal irrigation), New Zealand, Colombia, Nepal (small systems), and China, transfer units involve the entire scheme. In other models, transfer units may involve only distributary canals, as in the Philippines and Nepal (for large irrigation systems), Sri Lanka, Nigeria, Egypt, and India. The size of transfer units varies, from a low of 150 hectares in the case of communal irrigation in the Philippines, to as much as 14,000 ha in India, 25,000 ha in Colombia, and 30,000 ha in Mexico.

In terms of the new management unit, most IMT models transfer responsibilities to water users' associations (WUA) or irrigators' associations (as in the case of the Philippines, Indonesia, Egypt, Bangladesh, Nepal, India, Senegal, and Colombia). In Turkey, municipal governments became the new management unit. In Vietnam, parastatal organizations assumed responsibility, while in Sudan and New Zealand, private / mutual companies assumed responsibility. In the United States, Japan, South Korea, Mexico, and Taiwan, where IMT was deemed to have a generally positive impact, post-transfer governance entities tended to be farmer-elected boards of directors, while management entities tended to be cadres of professional staff appointed by the board.

In terms of the extent of O&M and finance functions transferred, IMT models in the Philippines, Indonesia, Nepal, Sri Lanka, Sudan, Nigeria, the Dominican Republic, and Colombia practice partial transfer of responsibilities. On the other hand, models in Vietnam, China, Bangladesh, Egypt, Turkey, Senegal, Colombia,

New Zealand, and Mexico (see Box 8) practice a full transfer of O&M and financial responsibilities. The powers and functions devolved to WUA after IMT includes authority, in varying degrees, to:

- Make rules and sanctions, with the maximum sanction of stopping water available to the WUA
- Make O&M plans and budgets
- Set water charges
- Hire or release management staff
- Control intake
- Control the main canal system and subsidiary canal systems
- Assume responsibility for future rehabilitation
- Manage canal rights of way
- Contract and raise funds
- Make profits.

In terms of ownership of assets, the government retains ownership in most IMT models, with the exception of Senegal and New Zealand, where assets were privatized. Experiments are also under way in the Philippines to transfer asset ownership to WUAs in large systems (Eleazar 2002).

Conditions For Self-Governing Irrigator Associations

What are the conditions most likely to result in sustainable irrigation governance organizations? Are there specific conditions under which irrigation user groups work better? The creation and strengthening of water user

Box 8
Irrigation Management Transfer in Mexico

The Mexican IMT Program is one of the most ambitious and successful of its kind worldwide, not only because of the large scale of its irrigated area and the speed of its implementation, but also because of the positive impacts claimed to be the result of the strategy followed. In less than a decade until the end of 1996, almost 2.9 million hectares have been transferred to 373 WUAs representing 90 percent of the area served by the 80 irrigation districts in Mexico. Kloezen and others (1997) described the characteristics of the Mexican program as follows:

- IMT did not come on its own, but followed and is part of a much wider set of liberal economic reforms arising from the economic crisis faced by Mexico in the 1980s.
- IMT was made workable as it met with a political commitment at the highest levels.
- IMT was accompanied by the introduction of a new water law that recognizes water rights to water user associations, as well as the authority/responsibility of water users.
- IMT is a rapid top-down process that has met with relatively little resistance from farmers, as it was developed on an already existing strong organizational base—the ejidos and the organization of private growers.
- The government, and later private organizations, provided training to the new WUA.
- WUAs agreed to jointly manage the system with the agency during a fixed /short time.
- The Mexican IMT program aims not to maximize direct user participation in O&M, but to involve farmers in representative governance.

associations through institutional development is a standard component of most donor-funded irrigation projects. Institutional development, however, is a poorly understood task. Usually, it is merely associated with providing technical assistance consultancies, staff and beneficiary training, study tours, and financial and logistical support. What is often left out is what Vincent Ostrom (1980) referred to as "the artisanship involved in the design, operation, appraisal, and modification of rule-ordered behavior," one which Uphoff (1986) also referred to as "the ongoing nature of getting the process right."

Ostrom (1992) suggested that "the rules governing the supply and use of any particular physical system must be devised, tried, modified, and tried again, and considerable time and resources will be invested in learning more about how various institutional rules, combined with particular physical, economic, and cultural environments, produce incentives and outcomes. The choice of institutions therefore is not a 'one-shot' decision in a known environment, but rather an ongoing investment in an uncertain environment. The time invested in this process is similar to the time invested in building and operating a better physical infrastructure." In a synthesis of 15 years of lessons learned on common pool resources, Ostrom, Dietz, Dolsak, Stern, Stonich, and Weber (2002) suggested the specific physical characteristics of the irrigation systems and the characteristics of the irrigators' associations are important factors affecting the emergence and sustainability of self-organized irrigators' associations.

McKean (1992) and Ostrom and others (1990, 2001) suggested that self-governing associations are more likely to form when the following attributes of the physical resource are present:

- *Resource scarcity and feasible improvement*. If irrigation water is abundant, there are few reasons for farmers to invest in organizing. This was the case of small irrigation systems in Central and West Java, where river water is usually recycled by downstream farmers. Attempts to organize farmers did not succeed, as the farmers did not perceive the marginal benefits of joining the group to be more than additional costs of time in meetings and labor contributions. On the other hand, incentives for self-organization may be higher when water scarcity is substantial, as in the case of irrigation systems in the arid Ilocos region of the Philippines (Ostrom 1990). In addition, if the irrigation system is substantially destroyed, organizing may not generate substantial benefits. Farmers may also have difficulties adapting to exogenous shocks such as prolonged drought and catastrophic flooding. This was the case with many irrigators' associations in the Bicol region in the Philippines, which ceased to exist after typhoons led to the collapse of infrastructure (Araral 2003).

- *Monitorable indicators*. The presence of frequently available and reliable indicators about the condition of the irrigation system, for example volumetric pricing practices in China, affects the capacity of farmers to adapt relatively soon to changes that could adversely affect their long-term benefit stream.

- *Spatial and hydrologic boundaries.* The larger the boundaries, the higher the cost of monitoring and enforcement, particularly in the case of small-scale farming, as shown in Africa (Shah and others 2002).

The following characteristics of the farmers affect the distribution of costs and benefits, thus

influencing the likelihood that a self-governing irrigators' association will emerge:

- *Salience*. If farmers do not obtain a major part of their livelihood from irrigated farming, the high cost of organizing and maintaining a self-governing irrigation system may not be worth their effort, as suggested by Koppen and others (2002) in the case of big landlords in Andhra Pradesh and Gujarat in India.

- *Heterogeneity of wealth*. Bardhan and Dayton-Johnson (2002) suggest that heterogeneity of wealth makes it more difficult to agree to allocation rules. This in turn makes enforcement and resource maintenance more difficult, as appears to be the case in large-scale canals in Gujarat and Andhra Pradesh in India (Koppen and others 2002).

- *Group size*. It is a lot easier for five large farmers to come together to agree to the rules of self-management than for 1,500 smallholders, as shown by the experience of South Africa and elsewhere (Shah 2002).

- *Common understanding*. If farmers do not share a common understanding of how the irrigation system operates (topographic, hydrologic, climatic, socioeconomic factors, and the magnitude of problems), they will find it extremely difficult to agree on future joint strategies (Ostrom 1990). This is particularly true of aquifers, where monitoring the resource condition is difficult and expensive.

- *Trust and Reciprocity*. Farmers who trust one another to keep agreements and use reciprocity in their relationships with one another face lower expected costs related to monitoring and sanctioning one another over time. Farmers who lack trust at the beginning of a process of organizing may be able to build this form of social capital if they initially adopt small changes that most farmers follow before trying to make major institutional changes, as experience in Nepal has shown. Uphoff (1992, 2003) makes a strong case for the importance of social capital for improved irrigation performance.

- *Autonomy*. Farmers who are able to determine rules without external authorities countermanding them have lower costs of organizing. For example, in many small-scale irrigation systems in West and Central Java in Indonesia (Samad and others 2002), while water users' associations have the mandate for O&M, they do not have formal rights to the water and infrastructure and are virtually powerless to settle disputes and enforce collection of irrigation service fees in irrigation systems that cut across multiple villages. They also generally lack the legal and political clout to mobilize loans and enter into contracts that would permit them to enter into business ventures. As a result, IMT does not constitute a dramatic change in management.

- *Prior experience and local leadership*. Farmers with prior experience with other forms of local organization greatly enhance the repertoire of rules and strategies known by local participants as potentially useful to achieve various forms of regulation. Pradhan (2002) suggests, in the case of Nepal, that groups with more social capital are better able to deal with collective action problems. Ternstrom (2003), on the other hand, finds strong empirical support for the role of local leadership in the emergence and sustainability of irrigation institutions.

Box 9 presents cases in the Philippines and identifies how some of these factors have been conducive to success. The growing theoretical consensus above does not, however, lead to a conclusion that most irrigation farmers will undertake self-governed regulation. The crucial factor is not whether all attributes mentioned above are favorable, but the relative size of the expected benefits and costs as perceived by the farmers. Farmers must perceive and actually experience that the marginal benefits of organizing will outweigh the costs involved. In addition, the macroeconomic policies of a country are equally important in determining these costs and benefits.

Assessing Impacts

Irrigation management transfer has now been undertaken in many parts of the world and

Box 9
Features of Successful Irrigation Associations in the Philippines

Araral (2003) describes the typical characteristics of outstanding IMT irrigators associations in the Philippines; that is, those that have consistently won national awards. These characteristics are broadly consistent with and reinforce the above conditions for self-organized irrigators' associations.

First, they have at least 10 years of collective experience as an organization. Second, the irrigation resource is salient enough to the users that they are willing to invest time and effort to create new institutions. A majority of the members depend on rice farming for most of their livelihood. Third, the farmers have the autonomy to devise and change operational rules at least within the ambit of their charters. Fourth, at least a subset of farmers are able to engage in direct communication with each other, including the opportunity to bargain. In addition, they share the following characteristics:

In terms of organization, they have high membership rates (80-89 percent of farmers in their service areas), the board of directors meets at least monthly or even more; the general assembly meets at least annually; they keep organized records (membership, financial, minutes of meetings; articles of incorporation; water permits; government reportorial requirements). In terms of organizational discipline, they regularly hold elections according to their by-laws; most conflicts are resolved within their IA without external assistance; enforcement mainly relies on hierarchically enforced norms, peer pressure, reputation, and altruism; agreed-upon sanctions are enforced 90 percent of the time; collective leadership is strong; at least 90 percent of members attend sector meetings to discuss plan preparation and evaluation, and contribute to group work and donate a portion of their labor as equity fund to the association.

In terms of O&M, successful IAs are strong in the planning, coordination and execution of O&M policies and plans, particularly in the preparation of the cropping calendar, water distribution plan, maintenance and repair, and amortization schedule.

In terms of financial planning and implementation, the better IAs seem to have a clear and generally agreed-upon financial plan for the cropping calendar; exercise fiscal discipline (high viability index measured as a ratio of income and expense); conduct internal audits at least every two months and external audits regularly; have a system of checks and balances to avoid nepotism between auditors and treasurers; and emphasize transparency and accountability as a norm of behavior among officers.

Successful IAs have a cooperative or a tie-up with a cooperative for agricultural assistance in terms of inputs, marketing, and equipment. Their collective leaders are entrepreneurs in terms of fund raising and mobilizing resources; women are actively involved (half of IA officers are women); and they provide incentives to officers and members (such as credit for scholarships, mortuary, and hospitalization, as well as incentives for officers such as a transport allowance and health insurance).

continues to grow in interest among donors, governments, and farmers. What do we understand about the impacts of irrigation management transfer? In this section, we review available case studies to identify impacts in terms of poverty reduction, government finance, operations and maintenance quality, and resource conservation.

Productivity and farm income

One of the underlying policy assumptions behind IMT is that it has a positive impact on poverty reduction and agricultural growth. The logic behind this assumption is that IMT can reduce the cost of water and also diversify revenue sources for water users' associations—both of which are expected to improve agricultural productivity and incomes. Reduction in the cost of water comes in the long term from increased water-use efficiency. Diversification of revenue sources, on the other hand, results from the granting of corporate powers and greater autonomy to the WUA.

The evidence on whether IMT leads to growth and increased agricultural productivity is rather mixed. Box 10 discusses a number of cases where IMT has led to a change in the cost of irrigated water. As shown in Box 10, the available empirical evidence suggests that 1) where significant subsidies existed before IMT, the cost of irrigation to farmers may rise substantially; 2) where there is little or no change in subsidies, IMT may lead to a decrease in irrigation costs to farmers; and 3) high-cost systems such as pump irrigation are more likely to significantly increase the cost of water to farmers (Vermillion 1997). Thus, overall, IMT will not necessarily reduce the costs of irrigated water to farmers. Instead, IMT may well increase the private cost of production to farmers.

Box 10
IMT Impact on Cost of Irrigation Water

The cost of irrigation to farmers can rise substantially after IMT, where significant subsidies existed before IMT. This is particularly true for high-cost systems such as pump irrigation. For example, Meizen-Dick and others (1997) report that IMT in Senegal has led to a 200 to 400 percent increase in the cost of water, mainly due to the significant loss of government subsidies. Privatization of irrigation in the Senegal River Valley, which was irrigated by lift pump schemes, led to a 78 percent increase in the cost of rice production for farmers between 1980 and 1993 (in constant 1980 prices) due primarily to discontinuance of subsidies for credit, input provision, and irrigation. The positive side, however, was that overpumping from lift irrigation was reduced as a result of improved supervision by farmer-hired staff. In Indonesia, Johnson and Reiss (1993) report that water charges to farmers increased five- to seven-fold as significant government subsidies were lowered. In the Dominican Republic, Yap-Salinas (**year?**) reports a 1,500 percent increase in the cost of irrigated water over an eight-year period when subsidies for pump irrigation were reduced.

On the other hand, where there is little or no change in subsidies, IMT may lead to a decrease in irrigation costs to farmers, particularly for surface irrigation. This was the case in the Philippines, where the cost of water declined by 75 percent (Oorthuizen & Kloezen 1995); in Nepal, by at least 40 percent (Olin 1994); in Colombia (Vermillion & Garces-Restrepo 1996); in the United States, by 16 percent (Svendsen & Vermillion, 1994); and in New Zealand, by at least 25 percent (Farley 1994). In these cases, farmers were granted financial autonomy that allowed them to determine irrigation tariffs, collect and keep greater water revenues, and take cost-cutting measures. These measures included reducing overhead costs and designing simpler repair and maintenance work, which improved operational efficiency and resulted in lower costs of water delivery.

The impact of IMT on agricultural productivity is measured in terms of an increase in cultivated area, cropping intensity, and yield, while impact on economic productivity is measured in terms of gross value of output, net farm income per hectare, and economic returns to irrigation. Box 11 presents several studies that try to understand the linkages between management transfer and agricultural growth.

The relationship between IMT and agricultural and economic productivity is indirect and often ambiguous, especially when compared to the relationship between IMT and O&M performance or financial viability. The ambiguity stems from the fact that most studies do not attempt to control for intervening variables such as changes in rainfall or fertilizer application rates, as well as factors such as prices, subsidies, and markets. For instance, an assessment by Kloezen and others (1997) on agricultural and economic productivity of the IMT program in Mexico revealed that fluctuations in productivity values cannot be related directly to the program, but have to be viewed in the context of other economic changes since the 1980s arising from neo-liberal economic reforms.

Box 11
IMT Impact on Agriculture

In an assessment of small-scale IMT programs in West and Central Java, Indonesia, Samad and others (2000) found that the potential for improving productivity or profitability of irrigated agriculture through changes in irrigation system management was limited. The main reason is that water and land resources were already intensively exploited. Cropping intensities are relatively high and water is generally recycled and reutilized between systems along river courses. This was the key reason for the lack of substantial improvement in agricultural productivity after IMT.

In other countries, impact on cropping intensity is mixed. Cases in the Philippines, Sri Lanka, India, China, Nepal, and Vietnam report increased cropping intensities ranging from 80 to 250 percent, which were generally attributed to more responsive irrigation operations after IMT (Wijayaratna and Vermillion 1994; Nguyen and Luong 1994; Kloezen 1996; Kalro and Naik 1995; Uphoff 1992; Pradhan 2002). However, in the Senegal River Valley, privatization of irrigated agriculture support services was accompanied not only by a decline in cropping intensities, but by an expansion in irrigated area. Farmers shifted to growing more of their crop only in the wet season, partly due to rising input prices and the greater complexity of dry-season irrigation after IMT. In another region, privatization led to a near doubling of irrigated area between 1985 and 1993 and an increase in cropping intensity from 86 to 93 percent (Wester, During and Oorthuizen 1995). Results for crop yields, however, were mixed and ambiguous and no information was generally available.

In cases where irrigation operations improved—that is, when more water was made available—there were reports of increased cultivated area, for instance 14 percent in Vietnam (Nguyen and Luong 1994), and 80 percent in Nigeria during dry-cropping season (Musa 1994). The increase in cultivated area in Nigeria resulted from significant improvement in water distribution to tail-end areas. Crop diversification was reported in India, the United States, and Colombia as a result of more flexible water distribution practices, emphasis on value-added crops, and in response to market demands.

Scant information is available on IMT impacts in terms of increased income, gross value of output, and economic returns. In the United States, average farm incomes rose 15 percent due to reduction in water cost (Svendsen and Vermillion 1994). In Mexico, Johnson (1996) reports that annual economic returns remained the same. In Colombia, the cost of water relative to cost of rice production increased, but net farm incomes and gross value of output increased substantially due to a shift to high-value crops.

While the impacts of management transfer on irrigation costs and on agricultural yield in general are ambiguous, it is clear that IMT can result in increased revenues to water user associations as they grow into mature for-profit organizations. When management transfer enables WUAs to diversify revenue sources and become profit-oriented (and not just a nonprofit service organization), this results in positive impacts. Diversified revenue sources come from membership fees; seasonal and shareholder fees; trading of fertilizers and agrochemicals; rice marketing; tractor rental and interest from small loans in Sri Lanka, *from farm enterprises* in China and revenues from mini-hydro power stations, and water-selling contracts and other income-generating projects in the United States. Diversified revenue sources enable the WUA to venture into agriculture business operations, such as wholesale procurement of farm supplies that help lower costs of farming for its members, and to engage in cooperative marketing that helps increase farm prices (Kloezen 1996). WUAs venturing as multipurpose cooperative are also able to provide patronage refunds in the form of cash and stock dividends to its members. In the Bayi District in Hebei Province in China, the water user association was able to develop nine enterprises between 1984 to 1992 after it became financially autonomous. Sixty-five percent of its $60,000 profit was allocated for water management costs; the rest was used as salaries and bonuses to workers, many of whom are also members of the irrigation staff (Vermillion and others 1994).

Impact of IMT on government finance and personnel

It is commonly assumed that IMT will save money for the government as it divests itself of the responsibility to finance routine costs of O&M of irrigation systems. It is also commonly assumed that the savings can be used to reduce government expenditure in the irrigation subsector or to reallocate funds to other functions that cannot be handled or financed directly by the private sector (Shah and others 2002). But much depends on political will, budgets, and financial policy (Vermillion 1997). Nonetheless, as Table 4 below shows, IMT does seem to lead to a decrease in government subsidies and improve the budget solvency of irrigation agencies.

Most studies dealing with fiscal impacts, however, only document government spending for O&M and mainly at the scheme level (Vermillion 1997). There is little information on whether savings from decreased government spending for irrigation O&M are being diverted to new construction, rehabilitation, or other uses within the sector; to other sectors; or to permit an overall shrinking of government expenditures.

The Philippine experience in IMT related to government personnel typifies IMT experience elsewhere. IMT in the Philippines was intended, at least partially, to reduce recurrent government O&M costs by reducing irrigation management positions. Reports indicate that overall irrigation agency staff diminished (by as much as 50 percent) both at the system and administrative levels as a result of a progressive and long-standing IMT policy adopted since the 1970s.

This decline, however, was gradual as the National Irrigation Administration (NIA) waited for staff to retire. Vacated posts were not filled as part of the personnel attrition policy of the Civil Service Commission. Other personnel management practices at NIA included (a)

Table 4. Impact on government subsidies and budget solvency of the irrigation agency

Impact of IMT on Government Subsidies	
Cases reporting, country, type of irrigation	*Reported Impacts*
Kim, Kwanbo, 2003, Korea, SI	Annual government savings of 20 percent due to efficiency improvements after IMT
Bagadion and Korten, 1991, Philippines, SI Wijayaratna and Vermillion, 1994, Philippines	Annual government savings of $12/ha due to increased cash and in-kind contributions from farmers. Revenues from irrigation service fees constituted 24 percent of the revenues of the government irrigation agency (NIA) in 1979 and 60 percent in 1990. Government spending for O&M fell from P25million in 1976 to zero in 1982, but limited subsidies were later introduced.
Kloezen, 1996, Sri Lanka, SI	Government O&M spending decreased from $14.80/ha in 1985 to $6.50/ha in 1994.
Pant, 1994, Uttar Pradesh, India, LI	Government subsidies for a typical tubewell decreased by 25 percent after IMT.
Mishra and Molden, 1996, Nepal, SI	Government subsidies for O&M declined from $6.65/ha to $4.06 after IMT.
Vermillion and Johnson, 1990, Indonesia, SI	Annual government savings of $13.5million in O&M costs of small-scale irrigation.
Johnson, 1996, Mexico,	Annual government subsidies for O&M fell from $40million in 1989 to zero in 1993, covering 2.4million hectares of service areas.
Impact of IMT on Budget Solvency of the Irrigation Agency	
Oorthuizen & Kloezen, 1995, Philippines, SI	The irrigation system's annual budget deficit declined from an average of $19,178 in 1982–85 to $554 from 1986–89, the first four years after transfer.
Pant, 1994, Uttar Pradesh, India, LI	Before IMT, annual losses of $876 and afterwards, consistent surpluses.
Bagadion, 1994, Philippines, SI	Annual average loss of $42,218 for 1981–89 converted into annual surplus of $42,880 after IMT during 1990–92.
Johson, 1996; Gorriz, Subramanian & Simas, 1995; Mexico, SI	Deficits declined from $66million in 1989 to $44 million in 1993 after 80 percent IMT.
Vermillion & Garces-Restrepo, 1994, Colombia, SI	Budget deficits for 2–4 years before transfer and surpluses 2–4 years afterwards due to staff reduction and increases in revenue.

relocating staff members into systems that were not being transferred (similar to the practice in Indonesia and Sri Lanka), or transfer of staff members into non-O&M activities such as construction of new systems (as in Turkey); (b) rehiring retired staff as project consultants; and (c) encouraging / requiring the irrigators' association (IA) to hire former NIA staff as part of IMT contracts.

Where affected staff remain valuable to the IAs—for instance, water technicians who are also local residents—IAs are more willing to hire them on a progressive salary-sharing

scheme (i.e. the irrigation agency initially shoulders staff salary, but progressively shares the cost until the IA pays 100 percent). Office and administrative personnel and irrigation system managers are less likely to be hired by the IAs, either because of little value-added or because they are too expensive.

Impacts on O&M quality and resource conservation

It is commonly assumed that IMT will bring about improvements in the quality of irrigation O&M and will result in sustainable infrastructure maintenance. Further underlying this assumption is the notion that farmer-users of small-scale irrigation systems are potentially capable of operating and maintaining their irrigation systems. It is also assumed that involving local water users' associations in the pre-construction and construction activities is an important means of developing the skills and structures of the associations and for ensuring that farmers are willing to contribute toward the maintenance of the investments (Bagadion and Korten 1991). Underpinning this assumption is the notion that farmers have a direct interest in enhancing and sustaining the quality and cost efficiency of irrigation management. When given the authority and incentives to act collectively, farmers will act to contain the cost of water management while improving operational performance.

Evidence on the impacts of IMT on O&M quality is mixed. In general, most studies report positive impacts in terms of improved operations—including increased water-use efficiency, reliability, adequacy and timeliness of water delivery, increase in service area, responsiveness of the IA to their members' needs, and more equitable water distribution.

The impact of IMT on maintenance, on the other hand, is less positive. Farmers tend to under-invest in maintenance, and evidence suggests an overall declining trend. In cases of lift irrigation, maintenance has generally worsened mainly because of increasing costs borne by farmers as a result of reduced government subsidies.

Not much evidence is available on the impact of IMT on water resource sustainability. Some of the unanswered questions are as follows:

- Does the most progressive form of IMT create adequate incentives for farmers in water-scarce areas to conserve water in a significant way?
- What kinds of water conservation incentives are created by IMT in cases of run-of-the-river type irrigation and aquifer-dependent farms, where monitoring water tables is costly?
- What about in systems where monitoring of gross consumption is easier, i.e. dam irrigation?
- Would the assignment of water rights to farmers create significant incentives?
- Are the incentives the same in the face of high transaction costs (particularly monitoring and sanctioning costs) in large-scale systems composed of thousands of smallholder farmers?

One can expect that incentives are more likely to be created for farmers to conserve water under the following conditions: (a) water is scarce but water rights are clear and secure; (b) water is priced as an economic good; (c) consumption is adequately monitored at the farm level (i.e. use of volumetric pricing) and at the basin level (i.e.

Box 12
IMT Impact Assessment in Mexico

The main impacts of the IMT Program, based on an evaluation of the Alto Rio Lerma Irrigation District (ALRID) in Mexico covering 113,000 ha, were summarized by Kloezen and others (1997) as follows:

- Farmers' increased control has not led to major improvements in operational performance, particularly in the way water is allocated and distributed. There were also no changes in the area irrigated or cropping patterns that can be attributed to IMT.
- Farmers' increased involvement in decision-making and control has increased managerial accountability. Farmers are particularly positive about the improvement of services provided by the ditch tenders. They feel that compared to the pre-IMT period under the government irrigation agency, the WUAs have more control over the ditch tenders' work and rent-seeking behavior.
- IMT has led to a better match between actual expenditures and farmers' perceived needs, especially in maintenance at lower system levels.
- Financial self-sufficiency has increased from 50 percent to 120 percent after IMT due to the ability of the WUA to achieve fee collection rates at over 100 percent. The hiring of professional administrative staff and the use of good computer software to handle daily financial administration has resulted in better financial administration.
- IMT has not resulted in an increase in the cost of water to farmers. Although the cost of irrigation to farmers remains low after IMT (less than 5 percent of gross value output), WUAs find it very difficult to convince farmers that irrigations fees should be increased to keep up with inflation. None of the WUAs also created a contingency fund for future emergency repairs.
- No convincing evidence was found that IMT had a substantial effect on agricultural and economic productivity. Fluctuations were attributed more to the dismantling of credit and subsidy systems, input price policies, and price changes in world commodity prices.

use of water accounting); (d)) irrigation systems are sufficiently small to keep transaction costs at a minimum or when WUAs are appropriately nested; (e) when water conserving technologies are practiced; and (f) when IMT is most progressive.[21] The empirical support for such a proposition can be suggested by indicators at the farm level such as land and water productivity (measured in terms of output per unit command when land is scarce or output per unit of water consumed when water is scarce), or at the basin level in terms of relative water supply—that is, total water supply (as measured in terms of water accounting) relative to crop demand. [22]

Unfortunately, however, even for the most progressive IMT, most conditions that are more likely to create conservation incentives are seldom met. Our review shows that IMT has had a variety of positive impacts on farm households. However, these are conditioned by different circumstances. Table 5 summarizes our best understanding of when IMT is likely to have a positive impact and the conditions under which they are more likely to be negative.

Challenges Ahead

This review of IMT experience in a number countries indicates a number of emerging challenges: (a) poverty reduction and IMT; (b) IMT and institutional development; (c) operations and maintenance; (d) water conservation; and (e) the poor quality of IMT research.

Table 5. Summary of IMT Impacts

	Positive impact more likely if….	*Negative impact more likely if….*
Productivity and poverty		
Cost of Irrigation water	There is little or no change in subsidies; the effect on any increases in water costs is overcome by improvements in efficiency or water availability.	Significant subsidies are phased out, particularly in high-cost systems such as pump irrigation.
Productivity for all income levels	Head-tail end-water distribution improves to increase cropped area. Opportunities for productivity improvement are high (i.e. when water and land resources are not being intensively exploited, cropping intensities are low), as well as opportunities for multiple cropping and diversification due to more reliable and flexible water supply.	Little impact if land and water resources are already intensively exploited and cropping intensities already high; productivity may not be due to IMT but may be due to dismantling of credit and subsidy systems, input price policies, and price changes in world commodity prices.
Revenue diversification	IMT enables water user associations to diversify revenue sources and become profit-oriented, not just service-oriented. Increased revenue for WUA helps lower costs of farming, increases farm-gate prices, provides benefits to members, generates local employment, and stimulates local economy.	
Government Finance	Significant subsidies for recurrent O&M costs are phased out, including redundant staff. Collection efficiency increases; savings are reallocated toward supportive investments in the agriculture sector, or are used for support services such as credit, research and extension and farm-to-market roads, which are all vital for the success of IMT.	Future financial responsibility for rehabilitation is unclear or government commitment is not credible, such that farmers believe that government will always bail them out.
Sustainability		
O&M	IMT is most progressive when WUAs are allowed to (a) make rules and sanctions; (b) make O&M plan and budgets; (c) set water charges; (d) hire or release management staff; (e) control intake; 6) control main canal system; (f) control subsidiary canal system; (g) be responsible for future rehabilitation; (h) have canal rights of way; (i) have right to contract, raise, and disburse funds and make profit; (j) have well-specified management functions and delineation of authority; (k) have effective accountability and incentives; (l) have arrangements for viable and timely conflict resolution; and (m) have adequate resources that can be mobilized for irrigation management. In larger systems, governing boards are farmer-elected and managers are professional cadres; legal structures are able to handle increasing scales of complexity. Economic value of irrigated farming is high, as in high-value export crops IMT bundled with infrastructure is improvement, such as canal lining and use of automatic diversion weirs that substantially reduce O&M costs to farmers.	Few or none of the progressive requirements of IMT are present; high operating costs such as in lift irrigation and when economic value of crops are low, as in paddy farming
Water conservation	(a) water is scarce but water rights and water service are clear, secure, and sustainable; (b) water is priced as an economic good; (c) consumption is adequately monitored at the farm level (i.e. use of volumetric pricing) and at the basin level (i.e. use of water accounting); (d) when irrigation systems are sufficiently	(a) water rights are unclear / insecure and thus little incentive to conserve; (b) water is priced as a social good; (c) poor monitoring of consumption, and transaction costs are high and more difficult to

Poverty reduction and IMT

IMT can contribute to poverty reduction if (a) head-tail distribution improves; (b) the effects of any increases in water costs are overcome by improvements in efficiency or water availability; (c) it leads to increased production and productivity for farmers of all income levels as a result of expansion of cropping area, an increase in cropping intensities, and crop diversification; and (d) farmer organizations are able to diversify their non-farm income sources.

However, many researchers suggest a recent trend in the IMT discussion that focuses more on getting irrigation off the back of the government than improving the lot of the farmers and the poor. For instance, IMT is considered to be beneficial even if it saves the government money and improves cost-effectiveness of operation and maintenance, while improving or at least not weakening the productivity of irrigated agriculture. Some scholars suggest a re-examination of this increasingly hands-off government policy to irrigation management.[23] A key issue concerns the appropriate responsibility-sharing arrangements between farmer groups and the government. In developing countries, small-scale paddy farming, for example, is a high-risk, low-return investment—crop insurance and credit markets are thin, infrastructure is poor, imported inputs are costly and the overall cost of farming is high. Farmers view IMT as a way in which governments reduce subsidies and pass on the burden of food security fully to them, while farmers in industrialized economies continue to be heavily supported by hidden subsidies (Araral 2003).

Koppen and others (2002), comparing the differential impacts of IMT on poor and non-poor farmers, note that it has often been assumed that the interests of the poor sufficiently overlap with the general interest in the irrigation scheme, and that rich and poor farmers alike have equal access to canal water. They point out, however, that evidence from Andhra Pradesh and Gujarat, India, suggests the strong possibility of elite capture of the IMT process, particularly in large-scale canal irrigation, where land ownership and locational advantages are skewed in favor of big landlords. They note that small farmers are often unaware of the existence of the water user association, but it is they who often participate in repair and rehabilitation work, while the large farmers involve themselves in meetings and committee work and makes decisions. In Andhra Pradesh, in particular, a higher proportion of small farmers depend on canal water, but the concentration of their plots, mainly in the tail-end, poses a disadvantage regarding water accessibility. So the challenge of making IMT pro-poor still remains.

IMT and institutional development

Institutional development is a common feature of IMT projects, but is a poorly understood task. It is associated more with blueprints related to technical assistance consultancies, staff and beneficiary training, study tours, and, financial and logistical support. A particular challenge of institutional design for IMT is how to cope effectively with heterogeneity among resource users, especially with respect to their predisposition to cooperate in the absence of clear sanctions. Conflicting values and interests become most severe when groups are economically and culturally heterogeneous in their relationship to the resource; for example, head-enders and tail-enders in an irrigation system (Lam 1998, Tang 1992), and when members differ in their degree of dependence on the resource (Berkes 1992).

Shah and others (2002), studying the smallholder IMT experience in Africa, suggests that "*IMT faces problems in smallholder communities not because they are less able or less cooperative but because the management cost of a government built irrigation system—like most service institutions—increases more rapidly with the number of customers than with the volume of business.*" They explain that a 1,500-hectare system that serves 1,500 irrigators costs much more to manage—in terms of logistics or service delivery, fee collection, and maintenance—and faces more difficult collective action problems than a similar 1,500-ha system that serves five large-scale farmers. Moreover, it is a lot easier for five large-scale farmers to come together to agree to the rules of self-management than for 1,500 smallholders. They conclude that IMT works better in cases of non-poor, market-oriented, large-scale, and business-like agriculture, as in the cases of large farms in the United States, Mexico, South Africa, New Zealand, and Turkey.

Vermillion (1997) notes that "*for several years, WUAs have been promoted both as a governing and a management body for irrigation systems. Community organizers have helped WUAs to develop a constitution and by-laws, select leaders, approve plans and budgets and apply sanctions. WUAs then directly manage O&M and finances. This model is probably not well-suited for management at higher levels of larger systems or in more complex management environments. Accountability between farmers and leaders, especially in finances, is often weak and WUAs generally do not have a professional staff. As a result, many conclude that IMT is more successful only at small scales of management*." Thus, on the one hand IMT appears to work best in large-scale commercial systems; on the other, in developing countries, with a large number of small farmers there are many challenges in scaling up.

Maintenance

Maintaining irrigation systems under IMT remains a pervasive problem. The problem seems to be one of moral hazard and co-dependency—farmers need the irrigation agency for irrigation maintenance and they know the agency will bail them out because the agency depends, in part, on irrigation fee collections and because dilapidated systems are used as a justification for donor support. Panella (1999), for instance, suggests that in the Philippines, a pioneer in IMT, the key achievement of 20 years of IMT has been improved fee collection performance. This is mainly because collection efficiency has been a major criterion in the performance evaluation of irrigation managers (NIA 2003). But despite this, NIA has not become truly viable. Over half of its operating budget is covered by hidden donor subsidies. Its emphasis on viability has led to extreme cost cutting, severe under-investment in O&M, and a staff orientation favoring collection at the expense of O&M (see also Hayami and Kikuchi 2000).

In Indonesia, Johnson and Reiss (1993) report an increase in deterioration of pump-set equipment for lift irrigation after IMT. This was attributed to lack of local knowledge, skills, parts, and cash, even though farmer motivation was high. The same problem of accelerated deterioration was reported in Senegal (Wester, During, and Oorthuizen 1995). In surface irrigation, however, attempts to attribute improvements in maintenance to IMT can be problematic in cases where IMT includes physical rehabilitation or repair of irrigation infrastructure.

Various authors have suggested that the moral hazard problem can be addressed by making WUAs assume future responsibilities for rehabilitation as a precondition for current rehabilitation. Given the financial frailties of most small-scale WUAs and their very limited capacity to provide for capital expenditures, it is unlikely that this issue will be resolved easily. The experience in small-scale farming has been that farmers are even hard up for their operating expenses and are less likely to be able to save for capital expenditures. Improving the quality of irrigation infrastructure—such as lining of secondary canals and use of proportional diversion weirs—would help ensure that maintenance costs to the farmers are relatively small. IMT therefore would have to be bundled with infrastructure improvements if it is to have a positive impact on maintenance.

IMT and water productivity

One of the underlying assumptions behind IMT projects is the potential for improved water productivity as a means to poverty alleviation. Yet, cost-effective alternatives to improve water productivity—particularly the development of water-saving technologies and management practices such as varietal improvements, zero tillage, raised beds, alternate wetting and drying, aerobic rice, and systems of rice intensification—are often ignored. As experience in the Philippines has shown (Sagun 2002), significant gains in water conservation can be achieved through the use of these farming practices in conjunction with IMT.

Poor quality of IMT research

Vermillion (1997) suggests that the quality of most IMT studies is poor. The problem with poor quality research is that there is now limited understanding of what really works and what does not. While there have been many studies of IMT, they are riddled with problems of a lack of internal and external validity. For example:

- Most studies do not provide for a balanced core set of performance indicators; most are biased in support of system efficiency and government finance, and biased against poverty impact, equity, and environmental issues. In particular, little is known whether price effects, where they exist, are lower than the efficiency effects, particularly for small farmers and tail-enders.
- Most studies excessively rely on irrigation agency data and are seldom validated independently.
- Survey respondents are seldom selected through a systematic random sampling; most often, surveys rely on convenience sampling, thus weakening the validity of the results.
- Most studies are qualitative descriptions and do not employ rigorous statistical techniques.
- There are no before-and-after and with-and-without comparisons of findings.
- Assessments of financial impacts are often undertaken from the government's perspective.
- Potential alternative causes of increased crop yields are often ignored, such as increased fertilizer application rates, rainfall pattern, cultivation technology, prices, subsidies, and markets.
- Documentation of changes in productivity is often not linked to IMT.

Box 13 provides some recommendations for improving IMT-related research.

Summary and Conclusion

This paper reviews recent IMT literature to answer a number of questions. First, what are the conditions most likely to result in sustainable local resource governance organizations? Are there specific conditions under which irrigation user groups work better? What do we understand about the impacts of IMT in terms of poverty reduction, quality of O&M, financial and personnel implications for the government, and impacts on resource conservation? And finally, what are some

Box 13
Recommended Improvements in IMT Research Methods

- Most studies on IMT focus on efficiency criteria and impacts on government finance. Wherever possible, studies should include a balanced core set of performance indicators, including financial performance, quality of O&M, equity, poverty impact (particularly on agricultural productivity), and incomes and impacts on the environment.
- Most studies rely heavily on agency offices. Future studies should avoid excessive dependence on agency data. Where such data are used, corresponding measures should be sampled independently (through farmer interviews) to validate the data.
- Most studies are prone to problems of self-selection of respondents. To enable generalization, farmers should be selected through systematic random sampling, normally stratified according to location of fields relative to irrigation head-works.
- Most analytical approaches suffer from internal and external validity problems. More extensive use should be made of before-and-after interrupted time series research designs that include data for at least 3 to 5 years before and 3 to 5 years after to firmly establish the timing of impacts of transfer.
- Most IMT studies are single case studies and have limited potential for generalization. Given the difficulty of conducting detailed time series analyses in a large number of schemes, case studies should be complemented by surveys of 20 to 30 randomly selected schemes where a smaller amount of data is collected on core performance measures.
- Most IMT studies measure only financial impacts to the government. Costs to the government and farmers should be measured, as well as changes in total cost of irrigation.
- Where transfer programs include improvements in irrigation infrastructure, research should include with-and-without comparisons, with controls for effects of physical improvements and management reform.
- Given the importance of documenting the physical sustainability of irrigation systems after IMT, impact studies should include direct observations of physical conditions and functionality of irrigation infrastructure.
- Assessments of agricultural impacts (such as changes in crop yields) or economic productivity changes should control for changes in fertilizer application rates, rainfall patterns, technology or cultivation practices, prices, market conditions, and subsidies. Statistical methods should be used to assess the relative importance of different causal factors.
- Assessments of economic productivity should compare changes in cost of irrigation to farmers with changes in the value of agricultural output.
- Changes in agricultural or economic productivity should be more clearly linked to transfer by documenting the nature and timing of effects of IMT on changes in policies and procedures for O&M and financing, and then relating O&M performance outcomes to agricultural productivity.

specific issues that are neglected as a result of IMT?

As is often the case, there are no clear-cut answers regarding decentralized management of irrigation and its impacts. However, the current review suggests that IMT can contribute to poverty reduction if (a) head-tail distribution improves; (b) the effect of any increases in water costs are overcome by improvements in efficiency of water availability; (c) productivity increases as a result of expansion of cropping area, an increase in cropping intensities, and crop diversification; and (d) revenue sources for farmers organizations are diversified. Whether these conditions are met in most cases is unknown because of the poor quality of IMT research. IMT does appear to decrease the financial burden on governments through reduced subsidies and improved collection efficiency.

Serious questions about the sustainability of irrigated agriculture remain. IMT clearly contributes to improving operations, but maintenance remains a significant problem. The current trend is that of decreasing investment in maintenance. IMT can also contribute to water resource conservation when certain conditions are met, such as secure water rights, volumetric pricing of water, farm- and basin-level monitoring and accounting, and availability of water conservation technologies. Conservation is aided when IMT results in considerably increased flexibility over water use.

The emergence and sustainability of self-organized irrigation institutions depends on the relative size of the expected benefits and costs as perceived by the farmers. The marginal benefits of self-management in terms of cost efficiency, responsiveness, service reliability, and productivity need to outweigh marginal costs associated with cooperation for successful irrigation institutions to prevail. There are many challenges that remain in designing effective irrigation institutions. Perhaps the most important of these is ensuring that management transfer considers the issue of heterogeneity among farmers and ensures that poorer farmers are aided and not hurt by decentralization. The second major challenge is addressing the moral hazard problem related to maintenance. Better empirical research to understand impacts and design issues will go a long way in meeting these challenges.

4 Assessing Decentralized Forest Management

Suranjan Weeraratne[24]

Introduction

Decentralization of forest management is a crucial component of community-based natural resource management. The process of decentralization and devolution of rights and responsibilities over forestry has moved along with considerable impetus, especially in the last decade. It has graduated from being a somewhat experimental strategy to being integrated into more conventional national forestry efforts (Arnold 2001). This acceptance of decentralized forestry reflects its appeal to two important stakeholder groups: those who believe that it can contribute to rural livelihoods, and those who view it as a durable mechanism for managing vulnerable forests.

Decentralized forest management typically includes two analytically distinct compartments: decentralization at the local government level and devolution of authority to the community level. However, a great deal of diversity exists at each level, and, there is considerable overlap between these two forms of decentralization. As Schafer and Bell (2002) note, a wide variety of institutional arrangements have been put in place and a large number of projects initiated around the world, primarily designed at placing more authority and control in local hands.

Given this context, it is appropriate to take stock and evaluate the progress made in the greater involvement of communities in the management of forests. A brief perusal of the literature reveals a tremendous variation in the different forms, degrees, and approaches of decentralized management. This paper, which is based on a review of case studies, presents a critical appraisal of decentralized forestry with a view to identifying emerging patterns, trends, and issues that would be of importance to scholars, practitioners, and policymakers alike. The paper primarily draws on peer-reviewed journal articles from established development and forestry journals in the last three to four years. Several working papers have also been reviewed.

The chapter is organized in the following manner. The first section presents a brief global overview of community forestry. The next section provides a detailed discussion on some commonalities and differences among different decentralized regimes. Conditions that seem to contribute to successful decentralization in forest management—and how these conditions relate to those prescribed by proponents of common property resource management—are also addressed.[25] The relative scarcity of empirical evidence precludes a thorough assessment of the poverty and natural resource impacts of community forestry. However, this is addressed in the next section, based on available information. A final section focuses on emerging challenges, bottlenecks, and policy issues.

Community Forestry Worldwide

Decentralized management strategies in forestry are particularly prominent in South Asia, Africa (mainly Sub-Saharan), parts of East Asia, and Central and Latin America. As mentioned at the outset, there is a vast array of institutional mechanisms by which decentralization takes place. A brief global synopsis follows.

Data on trends in forest-cover change and ownership are limited, and reliable data are even more difficult to obtain. Based primarily on information from 24 of the top 30 forested countries in the world, White and Martin (2002) estimate that (globally) some 4 percent of forests are reserved for communities, while 7 percent are owned by communities. The community-access numbers improve when forests in only developing countries are considered. Some 22 percent of the forests in developing countries are either under community ownership or are under some form of community management (White and Martin 2002). Thus, a significant amount of forest land in poor countries is actually under the control of community groups.

In South Asia, India and Nepal in particular are acknowledged to have advanced forms of community management. The National Forest Policy of 1988 in India marked a radical shift in government policy and resulted in the initiation of the Joint Forest Management (JFM) program, which made it possible for the forestry department to involve people in the management of certain forests.[26] By 2001, 22 states had adopted JFM and some 45,000 groups were protecting 11.63 million hectares (mha), or nearly 17 percent of government forests (Agarwal 2001; GOI 2001, in Kumar 2002; White and Martin 2002).[27] Under the terms of JFM, Village Forest Institutions (VFI) are given conditional access to specified forest products in accordance with the guidelines laid by state forest departments. In addition, community forest management is also undertaken by self-initiated groups.[28]

Nepal also has a long history of community forestry. Its decentralization effort received a further boost with the implementation of the 1993 Forest Policy, which led to the development of Forestry User Groups (FUG). By 2001, over 9,100 FUGs were protecting 0.66 mha out of a total 5.8 mha of forested land area (Bahuguna 2000, in Agarwal 2001). In Nepal, the FUGs are largely state-initiated, with communities participating at different levels. However, as in India, there is ample evidence of self-initiated community groups engaged in the protection of forests outside of the FUGs.

In Africa, more than 20 countries have implemented new forest laws since 1990 (Wily 2002a). Increasing prominence is given to community forestry in these laws. It is estimated that in 2002, there were at least 4,500 rural communities in Africa involved in some form of forest management (Wily 2002a).[29] Africa provides a diverse mosaic of decentralization patterns. These range from devolution to the lower tiers of government, as in Zimbabwe (Shackleton and Campbell 2001), to significant community empowerment (characterized by close to fully decentralized decision-making processes), as in some villages in Tanzania and Gambia (Wily 2002a). Uganda, Madagascar, Burkina Faso, Malawi, and the Niger among others provide cases where lower-level Village Management Committees are formed to lead community management. Such committees have differing levels of authority and state involvement. Management

agreements with the government were signed in the Niger, MOUs in Uganda, and contracts in Madagascar to implement the process of community forestry (Bojang 1999).

Western Ghana provides an interesting example of community forestry linked to the private sector.[30] Ghana Primewood Products Ltd. and Dalhoff Larsen & Hornemann implemented an innovative program in the Gwira-Banso region, where they developed a joint harvesting and replanting venture with local communities. Community involvement in commercial plantations has also gained ground in Malawi and Tanzania (Wily 2002a).

Wily (2002a) organizes the different forms of co-management found in Africa into four categories: (1) collaborative, in which communities are consulted with minor roles and powers; (2) contractual, in which community roles are more substantial, but still inequitable in terms of wood licensing and enforcement; (3) consigned, in which communities have all operational powers, including licensing and enforcement; and (4) community based, in which jurisdiction is fully devolved to communities and sometimes includes ownership. Box 14 extends Wily's framework to include a "consultative management" category.

Box 14

Different Categories of Community Forestry Worldwide (Based on Wily's Typology)

Consultative CFM: Community is consulted but has only minor roles and powers.

- The Government Forest Development Agency of Ivory Coast has established 69 Farmer-Forest Commissions as routes for local consultation (Wily 2002b).
- A Community Forestry Management Unit established in 1992 in Ghana promotes CF Committees as a contact point for consultation in forest reserve planning (Wily 2002b).
- Gokwe communal area in Zimbabwe.
- Decentralized forest regimes in parts of Latin America.

Collaborative CFM: Community is consulted to a higher degree and also possesses some management rights. But community involvement is largely restricted to user benefits; mainly involves joint forest management and multi-stakeholder management.

- Joint Forest Management in India.
- In Zimbabwe, communities assist the Forestry Commission to manage Mafungabusi Forest Reserve and the Pumula Forest Block. They protect mainly peripheral parts of the forests in return for agreed access to resources, mainly for fuel-wood and grazing.
- Zambia provides examples of multi-stakeholder co-management of local forests.
- Community forestry program initiated in the Philippines.
- Some forest regimes in Honduras, Guatemala, and Bolivia.

Community Based CFM: Jurisdiction is fully devolved and sometimes includes ownership.

- Most visible in Tanzania and the Gambia. In Tanzania nearly 600 Village Forest Reserves have been declared out of unreserved village lands, ranging from 5 to 10,000 ha, each actively managed and owned by the community (Wily 2001). Prominent examples include the Duru Haitemba forest in the Arusha region and Mgori forest in Singida region.
- In some cases, ownership is recognized but key management powers are retained by the state, as with certain forests in Nigeria and South Africa. This is also often the case with regard to Community Forestry Enterprises in Mexico.

Source: Modified from L. Wily 2002a.

This is a somewhat simplified framework and merely attempts to provide several broad classes to fit the many worldwide examples of community forestry.

In Southeast and East Asia, the Philippines stands out in particular in terms of community-based forestry, while reforms are taking place (albeit slowly) in Indonesia. The vast forest land of Indonesia is mainly under state control, with less than 1 percent of forests being community controlled (White and Martin 2002). However, there are many traditional "unofficial" community management systems overlapping with state regimes in Kalimantan and several other regions of the country. Recent legislative reforms in the country have opened new possibilities for co-management and are tantamount to a tacit recognition of such overlapping (McCarthy 2000). Decentralization is more advanced in the Philippines, though the Department of Environment and Natural Resources (DENR) has control and jurisdiction over the community forestry program (Gauld 2000).

Mexico is well-noted for its decentralized forestry and leads the way in Central and Latin America. The level of devolution in Mexican forests is almost unmatched anywhere else. According to some estimates, up to 80 percent of forests are in the hands of local communities with varying degrees of actual control (Bray and others 2002). Mexico is a unique contrast to the situation in most developing countries, where community forest management means the management of non-timber forest products (NTFP) or community woodlots for subsistence use. In Mexico, a significant number of communities—organized as Community Forest Enterprises (CFE)—are engaged in the management of common property forests for the commercial production of timber. Current estimates for the number of CFEs range from 290 to 479 at various levels of consolidation and sustainability; most have been operating since the early 1980s (Alatorne 2000, in Bray and others 2002). The 1986 Forestry Law formally recognized the rights of communities to form their own logging business (Klooster 2000a). Mexico's progress in this respect is unrivalled and unprecedented, though commercial timber production based on the Mexican model (albeit on a smaller scale) is emerging in several other Latin American countries, notably Peru, Guatemala, and Bolivia (Bray and others 2002).

Aside from Mexico, Bolivia, Honduras, and Guatemala have advanced decentralized mechanisms in forestry and passed new forest laws in 1990s. In these countries, authority is delegated to local municipalities. As per the 1996 Guatemalan and Bolivian Forestry Laws, the central governments of the respective countries devolved significant authority and financial incentives to municipalities to administer public forests within their domains(Gibson and Lehoucq 2003; Andersson 2003).

Community Management: Trends, Commonalities, and Differences

A review of forestry case studies reveals a fascinating diversity. This diversity is evident in the choice of institutional mechanisms, benefit-sharing schemes, legal authority, and many other aspects. The situational and contextual particularities of most case studies make generalizations difficult. However, some convergent themes and commonalities (with varying degrees of differences) can be singled out. These themes are discussed in depth below.

Three major institutional mechanisms

The survey of the literature reveals that for the most part there are three primary institutional mechanisms with regard to community forestry. These include devolution to local-level government, creation of new village-level institutions, and allocation of new powers to an existing traditional-leadership-based structure. It is hard to establish geographic trends and patterns; all three mechanisms seem to be present in many different parts of the globe.

Devolution of authority to lower levels of government is evident in parts of Latin America, especially Guatemala and Bolivia. Forest laws passed in the mid-1990s delegated authority to municipal councils in these two countries. It is evident from the Bolivian example that decentralization to local government increased local power and the ability to tax. The 1996 Forestry Law in Bolivia gave municipal governments 25 percent control over centrally collected royalties from community logging concessions (Andersson 2003). In Lesotho, local government in the form of District Development Councils—subsequently named Rural Councils after the Local Government Act of 1997— have been widely involved in issuing grazing permits, setting aside *maboella* or closed areas, and issuing fines for violations. They serve as a link between the central government and local communities (Shackleton and Campbell 2001). Similar examples are seen in other parts of Africa, notably in Malawi, with respect to the District Development Committees. As Shackleton and Campbell (2001) stress, decentralization to lower governmental levels often results in little community involvement in planning or decision-making, and a large percentage of the revenue is retained at the various regional/district/municipal levels.

In many countries, community-based forest management is characterized by the creation of new village-level institutions. Village Forest Institutions in India, Forest User Groups in Nepal, and Community Forest Enterprises in Mexico are among the more prominent examples. It is rather difficult to make an assessment of the overall effectiveness of new community-level organizations. Some, like the Farmer Forest Commissions in Ivory Coast, have resulted in limited managerial power and authority for the community, while others such as the CFEs in Mexico have yielded considerably more autonomy to local people.

Another problem in assessing the impact of new community-based institutions is that they co-exist with traditional collective action institutions, sometimes building on existing traditions and sometimes changing these to favor new rules. The Van Panchayats in Uttar Pradesh (UP) and the Kangra Forest Co-operatives in Himachal Pradesh are two such examples, sometimes dating back to the early part of the 20th century. Sometimes JFM is imposed on existing self-initiated groups and they are compelled to change their structures and functioning to conform to JFM rules.[31]

In many cases, especially in Africa, traditional leaders have established themselves as important stakeholders in community forestry and play crucial roles in their implementation. Quite frequently, there is evidence of parallel or dual local authority systems consisting of traditional leaders on the one hand and government-established structures on the other. The case studies on forestry cover a broad spectrum of involvement of chiefs and other traditional leaders, from situations where traditional authority structures have been completely removed (parts of Botswana) to cases where these institutions exert considerable

control, as in Malawi (Shackleton and Campbell 2001).

The Chimaliro Hills in Malawi present an example of the often dominant role played by traditional leadership. Malawi has always had a long history of traditional structures and the effectiveness of the village forest committees depended a lot on the influence of the traditional leaders. The influence they carry means that the recognition of traditional authorities has become essential in most projects and interventions in rural areas. This was clearly in evidence in the case of the state-initiated Moribane Forestry Reserve in Mozambique, where the local chief imposed several conditions on the Center for Forestry Research and made use of every opportunity to assert his primacy in the area (Schafer and Bell 2002). Another African example of traditional hierarchies exerting strong power structures is the Suledo Village Forest in Tanzania (Sjöholm and Luono 2002).

In Southeast Asia, case studies from Indonesia and the Philippines demonstrate the existence of traditional forms of community management that sometimes overlap with existing state regimes. This was evident in a survey done in West Kalimantan to assess people's participation in forest management, which unequivocally revealed the importance attached by stakeholders to traditional forms of management (Colfer and Wadley 1996).

The choice of the institutional mechanism is a very important issue for community forestry. The optimal mechanism will depend on local politics; availability of resources, including local leadership; whether a new institution needs to be created or not; and on whether there is any prior experience with community forestry in the area. A possible ideal solution is full devolution to a local community organization with ongoing support from a local government or government-supported agency.

Diverse benefit-sharing strategies

Classical forms of benefit-sharing strategies in community forestry include buffer zone developments and employment opportunities. Buffer zones have the longest history and are designed to reduce local dependence upon the forest by providing alternate livelihood opportunities and substitutes to forest resources. On-farm tree planting programs usually are included along with credit opportunities, and these often go hand-in-hand with environmental education programs (Wily 2002b).

There is little uniformity to be found in a plethora of benefit/revenue-sharing schemes (sometimes even within countries). In India, most JFM state orders ensure participating villagers a 25- to 50-percent share of the net income from timber on "final felling" of mature trees. This usually entails a minimum of 5 to 10 years of protection of the forests before the benefits are reaped. For example, in the state of West Bengal, by 1998 poles worth Rs. 40 million had been harvested and 25 percent of the net proceeds shared with the members of the concerned forest protection committees (Khare and others 2000). Recent amendments to the orders of two states, Andhra Pradesh (AP) and Tamil Nadu, now entitle the partner village institutions to 100 percent of the final produce. However, in AP's case, at least 50 percent of the income has to be reinvested in the JFM forest (Khare and others 2000). The benefits from timber are distributed both in cash and kind.

Malawi in East Africa presents more evidence of different village forest communities having

different benefit-sharing mechanisms. In the Chimaliro Hills, for example, 70 percent of the benefits go to the state, while the remaining 30 percent goes to the community. In Mangweru, by contrast, the village council has full control over revenue and none is claimed by the state. Evidence from case studies showed that many communities were plagued by inefficient and inequitable benefit distribution mechanisms. The San Martin Ocotlan community in Mexico is one such notable case (Klooster 2000b).

In addition to timber, fuel-wood, fodder, and non-timber forest products (NTFP) are the other main benefits from forests. In India, especially in areas where JFM facilitates the rapid regeneration of coppicing species like teak through community protection, it is believed that increased availability of fuel-wood maybe an early benefit prior to final harvesting. Availability of fodder grass is another early benefit, and is often the main incentive for participation in forest regeneration efforts in arid areas where livestock plays a crucial role in the economy.

There is a common perception that villagers have free access to non-timber forest products from JFM areas, which will provide them a regular flow of benefits in lieu of the opportunity costs they have to incur for protection. However, the more valuable NTFPs like cashew nuts, bamboo, and fibrous grasses have in the past been either excluded from free access altogether or included under income-sharing agreements. The same also applies to certain NTFPs that are nationalized (Khare and others 2000). Recent policy reforms in India have led to changes in NTFP revenue collection, and communities are likely to be benefiting much more than previously (Khare and others 2000).

Many of the benefits from community forestry are derived mainly at the community level. Often funds derived are invested in community development activities. In Nepal, income from the sale of timber, NTFPs, and other products is directly deposited in community funds and used for community development activities such as the construction of school buildings and irrigation channels (Adhikari 2003). However, there are also several cases of benefits allocated at a household level, yet in-depth information on these cases remains elusive. The logging community of San Antonio in Mexico invested a part of its funds on new public buildings for the village and also distributed 2,500 Pesos in profits to each community member in 1994 (Klooster 2000b).

From benefit sharing to power sharing

There are two main approaches to community involvement in forest management (see Box 15). The first and still more prevalent strategy recognizes local communities as forest users and seeks to secure their cooperation by granting legal access to certain products or a share in forest-derived benefits. The second approach mainly looks to forest communities as potential managers or co-managers, and devises arrangements to give them varying degrees of managerial control and authority. Proponents of decentralization argue that the second approach would encourage communities to govern more effectively and eventually lead to greater community empowerment.

The user-centered paradigm predominates in the Asian context. For example, management power mainly rests with the state in Indonesia. There is resistance to devolution of power from the forest bureaucracy and substantial influence from corporate interests wishing to retain

Box 15
Authority and Rights: A Synopsis

User-centric rights

- **Right to access**. In Zimbabwe, communities assist the Forestry Commission to manage Mafungabusi Forest Reserve and the Pumula Forest Block. To the extent that they protect peripheral parts of the forests, they can access the same mainly for fuel-wood and grazing. This right seems to pertain more to protected forests.
- **Right to share benefits with the State**. Benefit-sharing is with respect to timber and non-timber products. However, benefits are often restricted to specified products and contingent on conditionalities, as in the case of JFM in India, Mozambique (Tchuma Tchato), and Kenya (Arabuko Forest Reserve).
- **Right to lease land.** Used in the community forestry program in the Philippines, this is a mechanism to transfer user rights for a period of time. Under the community forest management agreement, land is leased out for 25 years and is renewable for another 25 (Gauld 2000).
- **Right to monitor use**. Many community programs have some form of a monitoring system. These range from community patrols to employing guards (India, Nepal, many African countries).

Power-centric rights (includes user-centric)

- **Right of enforcement on violators**. Often these rights are also retained by the state. However, exceptions do exist, as demonstrated by some cases in Mexico and with regard to national forests in Tanzania and the Gambia.
- **Right to form community logging business**. This is predominantly seen with the Community Forestry Enterprises in Mexico, with emerging trends elsewhere in the region, including Peru, Bolivia, and Brazil.
- **Right to legal recognition and tenure security.** In Nepal, forest user groups are legally recognized. In Africa, most countries have pushed forward land reforms; legal recognition is best exemplified by Tanzania.
- **Right to Ownership.** Tanzania and the Gambia are the standout examples. In some cases, ownership is recognized but key management powers are still with the state (Mexico, South Africa).
- **Right to sell forests and convert to non-forestry uses**. In 1992, an amendment to article 27 of the Mexican constitution enabled Ejido farmers to sell forests or seek joint ventures with private investors.[32] However, in many other cases, these rights are retained by the state.

control of forests and lands (McCarthy 2000). In India, substantial control over JFM resides with the forest department. Under JFM, the local communities are given conditional access to specified forest products. In most states, the Village Forest Institutions (VFI) are registered with the forest department, with the latter reserving the right to dissolve VFIs or unilaterally cancel the JFM agreement in case the VFI is thought to have violated any of its terms (Khare and others 2000). The exceptions to this are the states of Gujarat and Haryana, where the VFIs have an autonomous status. In Gujarat, for example, these institutions have an independent existence as cooperatives registered under the Co-operative Society Act (Sundar 2000).

In Nepal, the FUGs have varying degrees of management authority and seem to embrace elements of both the power-centric and user-centric paradigms. But, the right to sell forests and the right to convert them to non-forestry uses resides with the state, i.e. some crucial elements of negotiating power remains with the state (Chakraborty 2001). The last few years have seen several policy changes passed (or attempted) by the central government in Nepal that are unfavorable to community management (Shreshtha 2001; Britt 2001). In 1997, senior forest officials started a process to curtail the mandate of community forestry. These included raising taxes on community forest revenue, and restricting the maximum forest area per household to 1 ha in the hills and .25 ha in the Terai. This was followed by two amendments to the Forest Act Bill in 1998 and 2002 that sought to reduce user rights (Baginski and Blaikie 2003).

The user-centric approach is less entrenched in Mexico and in parts of Africa. In Mexico, it seems in many cases the ownership of forests rests with the communities. They also influence and implement logging plans. However, the government is in charge of the overall management framework (Klooster 2000b).

Wily observes that in Africa, more successful initiatives in community forest management have moved away from a user-centric approach to a more power-centric approach. The power-sharing mechanism seems most advanced in Tanzania and the Gambia. They have led the way in providing programs and supporting legal processes that directly encourage communities to bring currently unreserved forest areas under their own jurisdiction as community forests and to apply to manage nationally owned forests (Wily 2002a; Bojang 1999). After a series of user-centered projects in Mozambique, new initiatives have been launched to help local communities establish management regimes that are community-driven and sustained, and where possible to root these in recognition of local tenure (Anstey 2000, in Wily 2001). In Uganda, the content of joint forest management agreements has moved sharply since 1998 from division of usufruct rights and responsibilities into arrangements that designate local communities as managers. In Namibia, the demarcation of four new state forest reserves gave way in 1998 to their re-designation as future community forests to be owned and managed at the local level (Wily 2001). However, Wily (2002a) cautions that at present less than half of the community forests in the continent enable the community to be recognized as owner-manager and to manage the forest in largely autonomous ways. The remainder either limits local tenure or circumscribes local jurisdictions in some critical way. Often the state retains most or all control of licensing and enforcement, meaning that bringing offenders to book remains essentially with foresters.

Issues of legal recognition and land tenure security are closely allied with authority and control. The community forestry program in the Terai region in Nepal owes much of its success to the fact that local forest legislation has created a legal basis for the forest-user groups there. Tanzania and the Gambia are primarily focused on transferring legal ownership of unreserved forest lands to local communities and provide ample testimony of the benefits of legal recognition. In many ways, the Tanzanian case is unique. The Village Forest Councils in that country are considered autonomous legal entities able to sue and to be sued. The rules agreed upon by the village committees are

passed as village by-laws (Wily and Dewees 2001). Land reforms have also taken place in many other African countries—including Uganda, Mozambique, Swaziland, and South Africa in the last decade—with an emphasis on improving land tenure of the local communities. These new provisions have resulted in decreased powers of governments in forest reserves, upgrading of customary land tenure rights, and limited the powers of states to appropriate more customary lands (Wily 2002a).

While tenure security is very important for successful CPR institutions, there are several examples worldwide that show that it is not always a sufficient or even necessary condition for success. The complexity of forestry challenges—even with land tenure security—is demonstrated in the case of the Yanesha Forestry Cooperative (COFYAL) in the Palcazu Valley in Peru. The Yanesha had legal recognition and had received titles to their land under the 1974 Law of Native Communities in Peru (Morrow and Hull 1996). Yet, in spite of the legal recognition, the Yanesha did not feel secure about their land as they were subject to encroachment from constant migration.[33] Under these circumstances, the Yanesha expressed a primary interest in the short-term profitability (immediate cash returns from the resource) of the forest. Morrow and Hull conclude that this emphasis on short-term profits may have been motivated by feelings of insecurity about their ability to protect their lands from outside encroachment and the lack of adequate incentives for long-term protection of the forests.

At the same time, there is evidence from the Philippines and parts of South Asia and Africa where indigenous groups have had their own natural resource management systems on state land. In other words, there are also examples where the lack of tenurial security did not coincide with a lack of interest in environment management. The villagers, even in the absence of any kind of formal recognition, still undertook to protect the forests as they realized that as primary stakeholders hugely dependent on forests, it was in their best interests to engage in conservation.

From degraded to conservation forests

A distinguishing pattern of early community forestry was the restriction of local roles to areas of lesser biodiversity or tourist interest, limited commercial importance, and also to forests classified as "degraded." However, as Wily observes from her study of Africa, most governments seem to show an increasing proclivity to place well-stocked forests and protected areas under community control (Willy 2002a). This is particularly evident in Sub-Saharan Africa, though progress has also been made in several other parts of the world.

Uganda, South Africa, and Ethiopia have begun community forestry in official forest reserves, including those of the highest conservation priority. In Tanzania, community forestry currently operates in both protection and production reserves and unreserved forest areas, and covers all forest types from moist montane, dry woodland, and coastal mangroves to commercial plantations. The country is believed to possess the most expansive community forestry program in Africa (Wily and others 2000). In fact, Wily notes that in Tanzania "*in principle no forest is considered too large or too small, too valuable or too degraded to come under community based management*." However, it has to be noted that though most African states decreasingly draw lines as to

where communities can be involved, restrictions still exist in some countries.[34]

A singular feature of the initial JFM program in India was its restriction to degraded forests. Approximately 40 percent of the country's total forest area is considered to be degraded (having a crown cover of less than 40 percent and assessed by satellite imagery),[35] and thus effectively 60 percent of the total forest area in the country was precluded from JFM in accordance with the original guidelines. However, a Government of India resolution in 2000 recommended that JFM be extended to well-stocked forest areas (Kumar 2002). Nepal follows a similar pattern, with community forestry mainly restricted to degraded forests, though there have been several instances of well-stocked forests handed over to Forest User Groups (Agarwal 2001).

Enabling Environment

There is a copious amount of literature that addresses conditions needed for successful management of common property resources (Wade 1988; Ostrom 1990; Bromley 1992; Keohane and Ostrom 1995).[36] However, a survey of the literature on forest management reveals that in many cases, the communities on the ground rarely display these qualities. Communities are highly differentiated with multiple interests and actors, each of whom can influence decision-making in different ways. On the basis of the evidence gathered, a few more apparent conditions for the success of decentralized forestry are discussed below.

Changes in the policy and legal framework

It is apparent from the case studies that an enabling policy and legal framework is imperative for more effective decentralized forest management. Progress has been made, especially in Africa, in promulgating new forest laws in more than 30 countries since 1990 (Wily 2002b). Common changes in policy in these new laws include "*changes in the character of central forestry administrations, with wider civil society input in decision-making, sometimes relocation of forestry departments into semi-autonomous institutions, and variant degrees of decentralization to local governments and policy commitment and new legal opportunity for forest-local populations to participate in forest management*" (Wily 2002a). Tanzania and the Gambia have led the way in supporting legal processes that allow communities to bring currently unreserved forest areas under their own jurisdiction and to manage nationally owned forests (Wily 2002b; Bojang 1999).

Changes in legal and policy frameworks have had an impact on other parts of the world too. For instance, the 1986 Forestry Law in Mexico officially recognized community rights to logging and led to the establishment of the Community Forestry Enterprises (CFE). The Forest Policy of 1988 in India was distinct from preceding policies in prioritizing conservation and local subsistence needs over revenue generation for the state. And, as noted earlier, changes in forest legislation created a more secure legal basis for the Forest User Groups (FUG) in the Terai in Nepal.

Land tenure reforms are also important in creating space for community forestry. Again, Africa has made considerable progress in this respect. Reforms in many countries have led to more rigorous constraints on the use of the routine right by governments to appropriate land for public purposes, including the creation of Government Forest Reserves (Wily 2002b).[37]

However, as noted earlier, the existence of tenure is not always a good indicator of success. In general, policy change and policy implementation tend to be an incremental process, with some reversals (for example, in Nepal).

Effective community demand

To reap maximum benefit, community forest management has to be driven primarily by community preferences. Communities have to be convinced of the utility of involved participation. This often implies that the benefits to be derived from devolution of powers have to be in excess of the estimated costs. Examples of high returns to community forestry abound, and this possibly explains the rapid spread of this mechanism in the 1990s (see section on Impacts). However, collective action is not a given, and transaction costs can be a significant burden. The failure of the Yanesha Forestry Cooperative in Peru was due to increasingly high transaction costs and the failure of the cooperative to yield expected benefits (Morrow and Hull 1996). Hence, a high benefit/cost ratio would facilitate greater commitment and involvement from the communities.

Strong monitoring and enforcement mechanisms

Effective mechanisms in monitoring and enforcement are vital for efficient community forest management. Patrolling is a widely used mechanism of monitoring. For example, in Behroonguda in India, patrolling duty is mandatory for everyone in the village; failure to comply results in a penalty of Rs. 100. A person who does not show up for patrolling duty three times is removed from membership of the VSS (D'Silva and Nagnath 1999). This kind of effective night patrolling by villagers in Behroonguda accounted for the seizure of illegal timber worth Rs. 234,311, and imposition of penalties amounting to Rs. 63,343 by 1998 (D'Silva and Nagnath 1999). Monitoring of participation is also an effective way of building confidence among the community. This was evident in the San Antonio community in Mexico, where regular, well-attended community assemblies were a common feature. The community's 71 adult men share an obligation to participate; those who do not attend are fined with a day's communal work (Klooster 2000b).

Effective reporting is also a crucial ingredient in monitoring. This was present in the Suledo case, where the patrollers made sure information reached the right people. Accounting and reporting practices that provided members with healthy flows of information were also evident in the San Antonio and UZACHI communities in Mexico (Klooster 2000b).

There is considerable variation in terms of enforcement strategies used. These include mostly fines and in some cases jail sentences (as was seen in Isagala village in Tanzania). Graduated sanctions (as enforced in the Terai region in Nepal and parts of Africa, India, and Mexico), where the frequency and severity of the offense is taken into account, seem to be quite effective (see Box 16). Enforcement mechanisms are found under both community- and local-level jurisdiction. In Bolivia and Guatemala, such mechanisms are devolved to the local municipalities. Sometimes the absence of adequate legal provisions for the community can be problematic for meting out suitable punishment for transgressors, as referring offenders to the relevant authorities can often cause delays and bureaucratic wrangling.

However, there are also instances where enforcement mechanisms were primarily devolved to the community level. This is especially evident in Tanzania, both in respect to the management of community-owned Village Forest Reserves and national forests. In the Tigray woodlots in Ethiopia, violators are punished by community-controlled local courts (Gebremedhin and others 2002).

It is crucial that monitoring and enforcement is effectively implemented. The adverse effects of inadequate implementation are illustrated in the case of Bolivia. There, the central government disbursed funds to municipalities for the provision of forestry services.[38] However, there was also no provision for the withdrawal of central government funds in the event of non-compliance by municipal authorities.

Consequently, the mayors in those municipalities where government monitoring and supervision was not stringent did not have sufficient incentives for implementation. Andersson notes: "*If benefits can be obtained by an actor without a contribution, a temptation always exists to free ride on the efforts of others. The actor is not always motivated to contribute to the collective good. If municipal government officials notice that one of their principals, the Superintendencia Forestal, keeps sending them checks without monitoring the quality of the municipal forestry services, municipal officials have an incentive to shirk or even produce no effort at all.*"

Complementary role of external organizations

In spite of the presence of a fairly large number of self-initiated groups, community forestry for

Box 16
Features of Effective Monitoring and Enforcement

Communal Participation and Patrolling—a carrot-and-stick approach to ensure participation.

- Patrolling in Suledo village forest in Tanzania (Sjoholm and Luono 2002) is mostly undertaken by young men. Though salaries are not paid, they are exempted from other village development initiatives and sometimes received a percentage of the fines collected.
- In the Terai region in Nepal, some user groups employed *chowkidars* (watchmen) with salaries ranging from Rs. 200–1,200 per month. In general, community forestry members paid these salaries. In some cases the forest department paid salaries (Chakraborty 2001).
- Assemblies in the forests of Ixtlan, Mexico, vigorously debate decisions that affect every aspect of community forestry. Those who do not participate regularly receive fines, which are deducted from their share of the forestry profits (Klooster 2000b).

Fines and sanctions—effective when the frequency and severity of offenses are taken into account.

- In the Mahila Upakar user group in the Banke district of Nepal, grazing fines for goats were Rs. 5 for the first time; Rs.10 for the second; and Rs. 15 for the third time (Chakraborty 2001).These fines were substantial, considering that the average agricultural daily wage levels in the Banke district were Rs.20-30 for women and Rs.50-60 for men.
- In the village of Isagala in the Shinyanga region of Tanzania, a traditional law known as Mchenya is applied by punishing everyone who does not abide by the management plan for the village forest. The fine starts with one bull, which is valued at (in 2002) between $50 and $100, but the fine increases to more bulls depending on the kind of infringement and the frequency of infringement (Mlenge 2002).
- In the Lohgarh Hill Resource Management Society (HRMS) in Haryana, India, strict rules were designed to ensure that *bhabbar* was not cut with fodder grass by the villagers. Household fines were imposed for first-time offenders; these were upgraded to a withdrawal of harvesting rights of grass for those who transgressed a minimum of three times (Hobley and Shah 1996).

the most part is not initiated by the community itself. In Africa and in South Asia, the initial impetus for community forest management has most recently come from the government, though this may well be in response to community and NGO action. NGOs, donors, and other social and community groups play a vital role in facilitation, mediation, and advisory capacities.

Donors have played a critical role in facilitating community forestry and building the capacity of local organizations. For example, donor support has been instrumental to the expansion of community forestry in India. The World Bank has supported JFM programs in the states of Madhya Pradesh, Andhra Pradesh, Uttar Pradesh, Kerala, West Bengal, and Maharashtra. The Department for International Development supports JFM programs in Himachal Pradesh and Karnataka, and the Overseas Economic Cooperation Fund of Japan supports a large-scale JFM endeavor in Rajasthan (Khare and others 2000). Donors have also put pressure on the Government of Nepal to reverse some recent policies thought to be unfavorable to community forestry.

Donor projects often contain conditionalities on which the aid is contingent. This was evident in the Philippines, where the United States Agency for International Development (USAID) and the Asian Development Bank imposed stipulations upon the government. The release of donor funds for community forestry was contingent upon the government introducing policy reforms promoting market efficiencies and competitiveness (Gauld 2000). This resulted in a forestry program that emphasized technical production rather than one that highlighted community empowerment and equitable distribution of forest resources (Gauld 2000). Thus, outsider-driven initiatives can be fraught with problems, stemming from multiple stakeholder agendas. Failure to take into account contextual, institutional, and technological issues can hinder successful implementation. This was starkly illustrated in the case of the USAID- and WWF-funded Yanesha Forestry Cooperative in Peru, where the imposition of complex rules and the lack of attention paid to the social customs of the Yanesha stymied the smooth functioning of the operation and eventually led to its termination (Morrow and Hull 1996).

Nongovernmental organizations are another important actor in decentralized forest management. In the Gokwe communal area in Zimbabwe, state-controlled Resource Management Committees were viewed with suspicion by some local communities and even considered spies of the state. In this climate of distrust and suspicion, NGOs helped to dissipate tension and facilitated talks between communities and the state (Shackleton and Campbell 2001). In Chimaliro Hills in Malawi, the Wildlife Society of Malawi was instrumental in mediating access to forests, and provided training, marketing, and back-up support to make beekeeping in forests a success (Kayambazinthu 2000). Similarly, in Mexico (notably San Antonio), NGOs assisted communities in improving accounting, reporting, and auditing practices (Klooster 2000b). In India, there are examples of community forestry being initiated by NGO activity. In other parts of the world, such as Bolivia and Guatemala, NGOs have exerted pressure on the local municipalities to invest more resources into the provision of community forestry services. Thus, NGOs provide crucial assistance in three areas: (1) mediating between the state and distrustful communities; (2) initiating community forestry programs and

building community capacity to undertake these programs; and (3) acting as watchdogs and ensuring that the state assists and enables community participation.

Impacts of Community Forestry

In spite of an abundance of academic literature on community management of forests, in-depth empirical evidence that addresses impacts (on natural resources, poverty, and empowerment) is infrequent. Most of the scholarly material has focused on the evolution and the modus operandi of community forestry and not on its aftermath. This relative paucity of information on the impacts of community forestry makes a thorough assessment difficult. In order to deepen our understanding of impacts, we consider four sub-issues: (1) household and community benefits; (2) short-term versus long-term benefits; (3) gender inequalities and distributional effects; and (4) natural resource impacts.

Household and community benefits

Examples abound of benefits being acquired both at household and community levels. Household benefits include the distribution of monetary rewards from income generated by community forestry and the creation of employment opportunities. Furthermore, in addition to timber, fuel-wood, fodder, and non-timber forest products (NTFP) are the other main household benefits from forests.

Evidence in the Behroongudan case study in Andhra Pradesh shows that income generated from NTFPs and forest-related employment schemes (such as coppicing shoots and singling work) accounted for nearly 43 percent of the average family income in 1998 (D'Silva and Nagnath 1999). In 1998, villagers received Rs. 359,500 from the sale of 3,198 teak poles thinned from 100 ha as part of silvicultural operations. Further, wages offered by the forest department for these works (averaging Rs. 40-50 a day) were better than the agricultural wage of Rs. 25 for a female and Rs. 30 for a male. In 1998 alone, 3,656 days of employment were generated, equivalent to over two months of full-time employment for the 68 people who were interested in and available for forest work (D'Silva and Nagnath 1999). Since the advent of JFM, the villagers of Behroonguda have stopped migrating to nearby towns and villages in search of work, as employment is now locally available.

Income acquired from the collection and processing of palm kernels in northeastern Brazil was shown to account for 39 percent of cash income and 34 percent of total household income during the seasonal slack period in agriculture. Many of the poorer farmers were dependent on this cash for purchasing seed and other inputs required for planting in the new season (May and others 1995, in Arnold 2001). In western Niger, it was found that *"income from forest products from the commons rose as a share of household income from 2 percent in the harvest season to 9 percent in the hot and rainy seasons and 11 percent in the cold season"* (Hopkins and others 1994, in Arnold 2001). The authors also observed that cash income from these sources was sufficient to purchase between 9 and 28 percent of the households' annual caloric needs.

Logging and employment are key benefits from community forestry in Mexico. The logging community of San Antonio in Mexico distributed 2,500 pesos in profits to each community member in 1994 (Klooster 2000b). The Community Forest Enterprise (CFE) of El

Balcon on the Pacific Coast north of Acapulco generates around 250 full-time and part-time jobs and has fixed capital assets of over $4 million, not counting the natural capital of the forest (Bray and others 2002). The Oaxaca community operates a CFE that offers part-time employment to nearly a quarter of the community. The El Rosario de Xico community in Veracruz, Mexico, offers year-round employment for all of the 24 community members (Merino 1997b, in Bray and others 2002). In the San Antonio community, work is "*easily available for those who seek it, with rotation when necessary*" (Klooster 2000b). As Klooster further notes, there is a clear attempt here to increase local employment opportunities by paying for work in reforestation, road maintenance, and clearing the debris left by logging.

Examples from the Gwira-Banso region of Ghana, Chimaliro Hills in Malawi, and the Suledo village forest in Tanzania showcase the potential of beekeeping as an additional income generation opportunity for the villagers (Appiah 2002; Shackleton and Campbell 2001; Sjöholm and Luono 2002). The richness of these forests in a variety of flowering plants and reliable water sources make them conducive to beekeeping. It offers a source of livelihood for the poor who can use honey for making and selling local brew and for medicinal purposes (Sjöholm and Luono 2002).

Often, funds derived through community forestry are invested in community development activities. As Bray and others observe, the post-CFE period in Mexico has enabled "the communities to use profits to invest in the enterprise and to build community assets such as potable water networks, schools, clinics, public buildings, and social service safety nets in the form of free medical care and old-age pensions (almost unheard of in rural Mexico) and fulfill functions left unattended by the government" (Bray and others 2002). In UZACHI communities in Mexico, profits have been spent on collective goods such as road improvements, an auditorium for community assemblies, and the construction of churches (Klooster 2000b). Nuevo San Juan Parangaricutiro has established two saw mills, kilns for drying lumber, a furniture factory, a resin distillery, and also started a program of agricultural diversification (Lemus 1995, in Klooster 2000b). In Ixtlan, forestry proceeds have enabled diversification into transport, agricultural promotion, and ecotourism (Klooster 2000b).

In Nepal, income from the sale of timber, NTFPs, and other products is directly deposited in community funds and used for community development activities such as the construction of school buildings and irrigation channels (Adhikari 2003). Similarly, in Gambia, income generated by the community forest goes into a local fund. At least 40 percent of this fund is used for forest rehabilitation activities, while the remaining 60 percent is used for village infrastructure development (Sonko and Chamara 1999). In the Mwamishali village in the Shinyanga region of Tanzania, the sale of products from the community forest reserve has been utilized to build four classrooms, two pit latrines, and a head teacher's office at a total cost of 4,200,000 Tsh (Mlenge 2002). These examples show that the returns from common property management are often invested in supporting local public goods.

Short-term versus long-term benefits

A major challenge in community forestry is ensuring that there are short-term benefits to community management. Often, community forestry can result in closures of forests for

conservation and long-term sustainability. This can impose significant immediate costs on communities. Our review of cases across the world suggests that there are examples of returns in the short term.

In Mexico, the transition from concession logging to community logging translated into immediate profit benefits for the local communities. The forest management system under the concessionaires was dysfunctional, with widespread timber smuggling and logging wastes. In the village of San Martin Ocotlan, for instance, independence from concessionaires resulted in immediate profit increases of up to 600 percent, even after doubling the wages of community-member loggers (Klooster 2000b). Thus, Mexico presents a good example of how community forestry can result in immediate profits because of improvements in governance and consequent changes in the distribution of benefits.

In India, especially in areas where JFM facilitates the rapid regeneration of coppicing species like teak through community protection, it is believed that increased availability of fuel-wood may be an early benefit prior to final harvesting. In Gamtalao Khurd village in Gujarat, nearly 12 tons of fuel-wood was harvested during forest cleaning operations after just one year of protection (Arul and Poffenberger1990, in Khare and others 2000). Availability of fodder grass is another early benefit and is often the main incentive for participation in forest regeneration efforts in arid areas where livestock plays a crucial role in the economy. In Kaliakua village in Gujarat, where a JFM program has been implemented, villagers harvested Rs. 494,000 worth of grass in 1997–98 (Prasad 1998, in Khare and others 2000). In some Van Panchayats in Naini Tal District of Uttar Pradesh, the grass yield doubled after a year of protection (Mansingh 1991, in Khare and others 2000).

Box 17
Methods Used to Generate Short-Term Benefits in the Buldhana Forest Division in Maharashtra India

The Buldhana forest division is situated in the north-central part of Maharashtra. The JFM program was officially implemented here in 12 villages in the summer of 1996. Encouraged by the success of these 12 villages, within one year almost 100 more villages in the Buldhana division chose to adopt the JFM strategy, many of them as self-initiated groups. Part of this success was due to three main avenues of immediate income generation that were implemented in the Buldhana forest division (Ghate 2000):

- The Forest department undertook forestry work like a plantation, transporting dead wood from inside forests, and carrying out activities of coppicing, singling, and dressing of tree stumps in the forest area adjoining these villages, thus resulting in the generation of wage income.
- Forest Protection Committees took up the collection and marketing of Anjan (good fodder) on a large-scale basis. These are found copiously in the surrounding forest area and are often in demand in the Buldhana and Khamgaon markets. The persons involved in collection were given fixed wages (Rs. 60 per day), while the profits were deposited in the committee's account. This activity fetched immediate income for the households. The amount that went into the committee's account was used for executing several developmental schemes.
- The FPCs encouraged self-employment, small business ventures, and cooperative dairy development. Committees sought loans from cooperative banks to buy their own trucks to transport forest produce to the market. Some bought cattle and engaged in dairy business privately, while some committees initiated cooperative dairies with their own funds.

Evidence from the Ethiopian woodlots in the Tigray region shows few significant short-term benefits, due to the temporary closure of forests to protection (Gebremedhin and others 2001). This seems indicative of a larger pattern in several other places. In some cases, the lack of immediate benefits makes it difficult to ensure the participation of the villagers. Yet, as was portrayed in the Tigray region in Ethiopia, if the villagers are convinced about the long-term viability and profitability of the exercise, they will still participate in forest protection. The average estimated value of current benefits was EB 2783 per woodlot in villages where benefits were received (Gebremedhin and others 2001). However, it was estimated that a typical woodlot of eucalyptus trees would be worth more than EB 80,000 per ha on average, if allowed to grow, and that the eventual wealth of communities in the Tigray region would be more than EB 5 million per community on average (Gebremedhin and others 2001). Thus, the villagers were convinced about the long-term wealth of community forests and that they would benefit eventually, and only a small fraction expressed uncertainty about future benefits as a problem.

Gender inequities and distributional issues

The often peripheral role played by women is a common feature found in much of the literature on community forestry. State-initiated groups in South Asia—Village Forest Institutions in India and Forest User Groups in Nepal—broadly have a two-tier organizational structure consisting of a general body and an executive committee. It is estimated that women constitute less than 10 percent of JFM general bodies (Agarwal 2001). The situation is similar in self-initiated groups, where the customary exclusion of women from village decisionmaking bodies is replicated. In the FUGs in Nepal, the unit of membership is the household, and often it is only the man's name that is included on the membership list (Seely 1996, in Agarwal 2001). In general, women's representation in the executive committees is also very low. The Government of India passed a guideline in 2000 stipulating that 50 percent of the membership in the general body in all JFM endeavors should be women (Khare and others 2000), but it remains unclear how much of an impact this has really had.

Despite the general trend of low female participation in formal groups, there are exceptions in South Asia, including user groups made up exclusively of women or mixed groups with a high female presence. All women user groups are found primarily in the hills of UP and parts of Nepal. In Nepal, all women FUGs are said to constitute 3.8 percent of all FUGs (Government of Nepal 2000, in Agarwal 2001). User groups with high levels of women are also found in parts of UP, AP, and Nepal. Bheroonguda village in Andhra Pradesh is particularly noted for high levels of female participation and empowerment and boasted a female president for five years (D'Silva and Nagnath 1999). Africa followed a similar pattern, with high female participation being the exception rather than the norm. The Suledo village forest in Tanzania was a prominent exception, with half of the membership of the environmental membership committee required to be women (Sjöholm and Luono 2002).

In addition to gender inequalities, discrepancies in benefits distribution appear to be a common feature, though this is an area that needs further research. Generalizations are particularly hard to make on poverty impacts due to the minute number of specialized studies done on the subject. Adhikari's (2003) work in Nepal reveals that poorer households in forest-dependent

communities earn less from community forests than middle-income and rich households. Adhikari's study shows that the average "poor" household obtains NRs. 7,756 from community forestry, while the more "rich" households obtain an average of NRs. 24,466 per year. The previously cited example of Western Niger showed that with regard to cash income from forest products, the poorest third of households in the study were more dependent on this source of income than the richest third, and women (for whom it represented 27 percent of their income) were more dependent than men (for whom it represented 10 percent) (Hopkins and Others 1994, in Arnold 2001).

Distributional discrepancies are also evident in San Martin Ocotlan in Mexico. In 1995, 28 percent of the workers earned just 3 percent of the income at the lowest end of the scale; 34 percent of workers were in the next category and accounted for 15 percent of the total earnings. In other words, in San Martin Ocotlan in 1995, more than 60 percent of the work force earned approximately 18 percent of the total wages. This was in stark contrast with the 7 percent of the workforce at the top end of the scale (earning between 5000-10,600 pesos), who earned more than one third of the total wages (Klooster 2000b).

Positive natural resource impacts

There is demonstrable evidence in quite a few cases of community forestry resulting in positive natural resource impacts. Based on the evidence in the literature, it seems conceivable to visualize a positive trend in general.

Tanzania is perhaps the best example of having positive natural resource impacts in Africa. Especially in the Miombo woodlands of Duru Haitemba and Mgori, there are visible signs of gain. Charcoal burning, rampant timber harvesting, and unregulated in-forest settlements have all disappeared. This has coincided with a return of understory shrubbery and grasses and the return of bee swarms to forests (Wily 1999). Other positive impacts in Duru Haitemba and Mgori include fewer areas of erosion, steadier stream flow from the hills, and a complete absence of ring-barked trees or evidence of overgrazing (Berglund 1997, in Wily2001). In the Mwamishali village, "*after only three seasons, the area exhibited an almost unbelievable ecological transformation, from desolate landscapes of bare ground and heavily browsed shrubs to impressive vistas of grass and vigorously sprouting shrubs"* (Mlenge 2002).

In the village of Behroonguda in India, 250 ha of degraded forest was subjected to silvicultural treatment by 1997, in the process achieving their target 7 years ahead of schedule. Improved silvicultural treatment had positive effects on growth in Behroonguda and led to a 67 percent increase in the regeneration of seedlings (D'Silva and Nagnath 1999). Further, by building bunds across streams and excavating percolation tanks, soil and moisture conservation appears to have occurred.

Existing studies from Mexico suggest that the establishment of CFEs may have led to a stabilization of forest cover in the community. Satellite images of El Rosario de Xico show a significant expansion of forest canopy from 1982 to 1993, and the community has declared 4 ha under strict protection for the conservation of *Abies Hickelii,* a species of endangered oyamel fir (Bray and others 2002). Satellite images of UZACHI communities in Oaxaca show that the forest area has increased by 500 ha in the last 18 years as a result of community reforestation and limits on agriculture in forest areas (Alatorre 2000, in Bray and others 2002).Some forest

communities in the Sierra Jurez of Oaxaca have consistently logged below the authorized volumes in their management plans in an explicit endeavor to conserve the resource. Moreover, as noted by Bray and others, communities have regularly expressed a desire to reduce their volume of extraction when inventories indicate that they may be extracting at an unsustainable level. This was clearly evident in the Quintana Roo communities of Noh Bec and Laguna Kana, as they reduced their logging volume by 29 percent and 37 percent respectively (Bray and others 2002). Some communities also show a heartening commitment toward broader biodiversity protection. In La Trinidad, in an ancient forest area of 365 ha, the community declared 29 percent of it as a biodiversity protection area (Bray and others 2002).

In his study of community forestry in parts of Nepal, Edmonds (2002) discovered that resource extraction was approximately 14 percent less in forest user groups. Khare and others report that satellite images from southern West Bengal, where 90 percent of the forest is under JFM, showed that within 2 years, 4,100 ha of forest moved from degraded scrub (with less than 10 percent crown cover) to the open forest category (10-40 percent crown cover). However, in many communities the continued adoption of silvicultural methods designed toward maximum timber extraction is worrying and needs to be focused more toward local needs and sustainable management (Khare and others 2000).

Challenges to be Addressed

Some of the more crucial emerging problems, challenges, and issues in community forestry that confront the development and policymaking community are addressed below.

Compensatory mechanisms for lost rights

Evidence shows that poor, landless, forest-dependent people can be adversely affected from the temporary closure of forests for protection. They are denied access to products that are essential for day-to-day subsistence. The opportunity costs of closure are higher for the poor, as compared with the less forest-dependent, wealthier people. Several scholars (Khare and others 2000; Chakraborty 2001; Klooster 2000a) have referred to the importance of finding alternative fuel sources and alternative employment mechanisms as a way of providing compensation for lost rights. Box 18 provides some examples of how compensatory mechanisms have been developed in successful cases of community forestry.

Reconciliation of heterogeneous interests

In all community-based natural resource management initiatives, there needs to be a recognized group of people who are eligible to participate in natural resource management activities and receive benefits from use. However, defining the group—who to include and who to exclude—is a complex problem and remains one of the most difficult aspects in the implementation of community-based programs. Assessment of the multitude of case studies show that there is no uniform pattern to be found; examples abound of communities that are created on their own (by community agreement, in accordance with customary land rights, traditional mechanisms, etc.) and are created externally by outside actors.

There is a common propensity of policymakers to view communities from a reductionist perspective and treat them as homogenous entities. In reality, however, this is seldom the

Box 18

Compensatory Strategies to Decrease Opportunity Costs of Conservation

Wage income through forest-related activities
The village of Behroonguda in Andhra Pradesh, India, was very successful in creating alternative wage employment schemes related to forest protection. Employment from forestry work in Behroonguda generated 14,180 days of work in 1998 and contributed Rs. 2,360 in wages out of a total average family income of 9, 665 in that year (D'Silva and Nagnath 1999). These activities included soil and moisture conservation, silvicultural operations, and other support activities.

Decreasing dependence on fuel-wood
The use of appropriate alternative fuel technologies in Behroonguda village reduced fuel-wood consumption and decreased pressure on the local forest. The distribution of subsidized smokeless *chullas* (stoves) to half the households in the village cut down firewood needs by 25 percent. Eight families that received bio-gas generators operating on animal dung ceased collecting firewood altogether. These measures have resulted in a decline in the village's annual firewood consumption by 20 percent from 110 tons a year to 88 tons (D'Silva and Nagnath 1999).

Alternative resource collection/use mechanisms
The community of San Antonio in Mexico imposed many restrictions on individual uses, but for the most part also succeeded in redirecting traditional rights. For example, firewood gathering was coordinated with logging activities in order to decrease fire hazards and favor pine regeneration. Community members also have an agreement to forgo cutting pine trees for traditional roofing shingles, but as compensation for this, the forestry business supplies free tin roofing materials and lumber when needed. Some other communities maintain designated areas for cutting fuel-wood (Klooster 2000b). An example from the Terai region in Nepal shows how local people satisfied their needs for fuel-wood and other essential forest products through illegal extraction from a nearby government-owned forest (Chakraborty 2001).

Compensation for lost rights
The Nuevo San Juan community in Mexico integrated individual tenure rights with community interests. All forest lands in the area were parceled out to community members for resin tapping. Leaders establishing the community logging business choose to respect individual usufruct rights to forest plots; resin collection continues on these plots in accord with individual interests. When logging plans slate an area for cutting, communal interests take over, but possessors of resin-tapping plots get a stumpage payment as an incentive for protecting trees (Klooster 2000b).

case. There is often tremendous internal stratification within the community, based on ethnicity, race, gender, wealth, and a myriad other divisions. As Gauld observed in his study of community forestry in the Philippines, it seems that "*communities are typically, not universally defined on the basis of their geographical foundations as occupying a particular geographical space*" (Gauld 2000). The tendency is also to equate spatial proximity with political homogeneity.

Whether heterogeneity within the community leads to more or less collective action is an empirical question addressed by many, yet still remains a subject of much debate and contention. Often in forest management, this heterogeneity manifests itself in the form of rich versus poor, distant users versus proximate users, and in terms of stakeholders with widely differing needs and priorities. For example, in the timber-company initiated project in Gwira-Banso in Ghana, the local communities were

primarily concerned with immediate economic gains, while the timber companies were more focused on tree planting and long-term timber production (Appiah 2002). Similar conflicts arose in Moribane in Mozambique and in several cases in India. It is crucial that the concerns of all parties be taken into account and the different interests reconciled. There is often a role for NGOs in situations like this, as was seen in the Gokwe case in Zimbabwe. Yet, the literature also provides cases where heterogeneous communities designed innovative mechanisms, as epitomized in the case below.

Given the diversified nature of most communities, it is indeed crucial that more attention and care be given to tackle intra-community inequities. The literature includes many cases of elite dominance and contrivance with state apparatus to control decision-making. The San Martin Ocotlan community in Mexico is one prominent case where the elites of the central village controlled decision-making, as well as a disproportionate share of the benefits at the expense of people in the outlying villages (Klooster 2000a; Klooster 2000b). It is necessary that community meetings be assembled regularly, encourage participation of all involved stakeholders (especially women as the primary gatherers of fuel-wood and NTFP), and draw up proper accounting and reporting mechanisms to ensure greater accountability. As mentioned before, forest management has to be reoriented to meet current needs and long-term livelihood security of the poorest, facilitate local institutions to identify existing users, and lay clear guidelines for ensuring everyone's participation (Khare and others 2001).

Greater community control over non-timber forest products

NTFPs are particularly significant in South Asian countries. For example, on average 40 percent of the state forest revenue and 75 percent of forest exports are derived from NTFPs in India (World Bank 1993, in Khare and others 2000). The commercial importance of these products means that some of the most commercially valuable NTFPs (like cashew, bamboo, or fibrous grasses) are either nationalized or monopoly collection rights are granted to certain government and private organizations. Thus, they do not fall under the purview of 100 percent usufructs or under revenue sharing as a JFM benefit (Agarwal and Saigal 1996, in Khare and others 2000).

Box 19
Mechanisms to Overcome Heterogeneity: A Case Study from Nepal

Varughese and Ostrom's (2001) study of heterogeneity in forest communities in the middle hills of Nepal suggests that the more successful forestry communities devise innovative mechanisms to surmount problems created by heterogeneity. The authors hypothesize that when the benefits of community forestry are sufficiently high enough, the local communities will endeavor to find mechanisms to overcome heterogeneity. For example, in Raniswara in the Gorkha District and Bandipur in Tanahaun District, conflicts between proximate users and distant users of the same forest area were overcome by devising a mechanism whereby the more distant users agreed to pay an additional fee to the community as compensation for forsaking their share of guard duties (Varughese and Ostrom 2001). In addition, those who cannot participate in joint maintenance, harvesting, or monitoring can pay special membership fees so as to avail themselves of forest products at below-market rates. In Raniswara, special membership is noted after payment of a fee. In Bandipur, members have to purchase tokens of different colors; each color is specific to their membership type.

Recent Government of India legislation has been directed toward removing some of the controls on NTFPs. This legislation—adopted by states in 1998—gives ownership rights of all NTFPs to tribals in certain tribal-dominated areas (Khare and others 2000). Yet, implementation has been slow and progress has been made mainly in Madhya Pradesh (Khare and others 2000). In Nepal, the marketing of many of the NTFPs is often heavily controlled by the state or through chains of "middle men." Detailed information on NTFPs in other parts of the developing world is hard to find, yet, it seems that they are more widely devolved to community decisionmaking levels, especially in Africa (Wily 2002a). Thus, a survey of the literature clearly demonstrates the need for greater community control over NTFPs and more equitable distribution of NTFP benefits.

Devolution of bureaucratic power and not just usufruct rights

A lack of commitment by the state, particularly the forestry bureaucracy, to truly release power to a local level is considered a major factor limiting the success of community forestry (Shackleton and Campbell 2001; Agrawal and Gibson 1999). Ideally, the delegation of extra responsibility toward communities should be accompanied by commensurate power and authority. However, this often does not happen, and can lead to delays in implementation. In India, for instance, it is argued that legal and administrative arrangements for community forestry tend toward centralization and that local organizations under JFM are little more than a proxy for the forest department, with the latter still controlling key aspects (Jodha and Bhatia 1998, in Shackleton and Campbell 2001). Similar evidence is found in the Gokwe communal area in Zimbabwe and community forestry in parts of Indonesia and the Philippines.

Cases where devolution of authority goes hand-in-hand with recognition of local ownership of the forest are still not widespread. Wily observes that Tanzania and the Gambia have gone the furthest in developing a "*working regime of authority over the forest. Typically this working regime of authority is laid out in steps that assist the community to define and demarcate the forest area and to develop a rational and sustainable management plan for its protection and use, to be operated at their cost and through regimes that they themselves devise*" (Wily 2002b). Crucially, the end result in both country processes is recognition of the community as owner-manager of the community forest, rather than only licensee, user, or even manager. More than 200 community forests have been created in the Gambia through this process thus far, and more than 500 in Tanzania (Wily 2002b). A positive example from the Duru Haitemba forest in Tanzania and the process by which decentralization occurred is presented in Box 20.

Tackling corruption

Corruption, lack of accountability, absence of accounting and recording mechanisms are frequent problems encountered by forest management communities. Concerns about corruption arise not only because it is ethically wrong, but because of its adverse effects on the development process and in particular its impact on the disadvantaged, who bear the brunt of corruption and are least able to fight corrupt bureaucracies (Hill 2000). In an assessment of a World Bank-assisted forestry project in Madhya Pradesh, India, Hill notes that opportunities for corruption can be reduced

Box 20

Communities as Managers and not just Users:
The Case of Duru Haitemba, a Successful Example from Tanzania

The Duru Haitemba is a hilly Miombo woodland of 9,000 hectares in the Arusha region of northern Tanzania. It was surveyed for gazettement as a national forest reserve in 1991 and forest guards posted to protect the forest (Wily and Dewees 2001). There was resistance from villagers to the reservation. Feeling that their customary tenure had been ignored, villagers made excessive use of forests. By eliminating a local sense of proprietorship, the government eliminated local guardianship or recognition (Wily 1999).

The government then mooted a benefit-sharing concept, which was rejected by villagers. Thus, a new approach was needed and it was decided that villagers should have full control and authority over forests for a trial period. Informal support for this endeavor was provided by the local district council. It was decided that the gazettement process would be suspended pending demonstration by villagers that they could halt forest degradation (Wily 1997).

Eight villages around Duru Haitemba participated in this process. Each village formed a Forest Management Committee in late 1994/95, appointed volunteer forest guards, and drew management action plans for the part of the forest that fell within their village sphere. Access rules were central to the plans. Outsiders' access to the forest stopped. Village members agreed to limit use to certain zoned areas. Around half of each village forest was closed off to all use, given its degraded condition. Damaging uses like charcoal production were banned. Grazing was restricted to specified months and zones.

The government, impressed with progress, then began to withdraw forest guards and suspended gazettement. There was visible evidence of recovery and forest gain within three years. Charcoal burning, rampant timber harvesting, and unregulated in-forest settlement have since disappeared. The return of understory shrubbery, grass cover, and bee swarms to forests illustrates the positive natural resource impacts.

The composition of the forest management committees has shifted gradually from village elders to ordinary villagers (Wily 1997). There is also an increase in the number of villagers practically involved in the commitment toward forest conservation. Once villagers began actively managing forests, it became evident that "*they needed not just the administrative support they had received from the local council, but legal backing as well*" (Wily 1997). To facilitate this process, each village was provided assistance to rephrase their management plans and rules as village by-laws. Formal approval for these by-laws was granted by mid-1995 under the District Authorities Act by the Full District Council. Thus, as Wily notes, "*each village is by law, the legal authority and manager*" of that part of Duru-Haitemba forest that is adjacent to its own settled village area and specified in the relevant village by-law as falling under their jurisdiction (Wily 1997).

with improved decentralized planning involving beneficiaries and better monitoring of performance and impact. In addition, the fact that communities and not individuals were involved in management and benefit sharing tends to minimize corrupt practices.

Corruption was especially severe in the previously discussed example of San Martin Ocotlan in Mexico, and was further compounded by elite dominance in the central village, and a skewed profit distribution mechanism that disadvantaged outlying villages. After many years without profits, villagers in the outlying areas demanded audit reports and were staggered to find the amount of corruption within the central committee. Similar problems of corruption were avoided in other communities in Mexico (notably San Antonio) due to the presence of greater community involvement and better accounting and reporting procedures. Thus, an important

side benefit of decentralized management is lowered corruption. However, to be fully realized, this will require additional capacity building at the community level. There is a role for training and NGO support to develop community-level accounting and reporting mechanisms.

Conclusions

This paper, which is based on a review of case studies from around the world, sought a critical appraisal of decentralized forest management with a view to identifying emerging patterns, trends, and issues that are of critical importance to scholars, practitioners, and policymakers alike. In this concluding part of the paper, we recapitulate some of the main conclusions and findings drawn from the literature.

It is evident that community forestry is prevalent worldwide from India to Latin America and from Sub-Saharan Africa to Southeast Asia. The phenomenon of decentralized forest management has especially gained momentum in the last decade. There is also a steady, if somewhat hesitant, movement of community forestry being extended from degraded to more rich forests.

The case studies reveal that decentralization takes places primarily through three institutional mechanisms: (1) devolution to lower levels of government; (2) creation of village-level institutions; and (3) the allocation of more power to existing traditional institutions. Successful examples abound in all three different mechanisms. It is hard to establish geographic trends and patterns, as all three seem to be present in many different parts of the globe.

A critical issue that dominates the discourse on community forestry is the debate on power sharing versus benefit sharing. Even though there is a gradual movement toward more power sharing (especially pronounced in Africa), the user-centric concept still predominates. The power-centric approach, as the case studies have demonstrated, is important to success and mainly looks to forest communities as potential managers or co-managers and devises arrangements to give them varying degrees of managerial control and authority. Power sharing can occur through many processes. Reforms in land laws that give more tenure security to forest communities, general changes in legal and policy frameworks, and the willingness to devolve bureaucratic power are all crucial elements that facilitate power sharing.

Benefits from community forestry are basically derived both at the community level and at the household level. Benefits differ at each level, and can be both long term and short term. In general, it seems rather difficult to secure participation of the communities in the absence of fairly quick benefits, yet as the example from Ethiopia demonstrated, if the communities are convinced about the long-term viability of the project, they will still take part. However, it is crucial that effective compensatory mechanisms be drawn up in the short run to make up for loss rights due to the temporary closure of forests. These mechanisms range from the creation of employment opportunities to the provision of alternative fuel sources. Gender inequalities and distributional discrepancies are also frequently witnessed in community forestry programs, and, the mechanisms through which these inequalities can be minimized need further scrutiny.

Another crucial aspect of community forestry is effective monitoring and enforcement.

Communities use a variety of mechanisms to ensure collective participation in management of resources. These range from employment of guards to protect forests to fines for not attending committee meetings. Though a vast spectrum of strategies are employed to ensure rule compliance, it seems graduated sanctions—where the penalty imposed is contingent on the severity and frequency of infringement—is a particularly effective mechanism.

It is evident from the review that there is a clear need for more in-depth and carefully conducted research on the impacts of decentralized forestry. Assessment of impacts is indisputably the best way of measuring the success of decentralized forest management; thus, more structured and focused emphasis needs to be paid to impacts. In particular, more work needs to be done on distributional inequities, effects on poverty, and empowerment of communities. This is a clear research agenda for the future, and it is hoped that more specialized work is carried out that would be helpful in thoroughly analyzing the effectiveness of community forest management.

The paper also identified some emerging challenges and policy issues. These include the need to have greater community control over non-timber forest products, provision of compensatory strategies, effective mechanisms to overcome a host of problems related to heterogeneity and tackling corruption, and providing greater accountability of community forest practices.

Notes

1. This study is supported by the Trust Fund for Environmental and Socially Sustainable Development. It is part of a larger piece of analytical work undertaken by the Policy and Economics Team, Environment Deparment, on "Understanding the Impacts of Devolution on Natural Resource Management." This work includes three case studies on communal conservancies in Namibia, community-based forest management in India, and irrigation management transfer in the Philippines.
2. Policy and Economics Team, Environment Department.
3. Please see Bandyopadhyay and Shyamsundar (2004), and Bandyopadhyay, Humavindu, Shyamsundar, and Wang (2004), which are available as World Bank Policy Research Working Papers at www.econ.worldbank.org.
4. Communal Areas Management Program for Indigenous Resources
5. Administrative Management Design for Game Management Areas.
6. For instance, between 1989 and 1992, ADMADE in Zambia resulted in approximately 60 projects, including 23 houses for teachers, 9 maize grinding mills, and 7 rural health centers (Gibson 1999).
7. A high-end example is the Torra Conservancy in Namibia. Community members are documented to have earned $70,000 in wages from 1996 to 1998 through an agreement with a photographic safari company (Jones 1999b).
8. Such opportunity costs can result from many different forms of natural resource management and are not specific to community based management.
9. For instance, evidence from joint forest management in India suggests that these institutions re-create traditional patterns of discrimination against women (Agarwal 2001, Sarin 2001).
10. Among many such examples is evidence from national parks in western Uganda (Mgahinga, Bwindi and Kibale), which suggests that community relations with park authorities have improved as result of community outreach efforts (Infield and Adams 1999, Archbald and Naughton-Treves 2001).
11. These countries have supported legal processes that encourage communities to bring unreserved forest areas under their own jurisdiction and to apply to manage nationally owned forests (Wily, 2002a; Bojang, 1999).
12. In ADMADE in Zambia, 35 percent of revenues were allocated to community activities and the rest retained by the government. In CAMPFIRE, 50 percent was retained by the state and 50 percent divided between administrative costs and community dividends.

13. There is considerable theoretical and empirical literature on conditions for durable commons institutions and why cooperation in managing natural resources occurs in some cases and fails in others. Agrawal (2001), for example, identifies 24 conditions (see Table 1) based on three synthesis books by Wade (1988), Ostrom (1990), and Baland and Platteau (1996).
14. Murombedzi (1999), for example, argues that CAMPFIRE benefits are highest where human populations are low and animal populations are high.
15. Agricultural crop production may be subsidized, an issue often beyond the control of communities.
16. Nested enterprises refer to multi layered linked institutions.
17. CAMPFIRE and ADMADE stand for Communal Areas Management Program for Indigenous Resources and Administrative Management Design for Game Management Areas
18. It is not clear whether these monies were then distributed within the community or whether they were used for community projects.
19. Workshop in Political Theory and Policy Analyses, Indiana University.
20. Manager, Institutional Development Division.
21. An IMT can be considered progressive if , at a minimum, it provides for the following authorities and responsibilities to the WUA: (a) make rules and sanctions, with the maximum sanction of stopping water available to the WUA; (b) make O&M plan and budgets; (c) set water charges; (d) hire or release management staff; (e) control over intake; (f) control over main canal system; (g) control over subsidiary canal system; (h) responsibility for future rehabilitation; (i) canal rights of way; (j) right to contract, raise and disburse funds and make profit.
22. See— http://www.iwmi.cgiar.org/tools/perform.htm#ani —for methodological approach.
23. Conversation with Ganesh Shivakoti, Associate Professor in Resource Economics, Asian Institute of Technology, when he peer reviewed a draft version of this paper
24. Department of Political Science, McGill University
25. Common property resource theorists have identified a broad set of requirements for the successful implementation of natural resource management. Elinor Ostrom's eight design principles for successful CPR are prominent among these (Ostrom 1990).
26. The Forest Policy of 1988 was distinct from preceding policies. Environmental conservation and meeting local people's subsistence needs were articulated as the main priorities instead of revenue generation through timber extraction (Khare and others 2000).
27. The total land area under community management is likely to be much higher, as the above figures do not include many self-initiated groups.
28. Self-initiated groups are particularly evident in the states of Orissa, Bihar, Uttar Pradesh (UP), and Jharkhand. Orissa is estimated to have approximately 5,000 community forest management groups, of which around 1,200 are said to participate in JFM (Singh 2002).
29. Wily notes that over 1,000 community forests operate and at least 100 significant national forest reserves are under (or coming under) state-people co-management regimes.
30. Under Ghana's timber utilization contract, timber companies are required to allocate a

certain percentage of royalties for the provision of social amenities (Appiah 2002).

31. For instance in UP, the JFM order of 1997 required the existing Van Panchayats to accept in writing that the Panchayat rules no longer applied under JFM (Khare and others 2000).
32. For more information, see "World Bank loans $ 15 million for Mexican forests", *Environment News Service*, 2/24/97— http://forests.org/archive/samerica/15mexfor.htm.
33. The Palcazu Yanesha have a long history of insecure land tenure, encompassing several hundred years of exploitation and alienation from lands they legally held, but were not able to defend from Franciscan Missions or European or Mestizo colonists (Smith 1974, in Morrow and Hull 1996). In addition, at the time COFYAL was developed, the Palcazu communities were facing increasing population pressures due to constant in-migration from neighboring communities. The opening of a new road in the 1980s leading to the valley made the situation worse. In the words of one COFYAL officer, *"there was no proposed mechanism to guarantee that the native communities' lands could be defended against invasions of loggers, traders, and colonists once the road came in"* (Morrow and Hull 1996).
34. As Wily (2002a) observes in Zambia, only local forests are the target of community forestry rather than national forests. In Cameroon, community forests may be established only in unclassified areas and are restricted to 5,000 ha and 10-year agreement periods.
35. In the absence of precise parameters for defining degraded forests, the term is interpreted differently by different states. While some state JFM orders have left it to the discretion of local forest officers to differentiate degraded from non-degraded forests, others have defined it so precisely that only a small amount of the total forest area can be brought under JFM (Khare and others 2000).
36. Ostrom's design principles for common property management are best known (Ostrom 1990). They include (a) the resource and the users of the resource should be clearly defined and appropriators should be able to sustain legal claims; (b) the presence of a small number of stakeholders; (c) homogeneity in stakeholders and homogeneity in their endowments and preferences; (d) a set of small, simple rules related to access and user patterns, agreed to by the stakeholders and congruent with local conditions and provision rules; (e) stakeholders affected by operational rules should be able to participate in modifying them; (f) transparency and efficient monitoring of information between stake holders; and (g) access to rapid, low-cost conflict resolution mechanisms.
37. As Wily (2002b) notes, "*Procedures are being made more publicly accountable and almost everywhere require fuller consultation with those affected. The new land laws of Uganda (1998), Tanzania (1999), Mozambique (1997), and South Africa (1991, 1996, and 1997) are exceptional examples, but likely to be followed by proposed new legislation in Lesotho, Swaziland, Namibia, and Malawi. Comparable developments are under way in Francophone West Africa, versions of which are being delivered in the Ivory Coast (1998), Mali (2000), and Niger (1993).*"
38. The 1996 Forestry Law indicates that municipalities that receive forestry royalties must within 6 months of the receipt of these funds create a Municipal Forestry Unit. In

addition, municipal governments are responsible for identifying and demarcating public forested lands in the municipal territory that should be used exclusively for local communities. The Forestry Law also asks municipal governments to provide technical assistance to local forest users to develop forest management plans and to help local users to acquire formal forest property rights (Andersson 2003).

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