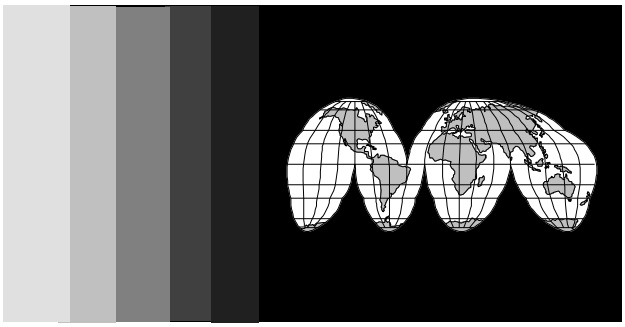

USAID Program and Operations
Assessment Report No. 14

Forestry and the Environment

An Assessment of USAID Support for Forest Stewardship

by

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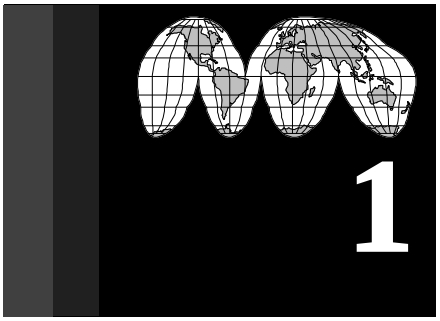


1 Introduction

This report summarizes findings from an assessment of the environmental contribution of selected forestry projects of the U.S. Agency for International Development. The assessment draws on field studies and literature reviews conducted by the Center for Development Information and Evaluation (CDIE). Findings and conclusions are for use by Agency managers and decision-makers in determining the course of future USAID support for forestry conservation.

CDIE launched this evaluation with a review of the literature on USAID's experience to date and on the state of forests and biodiversity on a global level. CDIE assessed the contribution of selected USAID forestry programs looking for impact—differences attributable to USAID project interventions—at four levels (see appendix):

- *Program impact.* Changes in knowledge, institutions, technical know-how, and economic policies that encourage environmentally responsible forestry use and management.
- *Impact on practices.* Adoption of environmentally sound forest use and management practices.
- *Biophysical impact.* Changes in tree cover, quality of soils, and diversity of plant and animal species in forest habitats.
- *Socioeconomic impact.* Changes in incomes, employment, and well-being of forest users and user groups.

Between August 1992 and October 1994, CDIE conducted field evaluations of USAID forestry projects in six countries: Costa Rica, the Gambia, Mali, Nepal, Pakistan, and the Philippines. Table 1 summarizes the projects in farm and community forestry examined by CDIE. Readers who wish to review the analysis and data behind the findings synthesized here may consult the country reports listed in the bibliography. Concurrently, CDIE conducted an assessment of USAID biodiversity conservation projects, many of which involved forest parks. For the findings from that evaluation, consult the CDIE synthesis report *Stemming the Loss of Biological Diversity: An Assessment of USAID Support for Protected Areas Management,* or the abbreviated Highlights by the same title. Both were published in August 1995.

Scope of the Assessment

CDIE examined the portfolio of USAID forestry assistance projects and selected those that began in the 1980s. Projects were selected from each geographic region (Asia, Latin America, and Africa) where USAID has supported forestry programs during this period. To include a range of social, political, economic, and physical settings, CDIE included

Table 1. Case Study Countries and Projects

Country	Project Name	Funding ($ millions)	Dates
Costa Rica	Forest Resources for a Stable Environment Project	7.5	1990-96
Gambia	Gambia Forestry Project	1.6	1979-86
Mali	Village Reforestation Project	2.8	1983-92
Nepal	Resource Conservation and Utilization	27.5	1980-89
	Institute of Forestry	8.7	
	Forestry Development	5.0	
Pakistan	Forestry Planning and Development	27.5	1984-93
Philippines	Rain-fed Resources Development	11.1	1982-91

countries at different stages of development and with varied forest ecosystems.

As a group, these projects have explicit objectives of increasing local involvement in sustainable management and use of forests by introducing or strengthening national farm and community forestry programs. Brief descriptions of projects and activities evaluated follow:

Costa Rica. USAID is supporting an integrated area conservation program aimed at protecting the country's biological resources from further destruction by inappropriate farming, ranching, and logging practices. Through the $7.5 million Forest Resources for a Stable Environment project and a $10.0 million local-currency endowment fund, the Agency is supporting Costa Rican Government efforts to set aside and manage protected forest habitats in the country's central cordillera volcanic region. USAID provides technical assistance and funds (through the endowment) for operation of a nongovernmental regional development foundation. It was created to support the Ministry of Natural Resources in promoting reforestation and natural forest management schemes on lands bordering national parks.

The Gambia's forest cover has been substantially depleted by agriculture. Dependency on firewood as the main source of fuel, combined with poorly distributed rainfall and uncontrollable fires, has led to unsustainable use of remaining forests. Through the $1.6 million Gambia Forestry project (1979–86), USAID helped the government move toward sustainable forest-based fuelwood supplies by promoting large-scale plantations and community woodlots. The Agency also introduced more

energy-efficient wood stoves and less wasteful sawmill technologies.

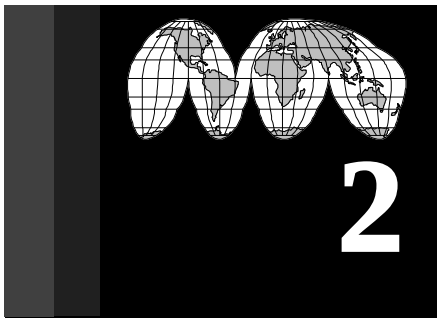
Mali. Increasing pressures from human and livestock populations in the fertile Mopti region along the Niger River have led to losses in tree cover that forests can no longer offset. Declining rainfall and desertification have placed further stresses on forest systems. Through the $2.8 million Village Reforestation project (1983–92), private voluntary organizations (PVOs), and several regional programs, USAID has helped the Malian Government and local groups introduce forestry and other natural resource management. The initiatives started with village woodlot activities. The Agency has also contributed to an ongoing participatory process of revising the forestry code. In addition, USAID funds were directed toward introducing a mix of tree and crop cultivation technologies.

Nepal. Population growth and lack of alternatives to subsistence agriculture have led to degradation of public forestlands, placing increased hardships on local users of forest products. Since the early 1980s, USAID has channeled assistance through a $41.2 million portfolio of projects to support Nepal's efforts to foster forest management by user groups through developing and testing local forest management schemes, encouraging policy reforms for community forest management, and strengthening public and nongovernmental institutions to support community forestry.

Pakistan. Removal of trees for fuelwood and construction is outstripping the pace at which public forests replenish themselves. Loss of forest wildlife habitats is increasing. Flooding, destruction of infrastructure, and deteriorating supplies of potable water from Pakistan's disappearing watersheds are further environmental damages from deforestation. Through a $27.5 million Forestry Planning and Development project (1984–93), USAID supported creation of a social forestry (now more commonly called farm and community forestry) program within Pakistan's Forest Service. It aimed to convert the Forest Service from *policing* forests to *promoting* tree farming. The project also helped develop markets for tree seedlings, custom tree harvesting, and other inputs and services needed to support private tree farming and reform policies restricting timber commerce in the country.

The Philippines is rapidly losing its remaining forests. Government agencies have limited capacity to police tree harvesting on public lands. Forest loss is accompanied by loss of wildlife habitats, destruction of watersheds, flash flooding, and decline of surface water and groundwater. Through the $11.1 million natural resources component of the Rain-fed Resources Development project (1982–91) and more recently a $100 million Natural Resources Management project, USAID and the Philippine Government have supported introduction of incentives for long-term stewardship of public forestlands. (The larger project is not covered here because it was just beginning at the time of the evaluation.) By issuing so-called certificates of stewardship contracts to upland households and local groups, the government has sought to mobilize local energies for reforestation and forest management. Local groups have been vehicles for distributing new tree seedling varieties and introducing tree-farming practices to upland households and community groups.

Remaining sections of this report include a background of the Agency's growing forestry portfolio and country programs studied in this evaluation in chapter 2; findings from the evaluation of the strategic approaches supported by USAID forestry programs in chapter 3; the overall performance of programs employing these strategies as gauged by their impact, effectiveness, sustainability, and replicability in chapter 4; and recommendations for future USAID forestry programs in chapter 5.



2 Background

Forest protection and management are prominent on the global agenda. Desertification, climate change, energy scarcities, loss of biodiversity, and degradation of agricultural lands—these are all linked to management of forests and other tree resources in developing countries, where the effects of diminishing forest resources are felt most acutely.

Increasingly, development assistance for forest management emphasizes local self-help approaches. A realistic examination of the tasks at hand shows that governments seldom have the budgets and managerial expertise to oversee the totality of a country's forest resources. Instead, they are being pressed to hand over greater control of trees and forests to local stewards. This emphasis of farm and community forestry brings with it new models of government reorganization, of professional training and research, of government and NGO partnerships, and of risk, benefit, and cost sharing (Gregersen et al. 1989, Arnold 1991).

Worldwide, most externally funded efforts in farm and community forestry have a history of less than 15 years. Few projects have been in place long enough to complete a full cycle of activities. Yet experience has been accumulating rapidly, and USAID is now well positioned to evaluate a number of these activities.

Tree Cover Patterns and Trends

Sound development assistance strategies require reliable information on changes in forest resources at national and local levels. The UN Food and Agriculture Organization is a recognized source of these data. FAO's statistics on forest cover have become increasingly detailed over the past 50 years.

According to the Forest Resource Assessment for 1990 (FAO 1993), the area of tropical forest decreased by an average rate of 0.8 percent annually from 1980 through 1990—from 1.91 billion hectares (7,374,521 square miles) in 1980 to 1.76 billion hectares (6,795,371 square miles) in 1990. In 1990 tropical rain forest covered 718 million hectares, whereas moist deciduous forest covered 587 million hectares. Contrary to popular impressions about the degree of rain forest devastation, 76 percent of the tropical rain forest zone is covered with forests today.

In 1990 the area of productive tropical forest plantations totaled 31 million hectares, with an average annual establishment rate of 1.8 million hectares, or 12 percent of the area deforested each year. Clearly, global forest establishment (through afforestation, reforestation, and natural regeneration) lags behind

deforestation. Figure 1 illustrates the point that very few developing countries have yet to reach a level where tree replacement equals tree removal and deforestation is reduced to zero. This pattern is not followed in industrial countries, where through planting and natural regeneration, forest establishment usually exceeds forest depletion by substantial margins.

Among developing countries, India deviates from the deforestation pattern. India's forest cover has been expanding by a planting/deforestation ratio of more than 4 to 1. And in Haiti, tree establishment approximately equals tree removals, although levels are low for both. But in most developing countries annual deforestation ranges up to 5 percent of forested area. Annual planting rates are nil or a fraction of 1 percent. Asia and the Pacific have been reforesting more than Africa and Latin America (see figure 2), perhaps because of stronger political will and institutional capacity.

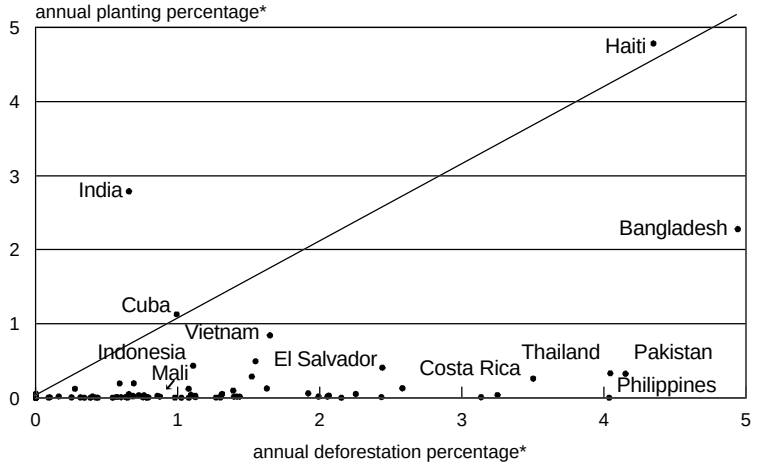
Natural forest cover has been declining in each of the countries chosen for this evaluation. The decreases are mainly in tropical rain forest in the Philippines; hill and montane forest in Costa Rica, Nepal, and Pakistan; moist deciduous forest in the Gambia; and a mix of dry deciduous and very dry forest in Mali.

Nepal, Pakistan, and to a lesser extent Costa Rica and Mali have been enlarging their areas of planted forests. Yet as indicated in table 2, planted forests are a small fraction of total forest area in each country. Because tree planting has not kept pace with population growth and forest conversion, each case country exhibits declining wood production. Although data reliability is an open question, broad trends are unmistakable. An implied loss of employment and income attends enterprises using forest-based raw materials. There is as well an increasing scarcity of household fuelwood.

Development Assistance for Farm and Community Forestry

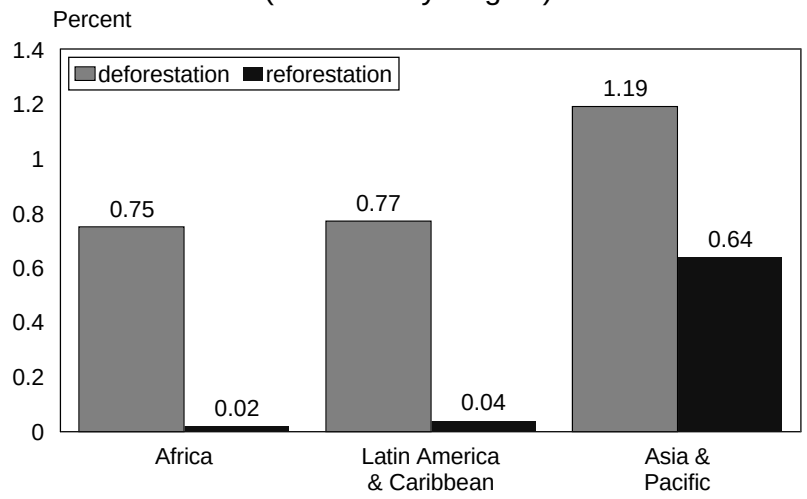
Rural populations always have depended on trees and forests for their livelihood, but external assistance to address this need is relatively recent. Most USAID and other donor assis-

Figure 1. Forest Establishment and Removal, Selected Countries



*As a percent of forested area in 1990
Source: FAO, 1993. Forest Resources Assessment 1990

Figure 2. Annual Deforestation and Reforestation Rates (1981-90 by Region)



Source: FAO, 1993. Forest Resources Assessment 1990

tance for farm and community forestry dates from the late 1970s and 1980s, when growing populations and depleting forests awakened countries to the threats facing the remaining global forests.

Farm and community forestry embraces varied contexts in which local people protect and manage trees and forests on a sustainable basis for their own benefit. Those contexts range from community woodlots to farm trees, food crops to cash crops, protective aspects to production aspects, and household consumption to market sale (FAO 1978, FAO 1985).

Despite this complexity of settings, the first generation of internationally funded projects concentrated on a narrow subset of linkages between people and trees. Most dealt almost exclusively with tree planting for fuelwood (Arnold and Jongma 1979). Projects placed little emphasis on managing natural forests or on managing forests and woodlands for conserving biodiversity or influencing climate effects.

Forestry programs and projects span a range of management systems. Among them are industrial tree plantations; industrial management of natural forests; government tree plantations and conservation works; government protection of forest cover in watersheds; government parks, reserves, and other protected areas; farm and community management of natural forests; and farm and community tree planting.

This is not a comprehensive list, and many combinations are possible. The management systems are determined by forest types, management objectives, and organizational units.

As noted earlier, this evaluation concentrates on USAID's experience in farm and community forestry (also called social forestry, although that terminology is losing favor) and its environmental impact. Elsewhere, CDIE evaluates its experience in biodiversity conservation (Church and Brandon 1995) and in agriculture and the environment (forthcoming). The scope of CDIE's biodiversity evaluation ranges over the different forest

management systems identified above, but it concentrates on forest ecosystems managed as parks, reserves, and other protected areas. CDIE's evaluation of sustainable agriculture includes discussions of agroforestry technologies. Thus it connects with this review of USAID's farm and community forestry.

Activities in farm and community forestry fit well with the goals described in *Strategies for Sustainable Development* (USAID 1994). Farm and community forestry contributes to environmental protection and to democratic processes, human health, and economic growth (see box 1). Figure 3 shows that USAID's forestry funding is widely distributed. No region or program accounts for more than 30 percent of total obligations. Funding for Europe and the new independent states of the former Soviet Union began in FY 1994.

Many other USAID projects that contribute to forest protection and management do not have forestry as their primary objective. Of 105 projects in FY 1992 that in some way supported forestry and biodiversity, 64 percent

Table 2. Natural and Planted Forest Area: Total and Annual Rate of Change During 1981-90

		Natural Forests				Planted Forests		
	total land area	total forest cover 1990		annual deforestation 1981–90		total area 1990	annual plantation 1981–90	
Country	000 ha	000 ha	%*	000 ha	%†	000 ha	000 ha	%†
Costa Rica	5,106	1,428	28.0	50	-2.9	40	3.7	30.5
Gambia	1,000	97	9.7	1	-0.8	1	e	1.8
Mali	122,019	12,144	10.0	106	-0.8	20	1.9	31.4
Nepal	13,680	5,023	36.7	54	-1.0	80	6.1	15.5
Pakistan	77,088	1,855	2.4	77	-3.4	240	6.0	2.9
Philippines	29,817	7,831	26.3	316	-3.3	290	-1.0	-0.3

e: Indicates a very small value
*Percent of total land area
†Percent annual change from 1981 through 1990

directed less than half their funding to forestry/biodiversity objectives (ENRIC 1994). Many forest-related activities are components of wider multisectoral efforts. This evaluation explores whether the selected USAID forestry projects have achieved their socioeconomic and environmental objectives.

Box 1. How Farm and Community Forestry Relates to Sustainable Development

Protecting the Environment

Stabilizes soil, protects watersheds • provides shelter belts, aids in soil moisture retention • helps regulate stream flow, reduces flooding • aids in land reclamation • buffers against spread of pests and diseases • helps store, distribute, and cycle nutrients • helps conserve biodiversity • helps stabilize climate

Democratic Processes

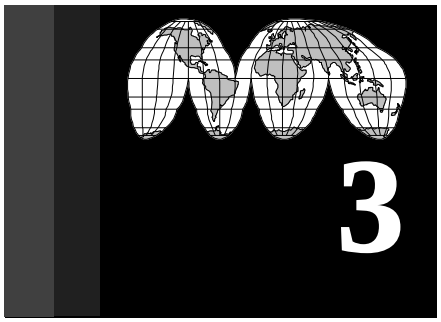
Results in the forging of multi-interest national agreements and policies for forest protection and management • invites local participation in decision-making • brings about dialog between national government and NGOs/PVOs on conservation issues of shared importance

Protecting Human Health

Improves nutrition by boosting food production: berries, eggs, fish, fruits, game, honey, larvae, mushrooms, nuts, seeds, spices, syrups, teas and other beverages • provides source for medicines: herbs, medicinal plants, pharmaceuticals • supplies materials for housing: boards, poles, posts, thatch • provides source for heat and energy • supplies livestock fodder: grass, leaves • promotes psychocultural health: forested homelands, community identity, revered trees and forests

Encouraging Economic Growth

Provides forest/tree products and services for market sale • promotes employment in tree growing, maintenance, harvesting • provides opportunities for value-added processing of wood, handicrafts • serves as energy source: fish-drying, tobacco-drying, bakeries and eateries, iron smelting, metalworking, dendrothermal power plants • helps support interindustry linkages: aquaculture, estate crops (cacao, coffee, rubber), hydroelectric power



3 Strategies for Local Stewardship of Forest Resources

Strategic interventions to promote sound forest management can be grouped as those that

- *Build institutional capacity* to support programs and projects in local forest protection and management. This is accomplished across government agencies, in the private sector and NGOs, in farm and community organizations, and in networks of many organizations.
- *Transfer appropriate technologies and practices* for forest use, protection, and management. This is done by providing technical guidance in tree planting and growing, in natural forest management and in harvesting and using timber and nontimber products.
- *Foster education and awareness* in addressing forestry problems. This is achieved by working at the level of farmers, NGOs, government forestry staffs, and private contractors.
- *Reform natural resource policies* that lead to unsustainable forest exploitation. This addresses legislation and regulation, market performance, land and tree tenure, and government subsidies and taxes.

The appendix lays out the analytical framework used in carrying out this assessment. The framework assumes that the above interventions increase the capacity and benefits for governments, NGOs, communities, individual landowners, and private enterprises that engage in sound forest management. Table 3 summarizes those activities carried out under each intervention in the six case-study countries. Target populations adopt improved management practices, and that leads to favorable economic and environmental outcomes.

Building Institutional Capacity

Introduction of farm and community forestry activities into existing systems usually requires new administrative units, especially in extension forestry and community outreach. Traditional agencies are realizing they cannot win the trust or cooperation of a farm and community constituency so long as they continue to present the image of rural police whose primary function is enforcing forest laws (Arnold 1991).

The role of "social forester" is evolving into a specialized professional and paraprofessional discipline. On the one hand, the social forester must master skills in communication, organization, and social analysis. On the other, the social forester must understand technical nature-forest ecology. This intersection of so-

cial and natural sciences must be reflected in curriculum development and field training for farm and community forestry (Burch 1988).

Success in farm and community forestry demands coordination between public authorities and participating communities. In the case of USAID support, various interventions have been the responsibility of such intermediaries as NGOs, PVOs, private contractors, and community and farmer associations. Required also, however, is a supportive institutional environment, one that promotes good working relationships and solid technical capacity across this spectrum of forestry activities.

Reorienting Governments Toward People-Centered Stewardship

USAID has employed a variety of approaches to help governments conduct farm and community forestry. Interventions include providing project advisers, training staff, and funding facilities and equipment to bring about government reorganization and technical development. These interventions are intended to build outreach capability and provide a policy setting favorable for local participation in forest stewardship. For this reason, capacity building in the public sector must be arranged as part of most other interventions. The aim is to instill in government forestry agencies favorable attitudes and positive incentives to support farm and community forestry. For example:

1. Institutional development is represented well in the case of Pakistan. There USAID directed its capacity-building strategies to planning and policy coordination through the office of the inspector general of forests, through creation of social forestry wings at the provincial level, and through expansion of curriculum development, training, and research at the Pakistan Forestry Institute.

2. In Nepal the Agency invested substantially in government and university staff and infrastructure for forestry. USAID sponsored 101 Nepalese for long-term and hundreds more for short-term training. Several senior administrators were educated in the United States, including two of the last three secretaries of the Ministry of Forests and Soil Conservation. Two USAID projects helped build the faculty at the Institute of Forestry; faculty members in turn educated the new generation of farm and community forestry officers. USAID also funded improvements in offices, housing, and access roads for community forestry in three remote areas.

3. Because the Philippines is rich in university-educated professionals, USAID's approach did not concentrate on formal long-term training as in Nepal. Instead, the Rain-fed Resources Development project enabled staff of the Department of Environment and Natural Resources to observe farm and community forestry in the field. With its many field sites, the project was a laboratory for trials that educated government officials and staff about the social and technical realities of farm and community forestry.

4. In Costa Rica, where there are also abundant skilled professionals, the Agency helped establish the Foundation for Development of the Central Cordillera. FUNDECOR is an endowed regional NGO that interacts with agencies of the Ministry of Natural Resources, Energy, and Mines on institutional and technical matters. As in the Philippines, USAID emphasized field activities. Through on-the-ground orientation and field programs, the regional NGO informs and influences government administrators and staff in both the parks and forestry agencies. This provides a bottom-up reality check on government policies and regulations. Because of good working relationships with government staff, the NGO exercises considerable leverage over policy and regulatory change.

5. In the Gambia and Mali, USAID gave less support to capacity building—with telling consequences. Designers of the Gambia Forestry Project determined that adequate technical re-

sources existed in the Department of Forestry, and no long-term technical assistance was provided. Yet at the time of the first project evaluation in March 1982, the project was behind schedule by nearly two years. That was due in part to limited technical capability of a small department staff.

6. In Mali the Village Reforestation project (VRP) aimed at improving technical capacity in the Forestry Service, but the budget for training was small. Government foresters had minimal preparation in extension techniques and were exposed to only a limited number of technologies and practices in the field. Evaluations sharply criticized the project for lack of attention to capacity building. Only late in project implementation did training take place for 314 Forest Service and VRP staff.

Making Social Foresters

Through projects aimed at farms and communities, USAID has helped orient part of the forestry profession toward the grass roots. Project activities to achieve this include training, curriculum development, and preparation of manuals and guidelines. Examples:

1. In Nepal the Institute of Forestry has worked on curriculum reform—including provision for social forestry—since its beginning in the early 1980s. Important in this were efforts through USAID to help the institute introduce concepts and methods in participatory planning and development.

2. In the Philippines, USAID funded development of field training and manuals to explain and guide practices in contract reforestation and assisted natural regeneration.

3. In Mali recent forestry activities have been supported by training sessions and publicity campaigns in local languages.

Establishing and Strengthening Intermediaries

Initiatives to foster local forest stewardship attract a variety of NGOs, farmers associations, academic and church groups, and others interested in tree management, socioeconomic development, and environmental protection. These organizations often succeed in farm and community forestry because of their grassroots orientation and commitment to the poor, and the trust this wins with project participants. Still, many NGOs lack technical forestry expertise, which often must be nurtured with the help of outside assistance. A principal strategy in projects evaluated has been to create and strengthen intermediary groups working in farm and community forestry. For example:

1. In the Philippines, 10 of 20 project field sites were contracted to existing rural-development NGOs. In another 10 sites, local residents organized themselves into community groups to contract for community-based forestry activities. When the project ended in 1991, a network of organizations experienced in community forestry had been established. They were staffed largely with former project personnel and participants (see box 2).

2. In Nepal a regional NGO with USAID support helped develop forest user groups. The Department of Forests credited the NGO with helping the government meet the targeted number of management transfers to user groups. One forest ranger commented that, because of the work of the NGO, he was able to reduce his time and effort in forest policing and give more attention to community outreach.

3. In the Gambia Forestry project, Peace Corps volunteers supported the village woodlot component. Although no woodlots observed by the evaluation team were yet successful in supplying fuelwood, all those still in existence had been assisted by a U.S.

Box 2. Sustainability and Spread: Unexpected Dividends From Investing in Project Staff Training

A subtle outcome of USAID farm and community forestry activities emerged in the Philippines. During the 10 years of Rain-fed Resources Development project support for farm and community forestry, implementers recruited and trained scores of Philippine staff to oversee operations at upland project sites around the country.

After USAID support ended, project field staff continued to operate (or have formed their own) NGOs and private consulting firms. These groups are active in social forestry and other upland conservation and development work. The former project staff carried with them the training and hands-on experience that is helping make farm and community forestry groups more viable.

Some former project staff also work for government agencies. Recent decentralization of forestry programs has opened up positions for forestry extension staff in local municipal governments. RRDP staff have also taken advantage of these opportunities. Local mayors and other officials hired project foresters because their training and experience proved valuable to meeting specific local needs.

Peace Corps volunteer, government forest agent or local NGO.

4. In Mali a local affiliate of CARE is testing participatory approaches in village management of nearby forestlands. Among other interventions, the CARE affiliate contracted a lawyer to identify possible mechanisms for villages to negotiate stewardship agreements with Mali's Forest Service.

5. In Costa Rica, the regional NGO, FUNDECOR, is legally constituted to contract out forestry services and receive income to cover the costs of its operations. By the end of 1993 FUNDECOR had had plans approved to reforest 435 hectares and signed agreements with the owners for sustainable harvest and use of 8,700 hectares of natural forest. FUNDECOR is able to avoid some of the bureaucratic constraints found in the public sector. It can concentrate on activities according to the market test of their viability. The organization also is striving to upgrade the capacity of other NGOs.

Transferring Appropriate Technology

Some observers hold that technical problems in farm and community forestry are minor compared with the complexity of social issues. This is debatable. In many cases, trees and shrubs are managed on sites that are small, dispersed, and unproductive for all but the hardiest of species. Critical factors related to soils and climate may be variable and unknown. Written instructions are useless where most of the people are illiterate and unaccustomed to receiving formal technical guidance (Foley and Barnard 1984).

The price of technical failure can be high. It is measured in time and money and lost confidence. Project sponsors and organizers accept a heavy responsibility each time they persuade farmers and villagers to invest land and labor in tree management. Losses because of droughts, insects, pathogens, livestock browsing, and other technical problems may seri-

ously discourage "beneficiaries." For this reason technical choices in farm and community forestry increasingly favor diversity, versatility, and adaptability in strategies to help manage risk (Chambers and Leach 1987, Tschinkel 1987, Kerkhof 1990).

In projects where trees are grown from seed or seedlings, a fundamental question is choice of species. Technical criteria for selection include ecological suitability, growth and yield, water requirements, seed availability, and resistance to pests, fires, and droughts. Above all, the species must satisfy the objectives of planting—whether for shade, fruit, fuelwood, fodder, cash crops, shelter belts, live fences, ornamental purposes, or other uses (Burley 1980, Butterfield and Fisher 1994).

Where doubts exist on seed availability or expected tree performance, many projects rely on species already known in the project area. This minimizes risks of failure, even if performance may be less than with species that are promising but untried. Prudent strategies typically begin with familiar species while simultaneously testing the survival, yield, and local acceptance of alternatives. But a quandary often arises: commercial pines and eucalyptus familiar to foresters are not familiar to local farmers, and the native species familiar to farmers are not well known by foresters.

Much current opinion argues for managing and regenerating natural forests and woodlands. Understandably, shifting the emphasis toward community management of natural vegetation is endorsed widely by environmental groups. At the same time, many field sites call for planting or seeding to protect watercourses, to establish high-value tree crops, or to reintroduce vegetative cover where existing vegetation is sparse or denuded. Both tree planting and natural forest management can be technically appropriate, depending on site-specific circumstances. Moreover, many projects need to consider both strategies in combination.

Choosing Among Technology Alternatives

In the case-study countries USAID forestry programs encouraged the spread of the best existing technologies (tree species and management practices), helped transfer technologies from other locations, and, in rarer instances, supported development of new ones.

In Nepal, working through CARE and other NGOs, USAID supported diffusion of local species and local practices. The Agency concentrated more on getting proven technologies in the hands of more farmers and communities than on developing or transferring new ones. The strategy for spreading forestry technologies was to promote community organizations and remove policies that discouraged tree planting. The Philippines program also used known technologies. At most project sites, the species planted were chosen on the basis of seed availability and ease of seedling production rather than economic value or other criteria.

In Mali the Village Reforestation project was among the first projects to incorporate agricultural interventions into forestry. These included fruit trees, gardening, field trees, and microcatchments. In VRP's grant to CARE, master farmers were trained in a technology, and those farmers then taught others. CARE withdrew its support once a technology was firmly established. Several practices used in Mali came from the Agency's regional Natural Resources Management System project and from projects in neighboring countries.

In the Gambia, project designers settled on the deciduous gmelina, as the primary tree for project woodlots and plantations. But this choice proved inappropriate on both biological and social grounds. Project designers had optimistic assumptions about seedling survival, growth rates, and local demand that turned out false in practice. Moreover, villagers were

more interested in fruit trees and vegetables than in fuelwood trees.

In Pakistan the USAID project initially promoted a local multipurpose tree, *Acacia nilotica*. But this tree met with acceptance in only limited growing areas. It had an unforeseen susceptibility to frost and saline soils, and market demand was poor. The project then turned to block plantings of *Eucalyptus camaldulensis*. Though an exotic, it was known to grow well in harsh conditions.

In Costa Rica, FORESTA promoted eight native species among its choices for reforestation. These were selected on the basis of research in the project area by the Organization for Tropical Studies. In addition, the project had a major component in natural-forest management. This represents a significant departure from most of USAID's past forestry efforts, which have undertaken mainly tree planting. FUNDECOR's approach is to apply "technologies" of planning, advising, and contracting to encourage forest practices that minimize environmental damage. Activities include road construction, tree felling, log extraction, and silviculture.

Significantly, several of the case countries draw on tree-growing networks supported in part with USAID funding. Important forestry networks operate today in Central America and South and Southeast Asia. The evaluations found no evidence, however, that these networks were important technology sources in the six country programs studied. This may possibly be explained by aspects of timing, by mismatched objectives, or by oversights by project evaluators. Or it could be because linkages, though real, were too indirect to trace. Remaining for a future evaluation is the question, What role should research networks play in supporting initiatives in farm and community forestry?

Providing for Planning, Monitoring, and Research

Choices and subsequent evolutions in project technologies require frameworks of planning, monitoring, and research. Only some of the projects developed such frameworks. Efforts along these lines have been negligible in the Gambia and the Philippines. Elsewhere they have been generally incomplete.

In Pakistan a research component was added to the Forestry Planning and Development project after initial momentum and commitment were established. The aim was to combine social research emanating from project headquarters with technology research across a network of provincial and departmental units. Technology trials concentrated on studying the growth performance of new or exotic species such as mulberry and cricket willow. At the time of evaluation, 3 technology studies had been completed, and 28 were under way.

In Nepal, USAID directed only modest support to forestry technologies. However, a few small efforts in applied research merit attention. In the Mustang District, the Agency helped the CARE/Natural Resources Management project experiment with methods of vegetative propagation of willows and poplars. The Agency also has introduced interplanting of grasses and forage herbs among planted trees, a promising approach in view of increasing market demand for hay. The evaluation team estimates that the forage in irrigated woodlots may exceed the value of the wood itself, illustrating the rationale for technology testing and assessment.

In Mali, USAID provided limited support to build a framework of planning, monitoring, and research. The Village Reforestation project did not generate usable data to chart the successes and failures of pilot activities. The project installed management information systems for administration and finance, but none

of this carried over into technical aspects of forestry activities. As a result, attempts to quantify the effects of technological interventions on land productivity are recent and of uneven reliability. Some base lines were flawed because of poor interview techniques. Mali's research institutions for forestry remain weak and dependent on external funding. USAID has funded research on farming systems, but because of institutional separations in Mali's government, none of this has been directed toward trees and forests.

In Costa Rica the institutional setting for planning, monitoring, and research is stronger than in Mali. Yet even Costa Rica's FORESTA has experienced obstacles in these activities. The FORESTA project has invested heavily in satellite-based geographic information system technology to aid in its planning and monitoring of forest management. The investment has yielded favorable results.

But FORESTA illustrates that research support through other institutions cannot be taken for granted, even in countries assumed to be rich in research capacity. FORESTA has benefited from research by local institutions. Little of this research, however, has sprung from actual requests from FORESTA—that is, it has been random, not demand driven. At the time of CDIE's evaluation, FORESTA had yet to pair with any of these institutions to engage in research addressing the specific needs of the project, even though FORESTA officials had submitted a proposal specifying the kinds of research they desired to carry out jointly with one or more of the institutions.

Fostering Education and Awareness

Tree management on farms and in communities is ideally a stewardship arrangement in which decisions and actions are in the hands of local people. The professional is promoter rather than policeman, motivator rather than manager (Gregersen et al. 1989).

Yet even in regions with pronounced scarcities of forests and trees, tree planting and forest stewardship may be low among priorities compared with immediate needs for water, food, health care, and employment. In some regions, local people cut trees to reduce crop-eating birds, to eliminate hiding places for thieves, and to get rid of snakes and ghosts. Consequently, the message that "trees are good" is far too simple (Foley and Barnard 1984).

It is often the women who are the experts in farm and community forestry. Because they generally hold primary responsibility for family food and health, women often know more than men about local fuelwood supplies, medicinal plants, and food products from trees and shrubs (Fortmann 1986).

Promoting Extension and Outreach

USAID's strategies to reach out to farmers and communities include a number of approaches. Among them are promotional materials (Pakistan), training centers (the Philippines), model sites (the Philippines), master farmers (Mali), village motivators (Nepal), extension agents (Mali), film and radio messages (the Gambia, Pakistan), farmer-to-farmer demonstration visits (Pakistan, the Philippines), and contractual arrangements (Costa Rica).

In Pakistan an estimated 80,000 farmers received direct training through the outreach component. At the field level, this was accompanied by farmer-to-farmer visits and placement of signs announcing farm forestry extension. The logo on these signs is repeated in banners, publications, bumper stickers, and sew-on patches. Other channels to create awareness included a video, communications with the media, and seminars on agricultural development.

As in Pakistan, USAID in the Philippines invested heavily in outreach strategies. More than 15,000 extension agents and farmers at

roughly 30 sites received training in agroforestry methods and in financial and administrative skills. Selected farmers were chosen to visit model farms, each of which featured different technologies. After their cross-farm visits, farmers were expected to share what they learned through community meetings and on-farm trials of the technologies they had witnesses.

Unlike Pakistan and the Philippines, outreach strategies in Nepal have been directed at a small number of targeted communities. A main approach is to have NGOs use village motivators to build awareness and capability during a three-year cycle. At some project sites, NGO field staff live and work with villagers for one year to build awareness and create user groups. They follow this with two years of technical support in forest planning, management, and harvesting among other topics (such as wood stoves, tree nurseries, and compost making). In the same way, CARE works through a motivator to build awareness in a particular village before following up with technical assistance to user groups.

In Mali, inhabitants of environmentally stressed regions are well aware of problems and issues in soil, water, and forest conservation. Thus in recent years, USAID's approach has turned from creating general awareness to alleviating specific constraints. Outreach strategies have featured master farmers and extension agents to transmit techniques in tree nurseries, horticulture, and soil and water conservation. NGO staff train selected farmers, who in turn teach the technologies to others. However, this strategy slights the question of how extension can be multiplied efficiently. Each master farmer knows only some technologies, and no efforts are afoot to expand the number of master farmers through an institutional approach.

The Gambia Forestry project worked through both film and radio to attempt to create awareness of specific issues in forest management, especially fire prevention and control. However, the first efforts relied on films imported from the United States. The project subsequently contracted a Gambian firm to produce a film on bush-fire prevention and control that was shown at regional gatherings. The extension component developed weekly radio messages, and the radio spots are credited with prompting requests from three communities to establish community resource management agreements with the government.

In Costa Rica the FORESTA project called for environmental education for the general public living in and near the project area. The evaluation team found, however, that this has not been done. Instead, FORESTA chose to concentrate its training on project participants—loggers, reforestation contractors, nursery operators and workers, and landowners participating in the project. One of FORESTA's principal outreach techniques is the use of contracts to specify how tree planting and harvesting are to be conducted. For example, logging contracts specify practices regarding tree marking, directional felling, road construction, and log extraction. These requirements are supported by training.

Reaching Women

It is frequently urged that women be given adequate representation in the planning and implementation of farm and community forestry, but this can be a hollow exhortation unless accompanied by specific strategies. Recruitment of women as professionals and technicians in farm and community forestry is one such strategy. Other strategies depend on local circumstances.

In the Philippines and Costa Rica, project designers did not make special provisions for women—perhaps on the premise that women in those countries are sufficiently empowered. In the Gambia, project conception and implementation largely predated emergence of the

gender issue. Hence only the cases of Mali, Nepal, and Pakistan are worth reviewing:

In Mali project designers recognized women's disproportionate workload in gathering wood. The design is based on the premise that woodlots, along with improved stoves, would lighten this workload. Yet the design overlooked that women also do most of the work to water seedlings. And the design failed to include women in the distribution of tree harvests. The project did make a small contribution to the direct employment of women as project staff. Women were contracted as extension agents to work on wood stoves in the later phase of VRP, but were let go when USAID funding ended.

In Nepal the Institute of Forestry at Pokhara opened its doors to women students, who were helped by an affirmative-action policy. Women constitute more than 10 percent of the student body, but graduates report difficulty in finding employment.

Pakistan. Through USAID's forestry project, training at the Pakistan Forestry Institute had two main initiatives: introducing a curriculum in social forestry, and supporting the training of female foresters. At the time of CDIE's evaluation (late 1993), female graduates were beginning professional work. They had yet to assume official posts in the government.

Reforming Natural Resource Policies

Government policies nominally designed to protect trees and forests often produce contrary results. This is true of tenure, pricing, fiscal, and regulatory policies. Many governments have been slow to make their forestry codes accommodate farm and community forestry. Officials have been reluctant to part with command-and-control approaches. For governments accustomed to strong intervention, deregulation and devolvement of control to local levels are not easy changes. This refers to traditional requirements in many countries that forest products cannot be harvested, transported, or sold without government permits—often even for trees on private lands (Ascher 1995).

Policies on land and tree tenure are hugely important for farm and community forestry. Local investments of time, labor, and materials do not take place without secure rights to the future goods and services that will be produced from trees and forests. But many governments have been reluctant to cede partial or complete user rights on public forests, woodlands, or even "wastelands" to local inhabitants. Thousands are using public forests illicitly, and governments resist granting legal rights to people they classify as trespassers. Moreover, granting greater tenure rights to local communities often draws resistance from government officials whose power depends on controlling as many lands as possible. (Fortmann and Bruce 1988).

Without enforcement to stop illicit use, forests and woodlots are open-access resources. Policies to discourage illegal activities must be sufficiently effective that all actors—farmers, communities, and others—adhere to prescribed practices. Yet the best means to accomplish this are widely debated. Use of government police power is one means. As noted earlier, though, local communities are wary of this. Other approaches are various types of community associations, kinship alignments, and other self-governing mechanisms (Ascher 1995).

Policies on subsidies pose another complex issue for farm and community forestry. Some projects have used cash payments, below-cost seedlings, and other subsidies to induce farmers and villagers to plant and take care of trees. The intent is to offer a means of encouraging local people to begin or expand tree planting and forest stewardship at little cash cost to themselves. But generous subsidies tend to attract people more interested in the cash pay-

ments or free seedlings than in resources management. And subsidies for seed and seedlings may discourage the start-up of nurseries by private growers, since they are unable to compete with the low-cost supply of subsidized seedlings (Laarman and Sedjo 1992).

Promoting Legislative and Regulatory Reforms

The designs of most projects evaluated here predated the prominent rise in forest policy issues, which took hold beginning only in the late 1980s. Nevertheless, all projects except Gambia's attempted to influence legislation and regulation. Principal interventions included assigning policy advisers to work with governments, sponsoring policy workshops and symposiums to raise the profile of specific policy issues, communicating observations from project fieldwork and commissioned analyses as a basis for proposing policy changes, and meeting with government officials to endorse or contest planning and policy frameworks.

In Pakistan the Agency's Forest Planning and Development project placed an adviser to work directly with government policymakers on issues pertaining to forests. It also sponsored market policy studies and an international symposium on forest policy issues.

Reforms targeted by USAID in Pakistan were to transform foresters from "forest police" into farm forestry promoters and to realign government spending from seedling subsidies to research and extension support. The market studies and a policy symposium to present their findings helped heighten the importance of farm and community forestry in Pakistan's National Forest Policy of 1991.

In both Nepal and the Philippines, USAID's projects helped contribute to the formulation, review, and final acceptance of forestry master plans. Plan sponsors were the Asian Development Bank and Finland. USAID and other donors have been active partners.

In Nepal the master plan places community forestry within an overall strategy of forestry development and allocates a substantial portion of funding for the effort. USAID provided inputs to the master plan in the form of policy analysis, document review, and lessons learned from its field activities in community forestry. Later, the Agency helped shape and encourage passage of a 1993 forest act, which gives legal sanction to statements in the master plan. Interventions included using a consultant to draft two key documents, translating the act into English, and contracting an NGO to make a legal review of bylaws that implement the act (see box 3.)

In the Philippines, USAID's Rain-fed Resources Development project was among the pioneering efforts to pave the way for the people-oriented principles laid out in the master plan. It also led to various administrative directives formalizing lessons learned from the project and other pilot programs for implementation of the Integrated Social Forestry Program.

Mali is another country in which USAID has contributed to policy reforms affecting forests. As elsewhere, these efforts have had to be negotiated and coordinated with those of other donor and NGOs. The Agency provided analyses through the Land Tenure Center (Wisconsin) on how weaknesses in the Forestry Code and its regulations interfere with establishing and maintaining trees. USAID imposed conditions that prohibit forestry staff from policing and law enforcement when engaged in outreach activities. Moreover, USAID funded background analyses and participatory meetings to facilitate a national conference on new forestry legislation.

In Costa Rica the pace and impact of reforestation and forest management have been slowed by complex bureaucratic rules and processes. For landowners, especially small ones, the costs and difficulties of meeting the government's forestry requirements are discouraging. USAID has supported efforts by the

Box 3. Codifying Community Forestry in Nepal

Although USAID is a relatively minor donor in funding for forestry in Nepal, it has played a large role in reforming forest policy and legislation. The Agency has been influential in involving other international donors in support for preparing a master plan for the forestry sector. The plan dramatically shifted national forest management and control policies toward involvement of local communities. The plan places community forestry within an overall strategy of forestry development.

Drawing on lessons it was learning in other projects, the Agency provided comments on sections of the master plan addressing community forestry. For example, the Agency was able to point out both sociological and technical issues in protecting and managing forests. USAID also helped move the agenda forward on private forestry. It did this through an analysis of private forestry in Nepal, along with an analysis of fuelwood marketing in Kathmandu. These influenced an important section of the master plan. These analyses remain important in donor attempts to encourage the Government of Nepal to privatize the Timber Corporation of Nepal, a money-losing parastatal.

After Nepal's government adopted the forestry master plan in 1989, and following the democratic revolution of 1990, the old forest act needed revision to reflect the new situation. USAID played an important role in drafting and encouraging passage of the 1993 forest act. The Agency funded a consultant to produce two documents useful in formulating the act and funded the English translation of the act to give international donors an opportunity to comment on it. Section 25 of the act states that

> The District Forest Officer may hand over any part of a national forest to a user group in the form of a community forest in the prescribed manner entitling it to develop, conserve, use, and manage such forest, and sell and distribute the forest products by independently fixing their prices according to an operational plan.

Thus the act gives legal status to user groups, allows these groups to sell and distribute forest products, and decentralizes the process by which national forestlands are transferred to them. This represents considerable institutional progress for a central government that in the past was reluctant to devolve even a small part of its control over forests.

Foundation for Development of the Central Cordillera to modify this regulatory framework in important ways. For example, FUNDECOR has worked with government foresters to change planting regulations to fit native species. Previous guidelines pertained only to exotic species, which are planted at higher densities than native species. Reduced planting densities reduce planting costs and the government's subsidy payments.

Forest management plans prescribed by the government's forestry authorities were complex, repetitive, and concerned with harvesting rather than management. FUNDECOR has helped the government introduce guidelines calling for improved methods of forest management. It has also suggested ways to reduce paperwork. As noted earlier, FUNDECOR has employed satellite-based geographic information system technology to improve the quality

and reduce the preparation costs of forest management plans.

Fostering Tenure Reforms

Several projects have aimed to increase local control of farm and community forestry through tenure changes, sometimes combined with training in managerial skills. Principal examples are the Gambia, the Philippines, and Mali.

In the Gambia, USAID's project had initial difficulty defining community ownership. Some woodlots were established on lands belonging to village chiefs, whereas others were started on a more ambiguous category of lands designated for tree growing by a village chief or some other village leader. It became apparent that community "ownership" was more secure on the first category than on the second, explaining in large part why different woodlots were either maintained or abandoned. Since 1991, USAID has joined with other donors to emphasize community resource management agreements as a means to strengthen local rights and decision-making over specified areas of forests and associated resources. The agreements, when supported by management plans, may facilitate the issuance of long-term (99-year) land leases.

Tenure was similarly critical in the Philippines. To promote group planting on government lands, people were paid in cash or in kind. In most cases, the planting was adequate from a technical standpoint. However, subsequent maintenance was not observed where outside payments had been withdrawn for a year or more. Moreover, even while payments were forthcoming, many planted areas were adversely affected by fires and livestock grazing. In comparison, maintenance generally was good where trees were planted on private lands.

As for Mali, that country illustrates a society in which projects can use the communal approach if they are able to build or take advantage of strong self-help institutions. For example, the Village Reforestation project (in its second phase) employs a highly participatory strategy in defining technology and extension. A group of agents visits a village, encouraging open debate on needs and means and persons to address them. Later, different groups of partners organize themselves to implement the different activities, including outreach visits to other villages.

Reforming Market and Fiscal Policies

In the selected projects, USAID's interventions in market and fiscal issues have been modest. The Agency helped along some privatization in Nepal and the Gambia. It funded market analyses in Pakistan and Nepal. It identified subsidies for farm and community forestry as key policy issues in Costa Rica, Pakistan, and the Philippines. Largely missing, however, have been cross-sectoral policy explorations—for example, linking markets and prices in agriculture and energy with effects on forests and other tree cover.

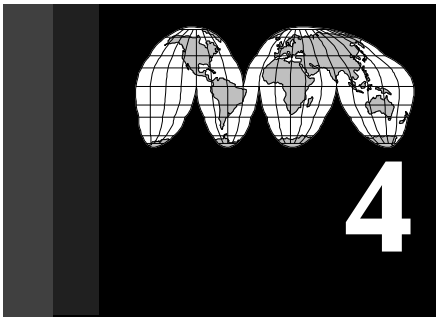
In Nepal, USAID helped move the private enterprise agenda forward by funding an analysis of private forestry and fuelwood marketing. This helped shape sections of Nepal's forestry master plan, and it strengthened the rationale for privatizing the parastatal Timber Corporation of Nepal. Although the government has resisted giving up its Timber Corporation, USAID's Rapti project successfully initiated privatization of tree nurseries. This is helping to trim program costs, because expenditures for seedlings produced in government nurseries had accounted for 30 percent of planting budgets in the Rapti area.

In the Gambia, privatization of the only sawmill was accidental. It occurred because of the Gambia Forestry project's failed efforts to strengthen the Forest Department's sawmill, leading to its divestment. USAID's successor project is designed to emphasize liberalization of natural resources markets, and rationaliza-

tion of resource pricing and revenue collection.

A principal policy issue in farm and community forestry is the level and composition of subsidies for it. As noted elsewhere, this was to have been a policy thrust in Pakistan's farm forestry, even though the project had no clear strategy to address it. The project in the Philippines correctly framed the subsidy problems but had little leverage to affect policy because of design limitations.

In Costa Rica, FORESTA has been able to get the government to verbally approve incentive payments for private management of secondary forests. The government has yet, however, to release any payments to landowners. The larger issue, still unaddressed, is whether reforestation incentives in Costa Rica are too generous in relation to their environmental and socioeconomic contributions. Important valuation questions are not well answered.



4 Program Impact and Performance

The evaluation examined the impact of USAID projects in farm and community forestry on behavior of participants and on the biophysical and socioeconomic changes that these practices produced. All evaluated projects aimed to improve management of forest cover by involving individuals and groups. Critical indicators are the number of participants and the nature of practices they have adopted in farm- and community-forestry management.

The field studies also assessed the performance of farm- and community-forestry programs on the basis of how efficient and effective USAID support was at bringing about changes in practices and in biophysical and socioeconomic conditions. Finally, they looked for evidence that farm and community forestry is sustainable beyond the period of USAID support and replicable beyond original project sites.

Impact on Practices

USAID forestry projects work to change environmental and economic conditions through changes in behavior and practices of participants. Because changes in environmental and economic conditions are often slow to occur and difficult to measure, changes in practices can serve as indicators of impact. Changes in practices were measured by the share of adopters among potential participants and the extent of adoption among the array of practices introduced. In the case-study countries, factors influencing changes in practices included security of tree and land tenancy, the degree to which participants had a say in selection of forestry technologies, and clarity of arrangements for distributing local costs and benefits among participants.

Security of Tenancy

Opportunities for local control over land and tree use has encouraged more responsible forest management. Fear of loss of control over land once trees are planted on it was a common obstacle to promoting farm and community forestry in all countries. Several years are required to build participant confidence that they can control trees for which they are responsible.

In Nepal, villagers are now protecting forests in anticipation of eventual turnover of management authority from the government. The process has, however, proven lengthy. First, villagers form protection committees to advance their claim as legitimate forest users. After providing protection for a few years, farmers report that they are able to present a strong case for being the legitimate users of the forest.

In Mali, villagers almost unanimously believed woodlots, even those they helped establish, belonged to the government and not to themselves. The Forest Service's directive approach contributed to this perception. Participating villagers only reluctantly adopted management practices proposed by government foresters. Fearing fines, villagers would not prune or harvest trees unless told to do so by the forestry agents.

Selecting and Adopting New Technologies and Practices

Participants in farm- and community-forestry programs were most disposed to adopting new practices when they had a say in the choice of forestry activities and techniques. Where projects promoted a "cookbook" approach to tree planting, they encountered the least receptivity to adoption. At the outset of social forestry programs in the Gambia, Mali, and the Philippines, project implementors attempted to introduce practices and technologies through cookbook tree-planting and management rules. Project staff later recognized that the pace of adoption accelerated when participants were given more freedom to adapt practices to their own concepts of what should be done.

In the Gambia and Mali, village fuelwood lots were promoted in large measure because of program designers' assumptions that there was a rural energy crisis. But fuelwood's value proved low compared with other woodland products. Participation in village forestry programs began to spread and last only when farmers' interests in planting fruit trees and other cash crops were recognized. As one local Malian leader commented about the trees his village was expected to plant:

> We told them we wanted mango, guava, and papaya trees but they brought us neems [trees whose bark and fruit have medicinal value]. They forced us to plant these trees. They fooled us; they said we could use the trees. But if we ever cut the trees in the woodlot, then they would make us pay a huge fine. We would like to make a village store, but we don't dare cut those trees.
>
> We aren't interested in expanding the woodlot, at least with those species! It's been seven years since we planted those trees, and we have not gotten any benefit yet. Now the trees are pretty, but other than looking nice, they are of no use to us. When you do work, you expect to get some kind of reward. The trees we have in the forest are more resistant to termites than neems are. These trees haven't convinced us they are worth the effort.

In Mali, garden/nursery/orchard/woodlots proved more popular than woodlots alone. These mixed agroforestry systems generate income and meet a variety of needs, including tree products. These systems are best owned and managed by individuals, except when access to land is limited.

The Gambia program switched from centralized and public sector nurseries to contracting with individual mini-nurseries. In this way private individuals and small companies could sell seedlings to the Forest Department, donor projects, and other individuals and companies. Also, tree nurseries combined neatly with vegetable gardening as an income producer.

In the Philippines, rapid rural appraisals were first conducted to identify local farmer and community needs and desires. Adoption followed quickly in project sites. For example, multistory farm forestry was introduced and adopted at sites where farmers had settled on a logged-over patchwork of forest remnants and grasslands. At these sites they established an understory of rattan, local fruit, shade cacao, and others. The next story included trees such as breadfruit, coconut, dap-dap, and mahogany. Ground cover consisted of camote, gabi, ginger, pineapple, and yam. Outside the canopy lay citrus groves, wet-rice fields, and tilapia ponds.

In hilly Philippine sites, farmers preferred to adopt agroforestry systems using trees in terraced hedgerows for soil conservation and fertility maintenance. On land at sites where trees once grew, participants chose timber trees for reforestation. This diversity of systems and practices added scope and vitality to the program.

Distribution of Local Costs and Benefits

Willingness to take an active role emerged only when there was clear understanding of costs and benefits of participation for individual members. Group management of forests has worked best when all understand and agree about sharing program costs (of land, labor, and funds) and benefits (income from harvests and wages from services). Failure to recognize how costs and benefits will be shared lowers program performance (see box 4).

In Mali group practices were adopted only when 1) other options were not feasible, 2) there were clear and prompt income or food benefits, and 3) benefit or profit-sharing mechanisms were clearly defined. Although local management of natural resources has attracted attention among development agencies and government organizations throughout the Sahelian region, Mali started later than its neighbors. USAID's activities to promote group management began only after 1991. The evaluation two years later found little evidence of change.

In Nepal, USAID–supported forestry activities often built on already well-established forest user groups. These groups typically pool their earnings from fees and fines levied on users into savings accounts to support local community development. Although village savings are modest, they represent an important development in collective cooperation, decision-making, and community self-help.

Biophysical Impact

Two types of biophysical impact were considered in this evaluation:

- *Changes in forest cover.* Have forestry projects slowed the net loss of forests by shifting demand for timber and fuelwood to farm- or community-grown trees?
- *Changes in soil and water quality.* Have soil and water conditions improved on lands under farm- or community-forest management?

Only anecdotal evidence exists to answer these questions, because little benchmark data were collected at the outset of most forestry projects. Moreover, most programs in farm and community forestry are only now gaining sufficient maturity to produce tangible, measurable biophysical changes. The dearth of information available to measure changes in biophysical conditions underscores the need for reinforcing efforts to monitor forest project implementation.

Changes in Forest Cover

USAID has contributed directly to getting trees into the ground and keeping them there. Newly forested areas now stand at several project sites in Costa Rica, Nepal, Pakistan, and the Philippines. Less evidence of biophysical changes exists at USAID project sites in the Gambia and Mali.

USAID support for farm and community forestry for fuelwood and construction timber has reduced pressures on natural forest cover to the extent that demand has been met from alternative production. In Pakistan, for example, 100 million trees planted on an estimated 40,000 hectares have begun to meet a share of demand for fuelwood and construction timber that otherwise would have been harvested from natural forests and scrubland (see box 5).

Box 4. Linking Benefits to Participation in the Gambia

The Gambia Forestry project implicitly assumed that "the community" would work to establish and maintain woodlots, and then "everyone" would benefit during the course of thinning, pruning, and harvesting. In practice, the experience was different.

Harvests from woodlots are not always easily divisible, nor are they necessarily timed in relation to when community members need or desire specific products. Women cannot simply collect wood when they need it, nor can someone cut poles for construction, without raising the question of whether benefits are distributed "fairly."

This has major implications. Establishment of a woodlot requires a considerable investment of labor. Once selected, the lot must be cleared and fenced. The land must be prepared to permit the planting of gmelina stumps, seedlings, or in some cases, seeds. New tree seedlings must be protected from animals and watered when rainfall is inadequate. Weeding is required during the first three to four years to reduce competition for moisture and lower fire danger. As trees mature, they should be pruned and thinned. This is the first activity to generate any benefit to participants. It comes only after a minimum of two years of labor investment.

Small branches and sticks collected during maintenance are meager compensation for the work, and even these benefits are difficult to distribute equitably. In several cases, respondents stated that the wood generated from these activities was left for those who wanted it, implying the benefits were insignificant.

Communities face further problems in allocating benefits when the trees become large enough to yield poles, large branches, and logs. At this point there is a greater sense of economic value to be gained. Some communities have insisted that woodlots belong to everyone, and nothing is harvested unless all will benefit. One solution would be to sell all wood harvested and deposit the receipts in a community fund. Another option is to divide the harvest among households, or place the entire harvest in a communal area and allow people to take from it according to their need. There was no evidence any of these options were implemented.

Lack of a means to link benefits with participation was a critical weakness in the Gambia's community woodlots. It resulted in poor management and a tendency to defer or delay harvesting. An important lesson from Gambia is that activity should not begin before a community has a vision and agreement on how expected benefits will be allocated.

In the Philippines the biophysical impact during the life of the project was limited. In addition to 3,500 hectares planted in agroforestry systems, 1,497 hectares were reforested, only 86 percent of the area targeted. Indirectly, though, the project probably affected a wider area. This supposition is premised largely on greater effectiveness of government forestry staff and environmental NGOs to continue farm and community forestry after termination of USAID support. The ultimate biophysical impact will depend on tenure and market incentives, technical capacity of NGOs and government forestry agencies, and the extent to which governments will deregulate forest production and harvesting.

To determine biophysical impact at a particular site, it is important to know how the site was prepared and how it was used previously. In the Gambia, for example, some sites con-

Box 5. Pakistan Sees Explosive Growth in Farm Forestry

Pakistan illustrates how rapidly farm forestry can take off if expected returns are attractive. At project outset a small group of farmers operated the privately owned contract nurseries. The government reimbursed these nursery operators for providing a timely supply of seedlings. The nurseries have been profitable, although dependent on government funding, and popular because they have been a predictable income source. Because of market guarantees, nursery applications were oversubscribed.

Equally attractive were revenues of seedling recipients. A strong rural demand for fuelwood and construction poles helped farm forestry at the outset grow at an exponential rate and spread beyond immediate project beneficiaries. Despite the government's raising of planting targets, the numbers of farms, seedlings, and nurseries consistently exceeded expectations:

- The 120,409 farms reached by 1992 was 141 percent of the end-of-project target of 85,240. Small farms dominated in numbers and area planted to trees.
- The cumulative total of seedlings produced and sold ranged between 84 and 120 million.

sisted of bush land (mainly small trees, shrubs, and herbaceous plants), whereas others were formerly cropped and grazed and had little vegetative cover except grasses. Two USAID–funded plantations did not increase the area under forest cover because the land first had to be cleared of existing vegetation to make way for gmelina plantations. Although the gmelina trees were expected to grow at a faster rate and produce more useful biomass than natural forested areas, there is no evidence that this occurred (given high failure levels due to drought). On balance, the net gain in forest cover and biomass production was insignificant and possibly negative.

In Costa Rica, adverse effects from tree harvesting have been reduced by promoting adoption of selective tree harvesting and careful logging practices (see box 6). Roads built according to project specifications showed fewer signs of actual and potential erosion. Particularly noteworthy was the reduced impact of tractors removing logs. Still to be assessed in Costa Rica is the effect of plantations of native

Box 6. Responsible Logging in Costa Rica

The FUNDECOR project in Costa Rica provides an example of engendering responsible logging practices. FORESTA aims to work through FUNDECOR to encourage landowners to retain forest cover, derive income from it, and minimize environmental damage. Still, if forests cannot be logged selectively to provide income, landowners are likely to convert the entire forest to pasture or crops.

In remote mountain areas where landowners were harvesting trees with FUNDECOR assistance, there was evidence of only minimal damage caused by *selective extraction* of trees. (Selective extraction involves harvesting mature trees of highest economic value and leaving the rest of the forest standing; it is an alternative to clearcutting, in which all vegetation is removed.) Notable was the reduced size of the canopy opening—and the lower number of damaged adjacent trees—where FUNDECOR had trained loggers. Training and supervision for sustainable logging in natural forests requires considerable time and energy by FUNDECOR staff, a requirement not easily met where trained foresters are few.

tree species, the performance of which in homogenous stands has yet to be determined.

Changes in Soil and Water Conditions

Farm and community forestry has contributed to improved soil and cropping conditions. Farm and community forestry has combined tree planting with soil conservation at several sites in Nepal, Pakistan, and the Philippines. In Pakistan an important but unmeasured contribution to improving the environment follows from reclamation of saline and waterlogged soils by planting eucalyptus. Areas in which such soil conditions are found and can benefit from eucalyptus planting are numerous in Pakistan.

The Pakistan program had another indirect effect on soil conditions. Project trees as they grew and were thinned provided a source of fuel that partly substituted for cattle dung in cooking and heating. Use of farm-grown trees for fuel meant more cattle dung for fertilizer, better soil conditions, and increased crop productivity.

In Nepal, forests under community protection have shown measurable increases in growth, regeneration, ground cover, soil moisture retention, and reduced soil erosion. Sites in Nepal's Rapti zone showed evidence of better hydraulic conditions and greater stabilization against erosion. These forests had less tree cover but were being protected from grazing to allow more rapid forest regeneration.

Similarly, project sites in the Philippines evidenced restoration of forest cover and physical conditions. These not only included more tree cover but greater and more uniform stream flow, attesting to better soil water retention capacity. One farmer reported that his measure of improvement was the number of days in the year during which he could bathe his water buffalo in the stream adjacent to his fields—a measure that had doubled, he felt, as a result of more tree cover in the project area.

Socioeconomic Impact

The lag between planting and realization of benefit flows means that at this stage much of the socioeconomic impact is difficult to forecast and measure. The data attest to the preliminary nature of any conclusions about economic impact but point to the importance of market orientation for viable farm and community forestry programs.

Economic and Social Returns

Farm and community forestry has proven to be competitive with domestic food crops, particularly in sites where agricultural productivity is low and wood demand is high. Economic returns from several alternative farm forestry enterprises compare favorably with traditional rain-fed grain cultivation, the only alternative for most of these lands. Some of the farm forestry enterprises project income flows and rates of return greater than many cash crops grown on better, often irrigated lands (see box 7).

In Pakistan a promising benefits picture results in no small measure from the strong market demand for wood products. The extensive practice of farm forestry would no doubt bring prices down. With lower prices, incomes and rates of return would more closely approach those of many other cash crops.

At some Philippine project sites, simple forest products enterprises (rattan furniture, construction wood) were emerging. Stands of planted trees—though not always well managed—were evidence that participating households found forest management to be a worthwhile investment of their land and labor. That local forest user groups were concerned about getting more seedlings and technical support from the government and local NGOs is further evidence of perceived local benefits from farm and community forestry investments. Of course, the above findings are anecdotal. At project completion in 1991, USAID

Box 7. Farm Forestry in Pakistan: An Attractive Return

Is farm forestry profitable? Economic estimates for Pakistan's farm forestry are encouraging. Returns can be expressed as the annual net benefits attributed to program costs of $34.5 million. The costs comprise $27.5 million from USAID and $7 million from the Government of Pakistan. The estimated return makes these assumptions:

1. *Benefit flows.* The analysis assumes a constant benefit stream of $20 million annually over five years because of the tree-growing practices. It assumes that there are no relative shifts in crop prices or in crop cultivation technologies that make farm forestry less attractive in future years. The analysis further assumes that the opportunity cost of land put into tree crops is zero. This is unrealistic if some land might be used, say, for livestock pasture. But in view of the marginal income likely from the poor lands on which many of the tree crops are planted, an opportunity cost of zero does not greatly overestimate benefits.

2. *Investment costs.* The analysis assumes farmers pay the full costs of tree seedlings, even though the program has subsidized most of the costs to date. Thus the actual rate of return to farmers is understated to the extent that they receive the subsidies.

Drawing on the preceding estimates and assumptions, USAID's support for farm forestry has an economic rate of return of about 60 percent. The benefit–cost ratio exceeds 2:1.

Could USAID's funds have yielded greater benefits in alternative forestry activities? Suppose that USAID had invested the $34.5 million in reforestation of public watersheds. This kind of reforestation can be costly, and planting failure rates usually are high. Whether a greater area would be reforested is speculative, but direct observation of Pakistan's watershed programs indicates that they have met only limited success. Reforestation of watersheds cannot provide the capacity among farmers to operate nurseries and cultivate tree crops, thus leveraging private resources in combination with public ones. Also, public reforestation would not reach the many marginal lands in private hands that now benefit from tree cover.

support had reached only an estimated 2,220 upland families with forest management technologies that were applied over little more that 3,500 hectares.

In Costa Rica, retaining title to forested land required preparing cumbersome forest management plans for government approval. The USAID project helped reduce plan preparation time and costs enough to make selective tree harvesting from natural forest areas as profitable as clear cut-timber harvesting.

In the Gambia, technologies introduced with USAID support did not result in significant improvements in socioeconomic well-being. Few if any Gambian community woodlots attained the level of sustained production anticipated by the project. In the majority of cases, the trees did not survive the early years when drought wracked the country. In one case, the trees survived the drought, but then were destroyed by fire when they were approaching the point of offering some yield.

Production estimates for gmelina were much higher than those reached in practice. Moreover, the cost of establishing plantations turned out to be considerably higher than estimated. That is because of the need for replanting trees that died from drought, were destroyed by animals, or were consumed by

brushfires. What's more, management of the plantations was poor, further reducing the economic return from this intervention.

Enterprise Development

Farm and community forestry has widened the scope for new private enterprises. New forest-based enterprises have emerged from most of the farm- and community-forestry programs. Particularly noteworthy are USAID programs in Pakistan and Costa Rica, where family tree seedling nurseries multiplied around many project sites. Custom tree harvesting and planting contractors and groups have also developed.

In Costa Rica several factors contributed to expand forestry enterprise. By acting as an intermediary buyer of seed and seedlings and as a contractor for tree planting and management services, the USAID project generated direct investment and employment in seed collection, nursery seedling production, and reforestation. A seed collection contract, four nursery contracts, and a range of tree-planting contracts represent the start of a new industry based on native tree species. One landowner was about to sell a native tree from which the project had been collecting seed. He changed his mind when he learned he could make twice as much money by selling seed rather than wood from the tree.

Tree nurseries, and many other forest-based investments, are labor-intensive enterprises that generate jobs. Nursery operators and workers represent a spectrum of social and economic backgrounds. One Costa Rican project employs up to 12 laborers, both men and women, in seedling production. The nursery owner said that several workers had been employed by the nursery long enough to develop on-the-job skills sufficient to carry on many nursery operations in his absence. He planned to use some employees to help set up and manage satellite nurseries in other locations . . . if his employees didn't leave to set up nursery operations of their own.

The Pakistan and Nepal forestry programs introduced a significant number of farmers and communities to new sources of employment, cash income, and low-cost tree products for home use and sale. They also have stimulated tree nursery operations, custom tree harvesting, and wood products fabrication. Although these activities may have had a significant effect on the participating farm population, their impact at the national level has been less dramatic. The importance of these programs lies more in their demonstration of the potential of farm and community forestry than in their influence on national timber production levels at this point.

Benefits for Women

Farm and community forestry has had a positive effect on women's roles. Women have the major responsibility for activities directly related to food processing and preparation. This often includes the harvesting of fuelwood for cooking and of fodder for livestock. Deforestation can increase the time women must spend to collect fuelwood and fodder and thus decrease the time they devote to agricultural production, food preparation, and child care.

Four of the projects in farm and community forestry show evidence of generating new income earning opportunities for women. In Costa Rica, Mali, and Nepal, women found employment in nurseries and in planting tree seedlings. In Nepal, women were being accepted, though in small numbers, into village forestry management committees. In Costa Rica, nursery operators and reforestation contractors preferred to employ women because they tended to give added care to transplanted tree seedlings. In Pakistan cultural barriers appeared to limit the role of women in forestry activities other than wood gathering. However, a new program set up under the USAID project to train women forestry extension workers promises to broaden women's income-earning activities as well (see box 8).

In Mali project designers were aware of gender-related issues in forestry and agroforestry. The fuelwood energy–based design of the project took into account women's disproportionate workload in gathering wood. Designers felt that the woodlots, along with improved stoves, would lighten this workload. Yet the design overlooked the fact that the women bore a disproportionate load in watering seedlings and that there was no plan to include them in distribution of plantation harvests. In its later phase, the Malian forestry program hired women as contracted extension agents to work on stoves. They were let go when funding ended.

Local Empowerment

The formation of forest user groups has strengthened democratic institutions through empowerment of rural residents, including women. A democratic society is based not only on elections to parliament, but also on strong local institutions that embody concepts of equality and fairness. Rural Nepal, for example, is burdened with a caste system, privileged elites, and a history of inequity toward women. That makes a weak base for egalitarian democratic development. Forest user groups introduce a new standard. Through inclusion of women and lower caste members in user groups, disenfranchised members of society are beginning to be heard. More important, group members are learning valuable lessons about working together to achieve a community benefit. User groups and user-group committees appear to be important building blocks to a more representative democracy in the country.

Moreover, forest user group empowerment has increased government responsiveness to local needs and interests. In Nepal, Pakistan, and the Philippines, forest user groups have begun exercising political power. Nepalese groups, for example, have banded together to form regional associations to petition the government for a policy change allowing them to engage in a broader spectrum of forestry activities such as sawmill operations. In Pakistan and the Philippines, an emerging industry based on farm and community forestry is lobbying government agencies for greater supplies of credit, planting materials, and marketing assistance.

Box 8. Women Foresters and Forest Owners in Pakistan

USAID's support for farm and community forestry has not everywhere met its expressed concern of developing institutions responsive to the concerns of women. Pakistan is one exception. USAID's farm forestry program funded facilities for training women foresters at the Pakistan Forestry Institute.

Two women graduates of the institute have been hired to work in community forestry. One of them reports having made "deep inroads" in the male-dominated forestry domain. In her first two years, she accomplished the following:

- 10,000 trees planted
- seven nurseries established
- 275,000 seedlings in production

At the time of project evaluation, the Forestry Institute employed a female instructor, and 14 female students were enrolled.

Participation of Women in Nurseries/Plantations

Year	Women Owners
1987–88	101
1988–89	104
1989–90	109
1990–91	125
1991–92	200

Program Efficiency and Effectiveness

Investments in farm and community programs are expected to produce both direct private benefits (for example, household income from forest products) and indirect public benefits (improved watershed quality, reduced damage from flooding and siltation of irrigation and hydropower reservoirs). The time period is too extended and the variables are too numerous and too difficult to measure for any meaningful analysis of these benefits in relation to costs for the programs evaluated here. It is safe to say, though, that the number of people involved in social forestry must expand considerably from levels now reached at the conclusion of most projects. Otherwise, total net returns of participating households and communities will fail to approach the amount of USAID and other public investments. Still, early results are promising (see box 7).

What USAID projects do contribute are insights into how to reorient government programs and policies in support of farm and community forestry. Noteworthy are two approaches employed to transfer skills: contractual commitments between forest users and government agencies, and farmer-to-farmer or user-to-user training. Farm- and community-forestry programs have been living laboratories for experimenting with local empowerment over resource use in settings where earlier patronizing administrative systems offered little scope for local participation in planning and decision-making.

Contractual Performance

Contract forestry has proven effective at fostering environmentally responsive forest management skills. Among the more innovative approaches to emerge in USAID support for farm and community forestry are government forest management contracts or agreements with local individuals and groups. Contractual arrangements have generally been of two types: contracts specifying how forest management and tree-planting or logging activities will take place on privately owned land (Costa Rica, Pakistan) and agreements that define methods and periods of "stewardship" by individuals or groups for forested public or common lands (the Gambia, Mali, Nepal, the Philippines).

Private forest management contracts. One promising vehicle for promoting sound forest practices among private land owners is use of service contracts for tree planting or harvesting. Written into these contracts are instructions requiring landowners, tree planters, and loggers to adopt specific practices for everything from spacing of tree seedlings to procedures for sustainable harvesting and low-impact logging.

In Pakistan, contracts took the form of informal agreements with project staff to plant eucalyptus stands at agreed spacing with periodic pruning and maintenance in exchange for free or low-cost seedlings and technical assistance when needed. Similarly, tree nursery operators were given market contracts for their seedlings early in the project if they agreed to follow appropriate propagation procedures.

The Costa Rica program has advanced this practice further. Tree harvesting in natural forests must follow strict environmental practices. The project offered training and guidance to help landowners and loggers comply with these requirements. Penalties for noncompliance (such as fines and disqualification from future work) were used to promote new practices. Such measures demand intensive management and oversight of contract performance, something many NGOs and government agencies have insufficient staff to provide. This raises questions about the feasibility of using contract compliance to foster better practices when participation rates increase substantially.

Community forest management agreements. USAID has also helped introduce and imple-

ment "social contracts" between governments and local groups and communities for the long-run management or "stewardship" of forests on public or common lands. These agreements emerged during the last two decades from recognition that national forestry agencies lacked the capacity and were not proving effective at enforcing protection of forested areas.

In Nepal the forest service is now authorized by law to draw up community forestry agreements with qualified local communities and groups. In the Philippines the Department of Environment and Natural Resources issues "certificates of stewardship" contracts to eligible local groups and individuals that enable access to public forests for periods up to 25 years if agreed-on management and use practices are followed. The Gambia's community resource management agreements and Mali's village forestry arrangements are gaining in use, if at a somewhat slower pace.

Affecting the spread and performance of all of these arrangements, still, is the capacity of government agencies to issue agreements and of local groups to meet their respective eligibility requirements. The pace appears faster among groups and communities where there is ethnic and social cohesion and where literacy skills are greatest.

Farmer-to-Farmer Methods

Farmer-to-farmer training is a cost-effective way to disseminate technology and skills. Transferring skills and encouraging new practices has not always worked well when provided by government agencies. Techniques are often too theoretical. Instead, farmers pick up knowledge from other farmers by "peering over the fence" and by more structured "field days." The Philippines gave farmer-to-farmer training the most central role. Pakistan and Nepal began toward the end of project implementation to pursue the same approach. Neither in the Gambia nor in Mali did the more centrist top-down programs give more than occasional recognition to the possibility of farmers' playing a role in testing and sharing forestry techniques.

The model farmer and model site approach was critical in Pakistan and the Philippines. It worked both to transfer knowledge about forestry practices and to dispel suspicions about program motives. In the Philippines, participants served not only as trainers but also as testimonials for program performance and benefits.

One limiting factor in Pakistan was the distribution of participants, skewed toward large farmers who had more time and resources to tinker with forestry technologies. In the Philippines, program effectiveness at reaching lower income forest users was more ensured. Project sites were on public upland areas. There, all participants were, in a sense, squatters, though many had lived in these areas for more than a generation.

Program Sustainability and Replicability

The evaluation looked for evidence that farm and community forestry would continue after project funding ended and that it would spread beyond sites that were at the center of project activities. This was examined from the standpoints of financial viability of forest enterprises, biological viability of tree in plantations and managed natural forests, and institutional viability of local user groups and government social forestry agencies that received USAID support.

Financial Viability

USAID's efforts in farm and community forestry show that local stewardship of forests can be financially viable over the long run. In Pakistan the greatest sign of financial viability is the mushrooming demand for tree seedlings seen toward the end of the project. Farmers found new sources of income from selling tree

seed or setting up nurseries of their own in the shade of their more mature trees.

In the Philippines, participants at several community forestry sites began to branch out into other activities that produced income while trees were maturing. Community forestry activities enhanced their eligibility for stewardship contracts to formalize management and use of forested lands for periods up to 25 years. The earliest project sites served as training centers for other programs, further enhancing their participants' commitment while creating a multiplier effect.

In Nepal user groups are earning money from their community forests and using proceeds for community welfare development projects. Their rights to harvest and sell products from the forest have been strengthened in new forestry legislation. Interest by villagers in community forestry is fueled by benefits from harvesting forest products. As the forests regenerate, they offer increased resources to fund local development needs. This builds a growing local stake in their management.

Markets have not been well addressed in the farm and community forestry projects evaluated. The projects in Costa Rica and Pakistan encouraged landowners to invest in tree planting and management. But they had not done much in the way of studying timber and fuelwood markets or developing market strategies. Apparently, project designers were convinced that future timber and fuelwood shortages would be so great in these countries that it would be easy to place trees in the domestic market when they are ready for harvest.

There may indeed be a strong future demand for forest products in these countries. It also appears true that the volume of timber produced under the most optimistic projections of success would be too small to affect that market significantly. Nevertheless, without a more systematic and thorough analysis of domestic and international markets, it will be hard to justify local or outside investment to continue and expand farm and community forestry programs.

Local forest stewardship has spread best when it is linked directly to livelihood activities that produce economic benefits. Evidence suggests that most individuals and groups engaged in farm and community forestry use more than one resource management technique. Such variety creates synergies. The more sustainable of USAID's recent forestry interventions have combined forest management and sustainable agriculture to enhance return to labor. Return is measured in jobs, income, and food security—not just access to timber products. In contrast, programs with single goals—say, village woodlots for fuelwood alone—have not proven profitable or sustainable.

In Nepal technologies and practices are bringing about economic changes at the household and village level. The major reason for these changes is increased food and income. Nonfuelwood tree plantations appear particularly profitable. One Nepalese village grows *Acacia nilotica* for tanning chemicals. Between trees villagers plant vegetables for sale. Tree hedges provide live fencing, erosion control, and soap-making materials.

In Mali much of the increase in income comes from improved resource management, including soil and water conservation. Planting trees to improve water harvesting helps bring uncultivable land into production and increase crop productivity. Individual woodlots, especially when interplanted with crops and orchards, produce a good return to household labor. The Mali experience also suggests that people will invest in a joint activity if they believe there will be some relatively prompt payoff. Also, group activities are secondary to individual or family efforts. They require institutions capable of distributing the resulting benefits.

The use of subsidies to encourage farm and community forestry has a mixed effect on sustainability and spread. Subsidized tree seed-

lings were components of all the projects evaluated. The evaluation found evidence that as the number of project participants grew, so did the total subsidy burden and with it the costs of sustaining the supply of tree seedlings. There was also evidence that subsidies discouraged expansion of private tree nurseries beyond those supported by the project. New nursery operators simply could not compete with seedlings sold at subsidized prices or distributed without cost. A major issue has been deciding when to continue distributing subsidized seedlings to attract low-income and small-farmer participants as an equity measure. The reverse side of that is deciding when to end subsidies to improve the climate for private nurseries as a measure to increase project efficiency.

Costa Rica provides a good example of the quandary facing a government over how long it is financially able to subsidize a share of landowners' reforestation costs. The subsidy now provided is arguably important to interest many landowners in planting and managing trees. But demand for reforestation subsidies now appears to exceed available funds. Without outside financing, Costa Rica probably cannot sustain the program. One hopeful sign is the finding by FORESTA implementors that native tree species should be planted at lower densities than exotic species—800 tree seedlings instead of 1,100 per hectare. This translates into lower subsidies per hectare, allowing government funds to cover a larger area.

Technical Viability

Forestry programs introduced tree species and forestry practices, often without much technical knowledge about their biological soundness. The evaluation found cause for concern over selection of tree species and forestry practices in several of the farm- and community-forestry programs.

In Pakistan the USAID project promoted *Eucalyptus camaldulensis*, an exotic tree but known to grow well in harsh conditions. It propelled farm forest acreage well beyond planting targets. Though risks abide in relying on a single predominant species in a country as ecologically and culturally diverse as Pakistan, forestry authorities and thousands of farmers seem to have accepted this risk.

In contrast, in the Gambia the choice of the popular and well-known gmelina as the primary tree for fuelwood woodlots and plantations proved inappropriate on both biological and social grounds. Project designers had optimistic assumptions about seedling survival, growth rates, and local demand factors that proved false in practice. Moreover, villagers were more interested in fruit trees and vegetables than in fuelwood trees. Project design called for establishment of 1,300 hectares of plantations, but only 578 hectares were completed. The anticipated number of woodlots was also revised, from a total of 50 hectares in 10 villages to 35 hectares in 13 or more villages.

Costa Rica provides a sharp contrast to Pakistan and the Gambia. In Costa Rica, FORESTA has pressed ahead with eight native species among its choices for reforestation. On the one hand, the choice of native species is a commendable pioneering effort in a country otherwise planting mainly exotics. On the other hand, the FORESTA project and participating landowners face high risks in view of large knowledge gaps on caring for and utilizing native species. Site and soil requirements of native species and their seed sources are only partially known. Management practices in relation to spacing, growth rates, thinning prescriptions, harvest ages, and so forth are mainly guesses. No information is available on growth beyond four years (see box 9.)

In Costa Rica, viability of the reforestation program depends on some critical assumptions about the performance of native tree species in plantations. Tropical foresters have yet to determine the performance of native tree species under plantation conditions. For the moment, risk to the landowner is reduced by the sub-

Box 9. In Costa Rica, Unresolved Issues Attend Native-Tree Planting

FUNDECOR has introduced reforestation with eight native Costa Rican tree species. The project calls for establishing 1,000 hectares of new plantings and for nurseries to produce 3 million native and exotic tree seedlings over the life of the project (1990–96). Use of native tree species in reforestation faces a number of technology gaps:

- *Seed collection and handling*. The timing of flowering and fruiting of some tree species varies by region within Costa Rica and from year to year. Because of the variability of seed crops, it is necessary to store seed from good seed years for planting in poor years. Research is needed to determine the viability of the seed of native species and the effect of storage techniques on this viability.
- *Tree species genetics*. Selection of seed trees is based on characteristics such as degree of self-pruning, straightness of the bole, and size of the crown. But little is known about the heritability of these traits or the interrelationships of genetics with sites.
- *Tree growth and competition*. Responses of the species to shade, moisture, planting densities, thinning patterns, and soil requirements are incompletely known. Plantings are too young for foresters to observe what happens as the trees mature and compete.
- *Timber yield*. For most native species, it is not possible to determine the optimal rotation and yield. Species that perform well on one site sometimes stagnate on another in response to differences in drainage, soil acidity, the presence or absence of trace elements, and the like. For these reasons, FUNDECOR has no way to make reliable economic projections for the native species it plants.
- *Sustainability*. The effect of future harvesting of planted trees on soil fertility and soil physics cannot be predicted. In some tropical soils, the yields of exotic tree species in plantations decline in the second and later rotations. Will this happen with the plantings supported by FUNDECOR? No one knows.

sidy. In the long run, native tree species have yet to demonstrate they can be adapted to plantation systems.

Institutional Viability

Emergence of user groups with authority to manage their own forests and tree plantations has enhanced sustainability of farm and community forestry. Through legislative and policy reforms, responsibility for forest management has begun to devolve from central government agencies to local user groups in varying degrees in each of the study countries. In practice, the actual acreage of trees turned over to local management in most cases remains low. Spread and sustainability, nevertheless, appear to correlate closely with the capacity of local groups.

At one site in Nepal a local NGO has mobilized a coalition of local politicians, local businessmen, the local government forestry agency, and even the local military. This group not only continues activities initiated with USAID support, but also ensures that illegal logging in the area is monitored. In this respect several shipments have been confiscated; military personnel caught in collusion with illegal loggers have been removed from their posts; and the community group has been seeking ties with other environmental NGOs to extend pro-

tection and coverage to the remaining forests in the area.

Another encouraging sign of sustainability in Nepal and the Philippines is the growing number of local user groups to undertake reforestation activities without project funding. One Nepalese farmers association contracted directly with the government to reforest an additional 50 hectares beyond what was planted during the project. Some former project community forestry groups in the Philippines have found ways to involve other donors in supporting their tree planting and rural development activities.

Farm and community forestry is now firmly rooted in the institutional structures of public agencies in several of the study countries. Newly created social forestry branches of government agencies in Mali, Nepal, Pakistan, the Philippines are still weak and struggling. Nevertheless, they have a much greater chance of survival today thanks to assistance from USAID programs. Key achievements are legislative reforms for local forest stewardship (Mali, Nepal, the Philippines), demonstrated effectiveness of these programs (Nepal, Pakistan, the Philippines), and setting up endowed environmental funds to sustain activities (Costa Rica, the Philippines).

In Pakistan, government resistance to farm forestry waned during project implementation as political, economic, and environmental benefits became more apparent. The social forestry program was originally viewed as a bureaucratic stepchild with none of the prestige of traditional forestry. However, construction of extension offices and training facilities, and provision of equipment and vehicles, gave import to the new program. Original fears in the agriculture bureaucracy that farm forestry would displace food crop production proved unfounded. In fact, support has followed when farm forestry emerged as a restorative activity on some waterlogged soils.

Reorienting and strengthening forestry institutions in many African countries has proven particularly difficult. By way of illustration, the entire senior professional cadre of the Gambian Forestry Department consisted of two people during the early period of USAID forestry support. In Mali an obstacle was working with a centrally controlled government during much of project implementation. Drought also hindered reforestation efforts. It forced communities to look to food production first, forests later.

Recognition of the constraint posed by scarce professional and technical capacity in the Gambia Forestry project led to a substantial component for professional and technical recruiting and training. In Mali, the Forest Service became more receptive to the village-level approach after a major political transition in 1991, but its philosophy on forest stewardship remains unsettled. The Mali project illustrates that building the capacity of government staff will remain unproductive so long as civil service incentives for promotion, salary improvement, and training are absent.

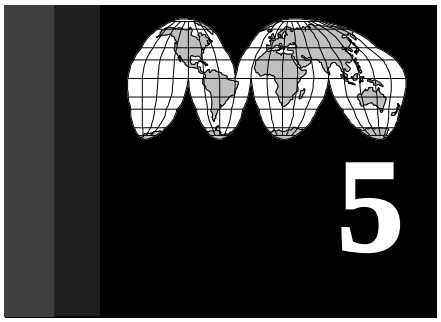
Promoting forest stewardship through local management agreements requires significant administrative support for its spread. Procedural delays in issuing stewardship agreements in both Nepal and the Philippines slowed the spread of community forestry programs. Some of these delays will be overcome as cautious bureaucrats gain confidence in the capacity of local communities to manage the forest resources around them.

Despite these shortcomings, reflecting the newness of farm and community forestry programs in the study countries, the institutional landscape after completion of most of the projects is demonstrably different. Forestry legislation is more friendly to local stewardship, and public agencies are more responsive to local involvement in decisions and implementation. At the same time there are more local organizations with an increased awareness of the roles they can play and greater capacity to make a difference and to participate in the

rewards from active stewardship of forest resources.

These changes help reduce the chances of reverting to unworkable command-and-control forms of forest management. They also place participating countries in a better position for sustainable management of natural forests.

It is noteworthy, however, that none of the evaluated projects and programs demonstrated much evidence of coordination with other aspects of USAID's development assistance efforts in the case-study countries. The evaluation identified numerous opportunities in each of the countries where forestry programs could have benefited from the USAID democracy, microenterprise, and women-in-development initiatives. Activities in farm and community forestry could, in return, have lent substance to each of these initiatives.



5 Recommendations

Several recommendations for enhancing performance of USAID farm and community forestry programs emerge from the evaluation:

1. *Design farm- or community-forestry interventions to meet the needs of each local and national setting.* Programs evaluated show that strategies in farm and community forestry must correspond to stages of social, political, and economic development. Education and awareness, organizational development, and elementary tree-planting experiments may be the most appropriate activities in settings where literacy is low and technology limited (the Gambia, Mali, and to some extent Pakistan). Countries that have passed through early development stages may be positioned—with project support—to tackle tenure and market reforms and other issues of a complex, institutional issues (the Philippines, Nepal, and Costa Rica).

2. *Budget sufficient time and resources to ensure farm and community forestry will be sustainable after funding ends.* A 10- to 20-year program assistance time frame is often necessary, particularly when institutional capacity needs building and natural resource policies need reform. Social forestry programs require considerable effort over a period of years to set up new government structures, erode bureaucratic resistance, test technical approaches, organize existing (or form new) local groups, and overcome skepticism among farmers and communities.

Resources more carefully used over a longer period can be more effective at changing government attitudes and public policies than a large splash of resources budgeted once to "buy" reform but with no follow-up support and monitoring. Where farm and community forestry has taken root, experience suggests that continued donor involvement may be warranted until an enabling policy environment is in place and local groups have built needed financial, technical, and administrative capacity for self-reliant operations.

3. *Encourage government agencies to form partnerships with local communities and NGOs to extend the reach and reduce the costs of farm- and community-forestry programs.* USAID should support partnerships between government forestry agencies, local communities, and national and international environmental NGOs to mobilize complementary talent and funding. The Agency can identify and involve NGOs with needed skills in community organization, financial management, and forest management techniques.

In this regard, one promising approach is the use of forest stewardship contracts and resource management agreements between government agencies and local communities, NGOs, and individual land owners. The

Agency should encourage involvement of international networks of forestry and environmental NGOs and research institutions to improve the exchange of information on forestry technology and management.

4. *Include private ventures in sustainable forest use that offer scope for generating early benefits for local participants.* Forestry programs must address the fact that local participants incur costs associated with their involvement: land is restricted from other uses; funds are needed to buy seedlings; labor is required to plant trees and enforce against encroachment. These must be offset with opportunities to generate early income.

Forests offer investment opportunities for local enterprises in ventures such as sustainable timber (charcoal, fuelwood, lumber, pulpwood) and nontimber products (nuts, honey, rattan, tree and plant nurseries). USAID also can foster service enterprises in reforestation, restoration and management of remaining old-growth forests, and operation of tourist concessions in and around forest parks. Such ventures enhance public awareness of the economic value of forest resources and generate immediate incomes for local communities.

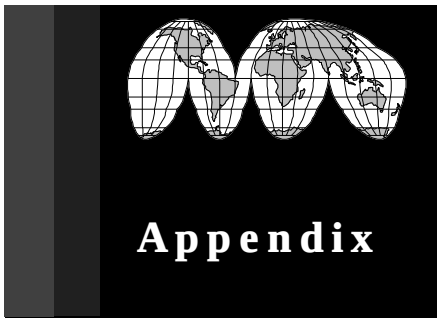
5. *Encourage adoption of economic incentives for sustainable forest use.* The Agency can enhance the effectiveness and accelerate the spread of farm and community forestry by identifying for reform regulatory, tenurial, and subsidy policies that promote conversion of forests to other, often unsustainable uses or obstruct local management of forest-based enterprises. For example, restrictive government controls over wooded land may be well meaning in their effort to halt forest loss, but they also discourage investments in tree planting by owners concerned about losing control over use of their land.

6. *Allocate funding for measuring and monitoring the performance and impact of every farm and community forestry program.* The long-term nature of social forestry programs means they will not produce tangible results for several years. Programs need to establish benchmarks, monitor change, and measure impact to determine if adjustments are needed. Environmentalists and policymakers require data to answer questions on water regimes, soil effects, energy substitutions, and the like, in relation to tree and forest management. This need is particularly great if native tree species, about which little may be known, are promoted. Also, projects need to monitor social and economic effects as activities mature.

7. *Continue to build an applied research information base on which to draw in future forestry programs.* Related to monitoring is the scope for cataloging and exchanging information about forest technology and forest systems management. In many settings there is less need to launch research into these questions if information exists from sites with similar ecological and social conditions.

Also, information on new forms of rural organization and NGO partnerships, as reflected in community forest management contracts, merits broad distribution among countries still grappling with local stewardship issues. Information gathered from performance monitoring can also be used in education and awareness programs for local communities and national decisionmakers.

8. *Coordinate program resources to ensure effectiveness of Agency efforts at fostering forest stewardship.* USAID can get the most effectiveness from its forestry programs when they are closely integrated with other Agency programs. For example, microenterprise programs can finance forestry ventures; agriculture and agribusiness programs can generate ventures in tree and nontimber products as alternatives to forest destruction; policy reforms can remove market distortions that undervalue forests and lead to their conversion; and democracy and governance programs can increase the ability of nongovernmental organizations and public agencies to address forest management needs.



Appendix

Evaluation Procedures

CDIE assessments of environmental programs are aimed at answering two central questions: "Has USAID made a difference?" and (if so) "How well did it do it?" The central hypothesis of the assessments is that USAID, through the right mix of program strategies, can affect local conditions and practices in a way that produces favorable, long-lasting changes in the environment and in the welfare of cooperating countries. This appendix describes the process used to test this hypothesis in evaluating selected USAID farm and community forestry programs.

Impact: How Much?

The assessment seeks to establish a plausible association between USAID program strategies or activities and changes in environmental quality, natural resource management, and socioeconomic well-being. In answering the first question, "Did USAID make a difference?" the assessment has attempted to document what happened or can be expected to happen. In each of the case-study countries the evaluation gathered and examined "impact" information to determine whether the USAID projects accomplished their goals of increasing sustainable local forest management. The evaluation examines relationships between environmental impact and program strategies using a five-level analytical framework).

In the analytical framework, level I lists the *program strategies* that USAID and national governments employed in implementing farm- and community-forestry programs. These strategies include fostering awareness; introducing new forest management practices; building community-based research, training, and extension institutions; and formulating public policies that support sustainable forest management.

At level II, *program outputs* are the conditions that have resulted from implementing these strategies. They could include newly formed local NGOs; use of new tree species; management practices identified as sustainable; implementation of a newly designed training curriculum; staffed, equipped, and functioning regional forestry offices; and changed policies or regulations affecting locally managed forests.

Level III *program outcomes* resulting from changes in level II conditions are the adoption of forest management practices by target populations.

Levels IV and V *program goals* constitute the biophysical and socioeconomic changes resulting from adoption of level III outcomes or practices. Level IV and level V goals can be viewed as mutually supportive.

For the purposes of the evaluation, level IV *biophysical goals* are the specific environmental objectives of the program being as-

sessed. They include such things as increased tree cover and less deforestation, soil and water runoff, and wildlife habitat loss.

Level V *socioeconomic goals* include sustainable increases in income, employment, and overall well-being of program participants. Although access to income data is difficult, continued involvement of beneficiaries in the program can be used as a vote-with-their-feet proxy indicator of positive socioeconomic impact.

Performance: How Well?

In answering the second question, "How well did the Agency do it?" CDIE's primary concern is the *efficiency, effectiveness, sustainability*, and *replicability* of the program.

Where data exist, the evaluation measures program *efficiency* by using monetary estimates of the flow of benefits to calculate an economic rate of return for USAID and host government investments to which benefits can reasonably be attributed. Because benefits occur into the future, their anticipated value must be annualized, adjusted to net out all costs incurred, and expressed as a discounted present value to compare with project investments.

To assess program *effectiveness*, the evaluation examines how well project-sponsored technologies and services (such as training) are reaching intended target groups and whether there is equity or bias in access by participants. To gauge effectiveness, evaluators look for trends in the delivery of services according to makeup of the target groups (gender, for example, or sociopolitical status).

Examination of *sustainability* is important at all program levels. At level I, for example, the question might be asked: Are the proposed activities appropriate for the particular country and for local conditions? At level II: Will conditions created with USAID assistance continue or will they be reversed? At level III: Will target participants continue to employ newly introduced practices? At level IV: Will new forest management systems thrive over the long run? And at level V: Will increased incomes, profits, and jobs continue after USAID and host government support is withdrawn?

Evidence of sustainability includes continuation of activities, regulations, institutions, and price structures beyond termination of USAID assistance either on their own internal momentum or with other donor or host government assistance. The principle measures of sustainability are 1) the number of beneficiaries continuing to employ project-promoted practices after Agency support has ended and 2) the nature and extent of ongoing government and donor support provided to activities initiated by USAID. Indicators of biophysical sustainability include the inventory of tree species and soil quality in target areas.

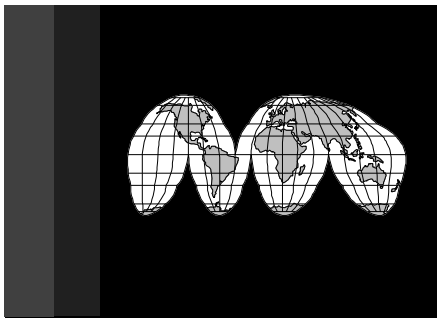
To determine *replicability,* the evaluation examines whether conditions and practices promoted by the program have spread beyond the target areas. It also determines whether such spread, if it has occurred, was spontaneous. Did it occur among participants by word of mouth, without further outside support? Or was it induced by public, private, or donor agencies? One replicability indicator is the number of similar activities supported by local or international agencies outside the program target area. Another is the number of participants outside the target area that have adopted in sum or in part Agency-sponsored practices.

Data Collection Procedures

CDIE employs a variety of primary and secondary sources of data to construct the chain of events linking program activities and resulting observed effects, to examine major evaluation issues, and to identify lessons learned. In preparation for the fieldwork, CDIE collected and analyzed relevant secondary data available in Washington or in host countries from a range of sources. They include project docu-

ments, technical reports, and special studies available with the Agency's Development Information System.

In each country the evaluation team reviewed studies and reports conducted by host government agencies, international institutions, and private voluntary organizations. The team was fortunate to discover a number of comprehensive surveys and reports. Primary data were also called for, so the assessment team visited field sites to make visual confirmation of USAID–induced changes and to conduct interviews.



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