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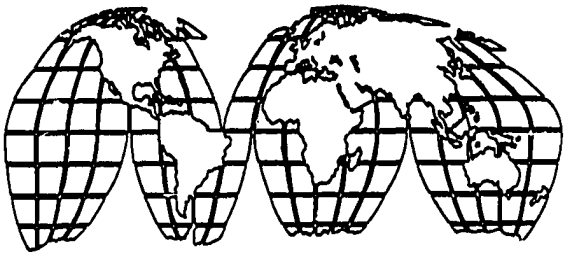

Forestry and the Environment

The Philippines Case Study

April 1994

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USAID Working Paper No. 204

FORESTRY AND THE ENVIRONMENT
THE PHILIPPINES CASE STUDY

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This Working Paper is one of a number of case studies prepared for CDIE's assessment of USAID Forestry and the Environment programs. As an interim report, it provides the data from which the assessment synthesis is drawn. Working Papers are not formally published and distributed, but interested readers can obtain a copy from the DISC.

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PREFACE

USAID's Center for Development Information and Evaluation (CDIE) is conducting concurrent global assessments of the Agency's environmental programs. These assessments focus on the development impact of USAID-supported environmental and natural resource management activities in the areas of agriculture, forestry and biodiversity conservation through parks and protected areas. This field study which focusses on the social forestry program supported by USAID's Rainfed Resources Development Project (RRDP) in the Philippines is one in a series of seven country case studies that also include Nepal and Pakistan in Asia, Mali and the Gambia in Africa and Costa Rica and Ecuador in Latin America. Findings from the seven case studies will be synthesized into an overall assessment report that extracts strategic lessons and related program implications for USAID senior management.

Since 1521, when Magellan's fleet put in for repairs, Philippine forests have been valuable timber sources. From over ninety percent forest cover in the sixteenth century to only twenty percent today, the country has experienced virtually unabated depletion of this valuable heritage. In her recent treatise on the Philippine logging, Marites Vitug cites U.S. Senator Alfred Beveridge's claim in 1900 that "the wood of the Philippines can supply the furniture of the world for a century to come." Senator Bevridge had no means of envisioning the extraordinary demand for Philippine timber following World War II. Since then, however, The Philippines has experienced unprecendented rates of deforestation not only from commercial logging but also from population growth and skewed land distribution that sent rural populations up the roads cut by loggers clearing for timber, fuelwood, and cultivation.

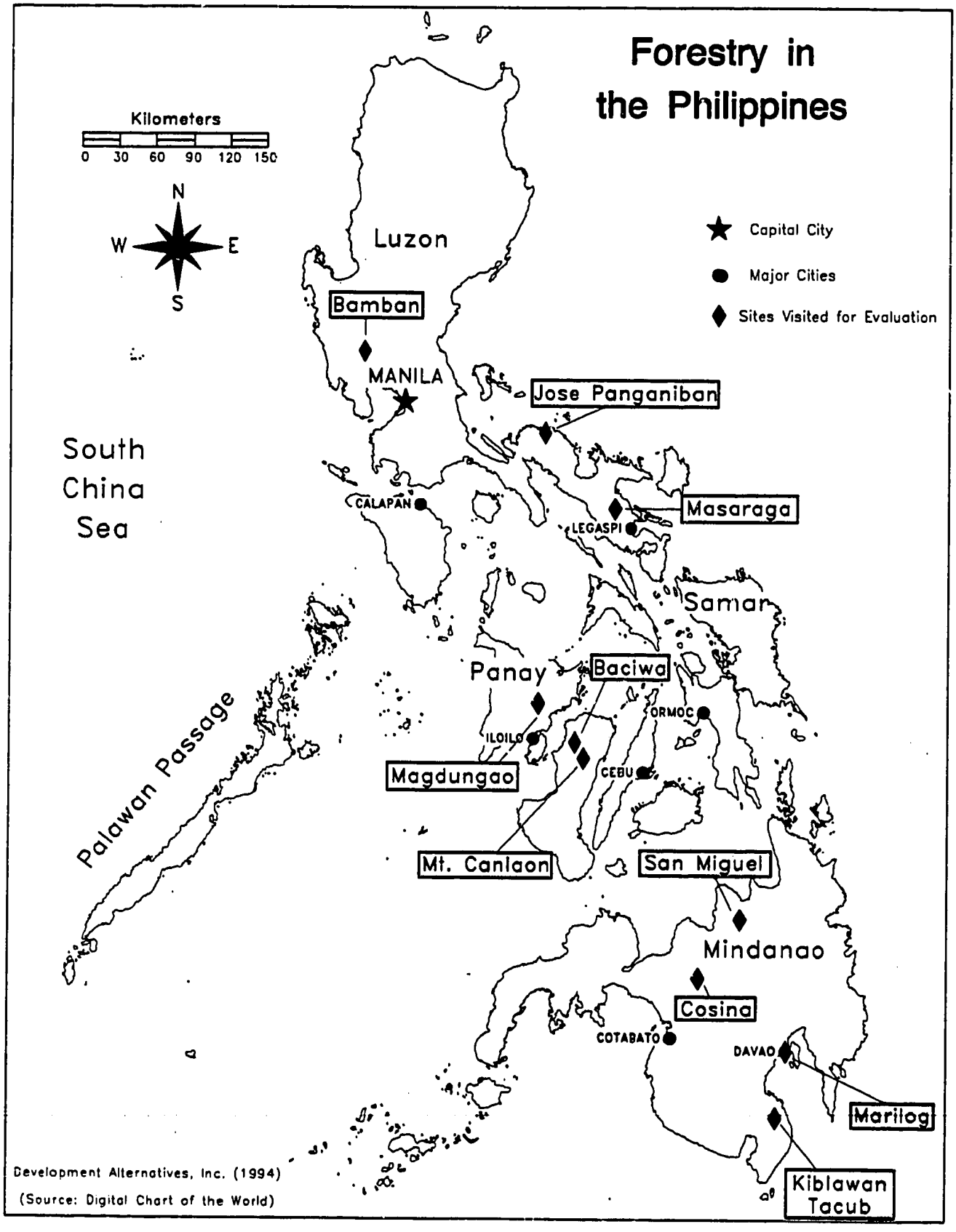
Development programs have been slow to arrive in these deforested upland areas. USAID's RRDP served to galvanize a number of tentative efforts, thereby giving new and ultimately irreversible force to the challenge of meeting this discouraging cycle of upland degradation. According to one senior member of the Department of Environment and Natural Resources, participating in RRDP unleashed a "fire within" giving a generation of young foresters the chance to put the academic lessons of social forestry to practice. In this report the accomplishments and shortcomings of that opportunity are documented.

The team wishes to thank all those individuals who gave so generously of their time during the assessment. We feel privileged to have had the cooperation of such knowledgeable and dedicated people. We hope that our efforts, in however small a way, assist them in ensuring that the Philippines's treasures -- its people and its environment -- are shared for many generations to come.

GLOSSARY

ADB	Asian Development Bank
ANR	Assisted Natural Regeneration
BURDFI	Bicol Upland Resources Development Foundation, Inc.
CALC	Certificate of Ancestral Land Claim, for indigenous people
CARP	Consolidated Agrarian Reform Project
CENRO	Community Environment & Natural Resources Office, DENR
CBFM	Community Based Forest Management
CFMA	Community Forest Management Agreement
CFP	Community Forest Program
CFSA	Community Forest Stewardship Agreement
CSC	Certificate of Stewardship Contract, in lieu of title
DENR	Department of Environment & Natural Resources
EDSA	Epifano de los Santos Avenue, where 1986 revolution began
FLMA	Forest Land Management Agreement
FMB	Forest Management Bureau
FPE	Foundation for the Philippine Environment
GOP	Government of the Philippines
IFMA	Integrated Forest Management Agreement
IPAS	Integrated Protected Areas System
ISF	Integrated Social Forestry
KRDFI	Kiblawan Rural Development Foundation, Inc.
MPFD	Master Plan for Forestry Development
NEDA	National Economic Development Administration

NFEFI	Negros Forestry & Environment Foundation, Inc.
NGO	Non-Government Organization
NIPAS	National Integrated Protected Areas System
NRMP	National Resources Management Project, DENR/AID
PCARRD	Philippine Council for Agric, Forestry, & Natural Resources Research & Development
PENRO	Provincial Environment & Natural Resources Office, DENR
PICOP	Paper Industries Corporation of the Philippines
PWPA	Philippine Wood Products Assoc.
RRDP	Rainfed Resources Development Project, DENR/AID
SeLF	Settlement & Livelihood Foundation
TLA	Timber License Agreement
TSI	Timber Stand Improvement
UDP	Upland Development Program
WWF	World Wildlife Fund


Forestry in the Philippines
Kilometers
0 30 60 90 120 150
N
W
E
S
Capital City
Major Cities
Sites Visited for Evaluation
Luzon
Bamban
MANILA
Jose Panganiban
South China Sea
CALAPAN
Masaraga
LEGASPI
Samar
Panay
Baciwa
ORMOC
ILOILO
Magdungao
CEBU
Palawan Passage
Mt. Canlaon
San Miguel
Mindanao
Cosina
COTABATO
DAVAO
Marilog
Kiblawan
Tacub
Development Alternatives, Inc. (1994)
(Source: Digital Chart of the World)

1. INTRODUCTION

Since the 1970s, four million hectares or 25% of the Philippine's forests were cleared and an unspecified expanse of cut-over forest was further degraded by unsustainable land use. (See Figure 1). The results have been far-reaching. Tragic flash floods have claimed the homes, land and lives of thousands; siltation damages to irrigation canals and hydro-electric power reservoirs; potable water supplies decline as rivers dry up and water tables fall; forests and marine habitats are destroyed along with the valuable wildlife they contain. USAID has assisted the Philippines in addressing these environmental problems in part through support for social forestry programs aimed at the sustainable management and use of remaining forested areas and at reforestation of hilly erosion-prone upland areas.

This July, 1993 evaluation examined the impact of one completed USAID project effort implemented between 1983 and 1991, which included as one important objective the introduction of community and private forest stewardship contracts to farmers settled in the sloping upland areas of the Philippines. The effort was a component of USAID's $31 million dollar Rainfed Resources Development Project (RRDP) and represents a pivotal step in the country's efforts to halt deforestation and restore productivity to its degraded uplands.

Section 2 of this evaluation summarizes the problem of community and private forest stewardship contracts in the Philippines uplands and the approach that USAID has taken to solve it. This section also summarizes procedures used to evaluate the impact and performance of USAID assistance.

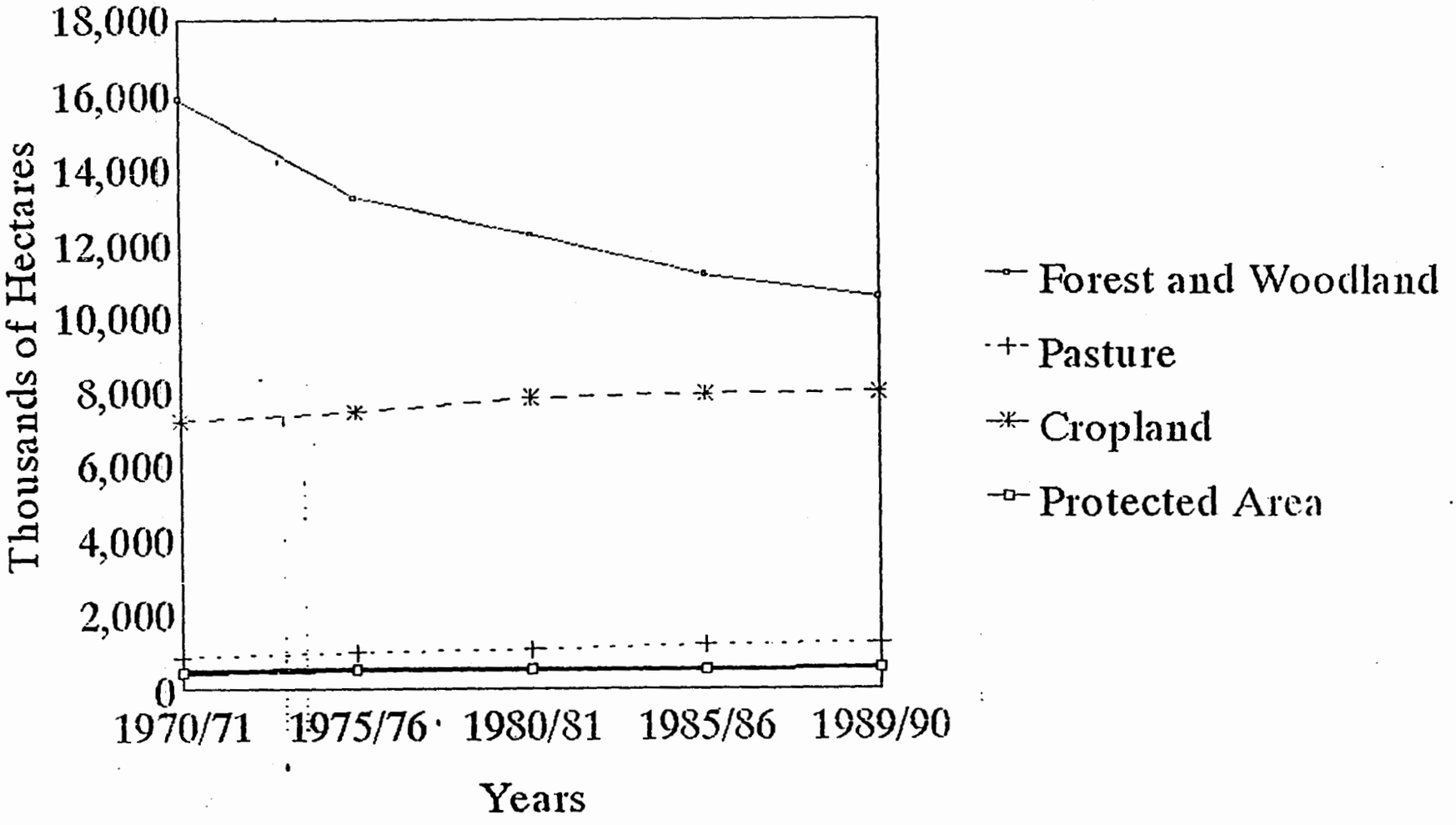
Sections 3, 4, and 5 present findings of the evaluation. Section 3 describes the nature and extent of impacts that were observed by the team, or recorded from other sources, and relate these findings to the RRDP strategies implemented by the program. Sections 4 and 5 present evidence of sustainability of impact after termination of project activities and spread of activities beyond project target areas.

Section 6 summarizes lessons that the evaluation has drawn from implementation and performance of RRDP's community and private forest stewardship activities. Section 7 presents outstanding issues which the evaluation team felt could not yet be answered from the information available in the Philippine setting or which merit examination for their applicability in other country settings.

FIGURE 1

Philippines: Land Use and Protected Areas

1970/71-1989/90



Sources: FAO 1987; IUCN 1990b; WRI 1992b

Note: Forest and Woodland, Pasture, and Cr and data are from 1971, 1976, 1981, 1986, and 1989.
Protected Area data are from 1970, 1980, 1985, and 1990.

2. BACKGROUND

The Problem

Under continuing population pressures, extensive deforestation is beginning to have serious environmental consequences and threatens the country's sustainable development. The most notable of these problems are:

- Increased erosion leading to soil infertility and loss of water retention
- Downstream siltation of irrigation systems and offshore siltation of coral reefs
- Reduced water availability and quality
- Increased incidence of water-born diseases (intestinal parasites and typhoid)
- Destruction of infrastructure and loss of life from flash floods
- Loss of wildlife habitat as remaining forested areas give way to slash and burn cultivation or indiscriminate and often illegal logging

Of the 30 million hectares (ha) in the Republic of the Philippines, almost exactly half have been classified as "forest" by virtue of their location above 1000 meters and/or their slope exceeding 18 percent. These 15 million ha fall into the following general classes (ADB 1992):

Virgin Dipterocarp	805,000	
Virgin Mossy forest	1,102,000	
Total old growth forest		1,907,000
Residual Dipterocarp	3,224,000	
Residual Pines	235,000	
Existing Mangrove	129,000	
Total residual forest		3,588,000
Brushlands	2,422,000	
Submarginal	520,000	
Total "unforested"		2,942,000
TOTAL		8,437,000
"UNACCOUNTED"		6,563,000

It is striking that almost 44% of the lands originally designated for permanent forests are no longer included, even as Submarginal or Brushlands. The extent of deforestation is even more pronounced when one considers that the original lowland forests have long since been logged and converted to irrigated farmlands and pasture. The deforested area includes approximately 320,000 ha of mangrove, probably the most critical loss to date.

Philippine biodiversity was tremendous under natural conditions of tropical temperatures, variable rainfall and elevation, large islands with long seacoasts, abundant fresh water rivers and lakes, and proximity to the Asian land mass. Although inventories are far from complete, there were an estimated 8 - 12 thousand species of flowering plants, perhaps 2500 mosses and lichens, and probably over 1000 vertebrate animals. Possibly 75% of flowering plants, 50% of the birds and reptiles, 70% of the amphibians, 45% of ferns were endemic species, found nowhere else.

********** BOX **********

The Philippines National Protected Areas System (NIPAS)

The NIPAS (National Protected Areas) program was initiated in 1986, with the selection of 10 protected sites in four of the major 5 regions, with 746,000 ha of land and 505,000 ha of wetlands and water, a total of 1.25 million ha. The Protected Areas and Wildlife Bureau (PAWB) of DENR will compile technical descriptions and maps of all areas designated, screen them for inclusion, conduct studies and public hearings, and prepare final recommendations. When approved by the President and congress, the park boundaries will be physically demarcated and a management plan prepared (NRMP 1993).

History shows the difficulties in protecting critical areas of high biodiversity which are plagued by timber and animal poaching and the encroachment of slash and burn agriculture. Administration and management of the parks is hampered by lack of money and trained personnel, and fragmented administration. There has been insufficient time, only six years, to see how well NIPAS will function. PAWB policy seems to be to distribute their efforts over maximum area rather than to focus on a few most-critical locations. There can be no really satisfactory resolution of a situation with too much to do, but not enough time, money, personnel, or support. Industrial TLA loggers reported that one armed guard for each 180 ha is necessary to minimize poaching and agricultural incursion. At that rate, just the land areas of the first 10 sites would require slightly more than 4000 guards to protect the parks while management is being planned and initiated.

********** Box **********

Still unknown species may have comprised 60% of the insects,

20% of flowering plants, and 5% of the mammals. (Berger 1989). Most tree species and large mammals were probably in the Dipterocarp forests and amphibians in the mossy forests. The number of species eliminated is unknown; but more than half the upland forests, probably two-thirds of the coral reefs, and almost three quarters of the mangrove forests have been eliminated in this century alone. Managing threats to biodiversity will not become easier as population density, exceeding 2 per ha, is approximately doubling each generation.

With little remaining old growth, the importance of managing secondary and residual forests and tree cover in cutover agricultural areas should not be underestimated (Saunders *et al* 1987). As Kummer (1992) so aptly points out, government and industry forest technicians look better by underestimating the areal extent and the magnitude of degradation, a situation helped by the ambiguity inherent in previous surveys. Key DENR officials now suggest that around 9 million hectares with a population of some 18-20 million rural dwellers are devoted largely to meeting subsistence needs. Most upland households live in poverty and look to externally funded programs for assistance much of which is covered under the so-called Integrated Social Forestry (ISF) Program. ISF usually targets individual households and consists of a combination of community organization, reforestation, agroforestry/soil water conservation, and tenure improvements. ISF has been complemented recently by community forestry interventions that are characterized by shared access and larger management units generally in areas where remnant forests are more extensive and in better condition.

Controlling the destructive cutting and agricultural clearing of upland forests is complicated by multiple problems:

- The Philippines has few technical or social solutions to alleviate poverty and environmental problems in upland areas. Official attention has focused on lowland irrigated rice cultivation and ignored the gradual settlement of upland areas and their unique cultivation needs.

- Official responsibility for land use in upland areas is unclear. Lands of 18% slope or greater are classified as public lands to be administered by the Department of Environment and Natural Resources (DENR) while the Department of Agriculture supports research and extension needs on lands with slopes of less than 18%. The DENR is ill-equipped to address agricultural concerns of cultivators on sloping public lands and the Ministry of Agriculture, which has more capacity, does not have the mandate nor much motivation to do so. (See Figure 2).

- Because there is no clear title to sloping public upland areas, cultivators are essentially squatters with little

sense of responsibility to manage the land in a sustainable fashion.

- Upland communities are characterized by high degrees of poverty and illiteracy making it difficult to transfer knowledge or provide services. Reluctant to attract more families into upland areas, the government has been hesitant to expand social services. Even where the Government of the Philippines (GOP) has provided education, health, credit, and agriculture extension services, it is more difficult and costly in the uplands than the lowlands.

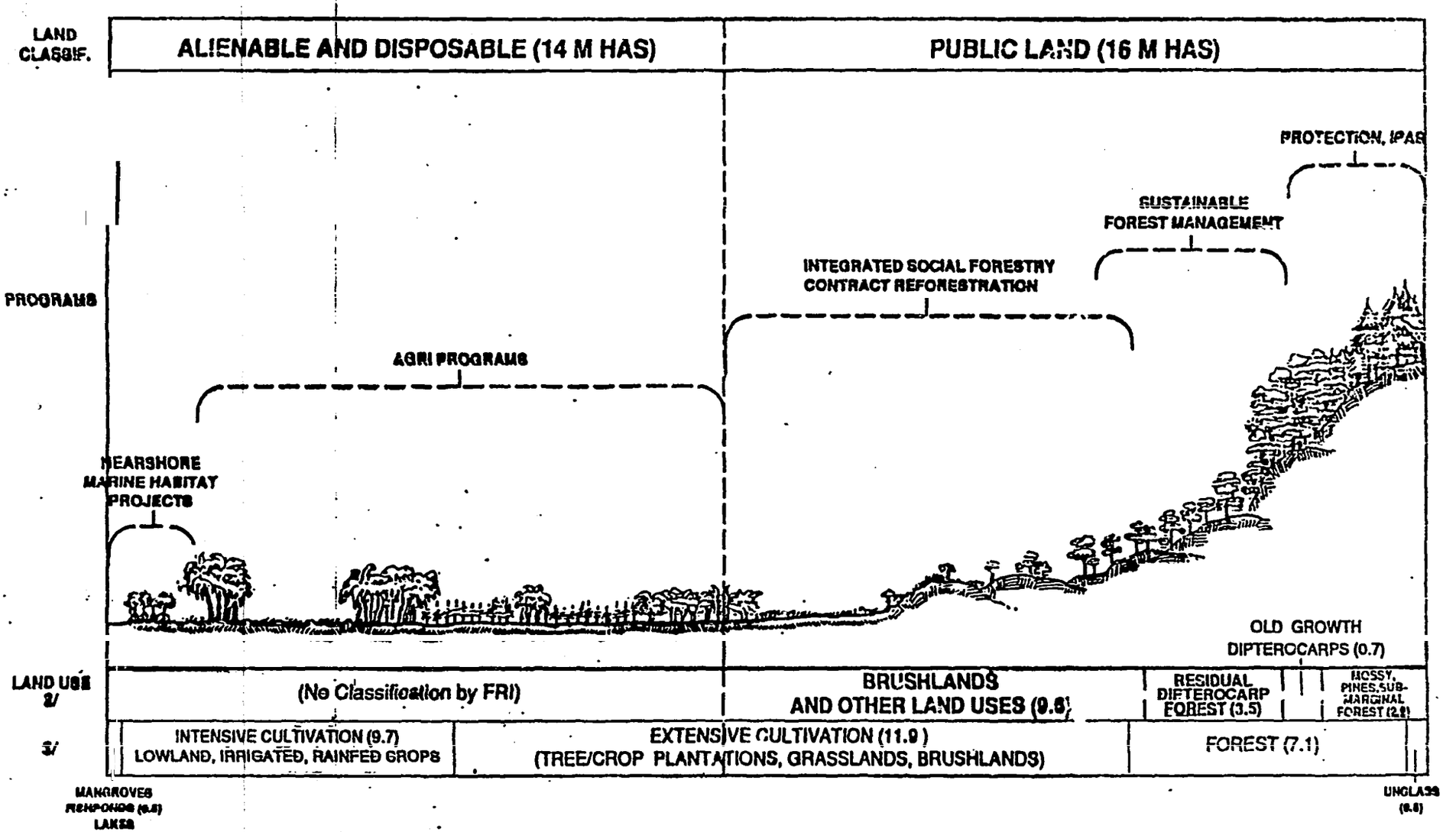
Forest users in the Philippines have been extracting forest resources in an unsustainable manner. Since about 1950 forest resources have been depleted and degraded at accelerated rates due to increasing population (more than doubled since then), rising demand for goods and services, continuing peace and order problems, the introduction of more effective forest tools such as chain saws, skidders, improved headsaws and lathes, and the extension of road and communications systems.

Destructive logging has prompted environmental groups to push for bans on commercial tree harvesting in natural old growth forests. However, logging bans do not prevent the degradation of forests by the upland poor who cut and clear for fuelwood or to cultivate crops. Nor do bans provide incentives for legitimate public or private investments in what become highly devalued forests once a timber ban is enforced.

In keeping with recent ecological concerns and "power to the people" movement, the basic system of providing concessions to commercial organizations or individuals (the Timber License Agreement or TLA) has been discontinued. As an exercise in cronyism without supervision, TLA was an economic and ecological debacle that not only failed to prevent but actually accelerated forest degradation (World Bank 1990). The cancellation of TLAs, down from a peak of around 1,403 in 1969 to 33 in 1993, has left a management vacuum in the almost 2.0 million ha of former TLA lands.

As an alternative to reform of the TLA systems, recent Philippine administrations have been promoting conservation through community based forest management (CBFM). Unfortunately, the new approach is beset by diffused responsibility, diffused authority, weak tenure, and inexperienced supervisory and administrative personnel. CBFM represents a noble experiment whose prognosis is questionable unless political will is backed by technical and financial resources. The communal reforestation projects visited during the field visits were only in start up phases and appeared to lack requisite technical skills.

PHILIPPINES: Land Classification, Actual Land Use and Development Programs 1/
(In Million Has.)



1/ Adapted from the USAID Sponsored Sustainable Natural Resources Assessment-Philippines, December 1989.

2/ From: Forest Resources Inventory FRI, (German Supported), 1987 which concentrated survey on area with Forest cover. Their reported estimate of old growth residuals was 668,000 has. Present figure is adjusted to 700,000 has. to reflect current estimates as reported by the Sustainable Natural Resources Assessment-Philippines.

3/ From: The (Phil.) Environment and Natural Resource Management Study (World Bank), 1988; land classified according to land use i.e. forest, extensive cultivation etc.

As of July 1991, 12 donors were funding 20 projects/programs for periods of 3 - 8 years, an average of 5 years (ADB 1992). The Master Plan for Forestry Development, MPFD, (1990) was prepared partly to facilitate coordination of donors. It is meant to protect remaining virgin forests, hold cutting below growth in production forests, increase production forest area 50% by 2015, reduce annual deforestation 96% by the same date, and produce a surplus of timber exceeding domestic demand. No mention is made of fuelwood cutting, which has been 13 times reported commercial timber cut in recent years (Phil. Wood Producers Assoc., 1992). Kaingin or shift and burn agriculture often follows logging but can penetrate areas where no logging has taken place. As practiced by most upland colonists, it is an ecologically destructive system.

Deforestation has progressed rapidly and thoroughly even in areas where commercial harvesting is not permitted. The most optimistic plans prepared to date leave 2.83 million ha, of the 3.6 million ha of production forest, without management or protection (NRMP News 1:4:4). Reforestation contracts on the areas for management are scheduled at present for a 3-year life (ADB 1992), despite uniformly disappointing results from past 3-year reforestation contracts.

There appears to be no provision for transferring ownership to individuals or communities, even under use restrictions; leases shorter than natural forest rotation (25 + 25 years) and subject to cancellation for unsatisfactory (non-specified) management are the unappetizing alternative adopted. Neither is there any provision for encouraging, or even permitting, present owners of non-agricultural lands to manage them permanently for production forests.

The Department of Environment and Natural Resources (DENR) encompasses all environmental and natural resource concerns, although complete responsibility does not lie with any one governmental organization. Among the existing policy instruments for allocating management responsibility, the following appear to be most relevant for the threatened forests and upland areas targeted by USAID supported activities:

FLMA (Forest Land Management Agreement); life of 25 years, and is renewable for an additional 25 years. Rehabilitation, protection and management of reforested areas by local communities.

CFMA (Community Forest Management Agreement); 25 + 25 years. Rehabilitation, protection, improvement, and management of fragmented natural forests, including degraded and productive residual forests, brushlands, virgin forests, marginal lands, by communities. Generally granted to groups of villages to manage up to 1,000 ha (with provision for increases to 5,000 ha).

CSC (Certificate of Stewardship Contract); 25 + 25 years. Rehabilitation, protection, and adoption of agroforestry systems in occupied public forest lands; includes private wood lots. Generally allocated to individual households who have settled in the uplands.

IFMA/EPMA (Industrial Forest Management Agreement and Environmental Protection and Management Agreement): 25 + 25 years. Rehabilitation, protection, and management of natural forests by qualified organizations with the incorporation of communities in the overall management. IFMAs are closest to the old TLAs.

All the above have at least three major disadvantages:

1. Permanent title is never passed to the community/individual/ industry;
2. Tenure can be canceled at any time for failure to comply with ambiguous principles and enforcement procedures of DENR;
3. Fifty years is less than a biological rotation in natural forest and less than three cutting cycles, so the full benefit of optimum management (at least for hardwood timber species) does not accrue to the manager.

The USAID Assistance Approach

Before the 1980's USAID had focused much of its program and project support on the productive irrigated areas of the Philippines. USAID interest in developing the uplands was first articulated in its 1980 USAID Country Development Strategy Statement that identified small farmers in rainfed and upland areas as a major poverty group.

Between 1982 and 1991 USAID and the Philippine government committed $ 31.9 million to fund a Rainfed Development Resources Project (RRDP) that supported the introduction and spread of community and private farm forestry in conjunction with hillside conservation farming practices to rehabilitate these upland zones. The RRDP was implemented in four components: Agriculture, Research, Natural Resources and Rural Infrastructure. The Natural Resources Component provided approximately $11.1 million -- $7.0 million USAID and $4.1 GOP -- to carry out RRDP social forestry activities.

One aspect of the USAID's social forestry approach under the RRDP was to assist the Government of the Philippines, expand its Department of Environment and Natural Resources (DENR), from a largely regulatory agency to become a development organization capable of mobilizing local community and private management of forest resources. A second aspect of the USAID approach was to

provide technical assistance to upland communities to develop and implement forest management plans. This assistance, which was provided to communities through contracts with NGOs, also expanded the DENR's basic forest conservation and utilization strategy to include development oriented approaches (as compared to regulatory approaches).

The RRDP was to create or strengthen local government (municipal and village "*barangay*" offices) and non-government organizations (private community development foundations and farmer groups) both to spread technical information and to seek public or private suppliers of planting material, and other inputs and needed services. Community development workers were employed by the project to live in target villages to help farmers express their needs and look to the government for services. In sum, the RRDP strategy:

- was based on proven technologies utilizing resource-efficient methods;
- engaged local NGOs and government agencies;
- promoted greater reliance on local institutional and beneficiary competencies.

RRDP Cycle I (1982-86) focused on building local governments and NGO capacity by using project staff skilled in community organization. During Cycle II (1987-1991), RRDP activities expanding in coverage of sites from 4 to 16 by adding 12 "micro-project" sites. To stretch project funds over the additional project sites RRDP activities were expected to focus on only the most needed community problems. RRDP staff and farmers carried out rural community assessments to identify critical needs and plan programs to address them.

Since 1992 USAID has continued to provide indirect support for RRDP initiated activities under a new Natural Resources Management Program (NRMP). The goal of the Natural Resources Management Program is "to encourage ecologically sound long-term economic growth in selected areas of the Philippines. The program's purpose is a) to promote economically and ecologically sustainable management of the Philippines natural resources, with special attention to tropical forests and biodiversity; and b) to increase the economic efficiency in the forest products industries (USAID 1990).

Although NRMP focuses on its objective of management of natural resources, the program also builds the GOP's institutional capacity to develop and implement policies and increases private sector involvement and efficiency in forest industries.

The Natural Resources Management Program strategies are:

- Integrate environmental considerations into economic policies and decision making;

- Improve natural resources pricing schemes, with reference to land rents and replacement costs for forests, to correct for resource underpricing;

- Strengthen the Integrated Protected Areas System so that it has improved management and capacity;

- Foster economic growth in rural areas, especially by involving rural communities in sustainable natural resources management;

- Increase the public's awareness of environmental issues and their importance;

- Increase people's participation in decisions which affect natural resources.

The NRMP also provides technical support to the DENR to improve its capacity in regional and provincial planning, budgeting and management. Other technical assistance included support for information, education and public awareness campaigns, upgraded training and human resources programs, and improved techniques for forest resource inventory and monitoring.

The Evaluation Procedures

To conduct this evaluation, CDIE sent a field team to collect information on completed and on-going RRDP-related social forestry activities introduced better resource management practices to farmers, rural communities, and local NGOs. The team compiled its information from:

- visits to former RRDP project sites to observe current socioeconomic and biophysical conditions and to verify information received from other sources

- direct interviews with individuals from upland households, former RRDP project staff, NGO and municipal and regional government agencies and from university and central government offices

- secondary data sources drawn from the extensive array of project documentation, evaluations, academic research, and consulting reports generated during and following RRDP implementation

Appendix A of this report outlines the procedures followed by CDIE in conducting its evaluation of USAID "Forestry and the Environment" programs.

TABLE 1. SITES VISITED FOR THE CDIE EVALUATION

Site Name and Location	Funding Source & Implementor
San Miguel, Northern Leyte	RRDP - Dept of Agriculture (DA)
Mananga Watershed, Cebu	RRDP - CIDA & local NGO
Kiblawan, Davao del Sur	RRDP - ENR & local NGO
Tacub, Davao del Sur	ADB - DENR and local NGO
Jose Panganiban, Cam. Norte	RRDP - DENR & local NGO
Marilog, Davao City	RRDP - DENR & local NGO (SeLF)
Bamban, Tarlac	RRDP - Local private firm (TREE)
Kalibigaho, Osminia	RRDP - DENR and local NGO
Masaraga, Albay	RRDP - Bicol Univ Coll of Agr
Baciwa Watershed, Negros Occ.	RRDP - DENR & local NGO (NFEFI)
Mt. Canlaon National Park Negros Occidental	ADB - Local Govt. and local NGO
Cosina, Bukidnon	RRDP - DENR & local NGO
San Miguel Baungon, Bukidnon	RRDP - DENR & local NGO
Magdungao, Passi, Iloilo	RRDP - DENR and local NGO

3. EVALUATION FINDINGS: PROGRAM IMPLEMENTATION

The evaluation considers four program strategies to be critical determinants of USAID program impact and performance:

- institutional change
- technology introduction
- education and awareness
- policy reform

The evaluation examined the changes in development conditions that could be attributed to RRDP's implementation of these strategies. Many of these changes have been detailed and documented in an earlier RRDP evaluation (Riggs 1989) and in the RRDP Project Assistance Completion Report (USAID 1992). The specific findings presented below further document the environmental dimensions of the RRDP social forestry program.

Institutional Change

RRDP support has helped the Philippines government transform its forestry management from purely protection and policing forests to include social forestry as a conservation approach.

The most significant and enduring contribution of RRDP was in catalyzing the change in orientation at the central planning levels of the DENR from policies based on policing of local users and collusion with vested logging interests to a community based approach to forest management in which local residents are considered as partners. Prior to RRDP, DENR viewed the populations inhabiting the uplands as squatters bent upon the destruction of the forest lands under forest service administration. The TLA system with its selective logging and annual allowable cut features was to provide for sustainable long term management needs. The reality of abuses (and weaknesses) of the TLA system and dynamic settlement processes following the logging roads lead to a reconsideration of upland development. Although not yet complete, the momentum of this transformation appears irreversible. RRDP, of course, was not the only factor in contributing to the development of a social forestry capacity within the DENR. It did, however, elevate the debate to a key central role within DENR, so that when the EDSA reforms reoriented many national programs, RRDP was in position to make a significant lasting institutional changes.

Many RRDP staff have been absorbed into the permanent cadre of the DENR, and some occupy key positions in the organization. For example, two former staff occupied positions as Regional Technical Directors. A number of others occupied key Provincial positions. Under the recent decentralization policies, implementation of social forestry will shift to local government units whose responsibility it will be to determine and engage forestry staff as needed. Regional DENR offices maintain technical supervision.

Millions of hectares of former forest have been degraded to brush lands and cogon (*Imperata*) grasslands and these are burned over annually. RRDP supported a variety of institutional arrangements for implementing social forestry programs at the field level in an effort to improve the management and productivity of these areas. DENR staff had been unable to control use of these areas through its traditional policing approach. Under the RRDP social forestry program, the government sought partnerships with local organizations or assembled its own project teams to carry out field level actions. In each case the implementing agency carried out community organization with groups of resource users at the local level (barangay and below). The institutions that RRDP worked with to bring about field level implementation include private firms such as TREE, DENR contract staff, national universities and local NGOs.

Despite improvement in orientation and openness to change brought about in part with this USAID support, government services have usually proven incapable of timely delivery of inputs and of offering sustained and technically sound advice to local forest users. To partially offset public sector inefficiency, RRDP played a role in fostering the involvement of environmentally oriented rural development NGOs with sustained service delivery at the local level. The NGOs' strong commitment to local level development notwithstanding, they often lack the technical capacity to transform this goodwill into effective service delivery. Where universities or international NGOs reinforced local NGOs, capacity was enhanced. The movement in and out of the DENR bureaucracy by this pool of trained technicians reinforces the overall movement away from policing and toward social forestry.

The RRDP helped integrate site-specific approaches for upland forestry and tree farming into Philippine extension organizations.

The USAID strategy for reforestation and forest management in upland areas has involved changes in both government and non-government extension approaches. The RRDP has built capabilities of GOP agencies to undertake conservation oriented forestry programs that engage local households and communities and foster non-government organizations in introducing and supporting sustainable forest use and management practices on hilly erodible land. This

process has taken time. Nearly 15 years after recognition of the basic needs for upland development, the oldest planted tree observed by the CDIE team had been in the ground for only 4.5 years.

This is perhaps due in part to USAID overemphasis on institution strengthening. As a result there is a plethora, of people with academic and workshop training who establish work plans, programs, and principles but a comparative dearth of on-the-ground activity. In limited areas the basic technologies of hillside conservation farming, contract reforestation, and improved residual forest management have been adapted according to specific circumstances in which they have been applied. A series of extension manuals were developed to assist RRDP and DENR staff to accomplish this objective. To aid in site selection, design and impact analysis, the project produced a Rapid Rural Systems Analysis manual in collaboration with the University of the Philippines, Los Banos Institute of Environmental Science Management. To assist in tailoring approaches to suit local needs, the project produced a "Key Farmer Problem Approach" manual. Another manual, "How to Localize Technologies" was designed specifically to diagnose failure and rectify problems encountered when applying RRDP approaches generically.

Implementing organizations at different sites developed specific approaches for their areas. The Bicol University College of Agriculture (and Forestry) took the experience and insights gained from working under RRDP and developed a specialization in Upland Production Systems. The university transformed the former Masaraga site of RRDP into what it terms a social laboratory for this program (and in the process keeping some funding alive for the site). The college has taken the lead through research and practical experiences in developing multistory cropping systems including improved fruit varieties. In Cebu, the emphasis has been on integrated watershed management which has prompted experimentation with a wide range of tree species for reforesting the various microsites found within a typical watershed. The Mt. Kitanglad Community Development Foundation developed the integration of private woodlots with intensive stall feeding of livestock. RRDP helped strengthen DENR's Integrated Social Forestry Program and contributed to its decentralization in Provincial Environment and Natural Resource Offices (PENROs) and Community Environment and Natural Resource Offices (CENROs). Agroforestry, Contract Reforestation and Assisted Natural Regeneration manuals were developed to help support institutionalization of the technical capacity to modify approaches according to site physical and socio-economic characteristics.

RRDP has helped directly and indirectly to increase the role of NGOs as change agents in the Philippines.

Many NGOs set up in former RRDP project areas continue to carry out community development activities based on or incorporating

upland forest conservation and use. One purpose of the RRDP natural resources management component was to establish NGOs with the capacity to implement social forestry activities. Of the twenty field sites, ten were originally contracted to NGOs. In ten other sites, DENR contract staff formed themselves into NGOs and continue to be active as contractors for community based natural resource management projects. According to one former RRDP site director who now heads an environmental NGO (BURFDI), in 1986 only three viable environmental NGOs existed; by 1991 this figure had increased to 35, then 65 in 1993. He took pains to distinguish real NGO capacity from the hundreds in not thousands of nominal NGOs which have sprung up in the wake of the EDSA revolution.

The RRDP-supported NGO methods are in harmony with the grassroots participatory development philosophy of the current government (See Box 2). Former RRDP staff have organized local NGOs with a regional focus to vie for national and international funding support for their various conservation forestry and other rural development initiatives. Several local NGOs launched with RRDP support have become attractive to donors became they often operate on lower budgets and appear to have the necessary rural development skills.

By the time RRDP ended in 1991, a network of organizations with proven experience in community based environment and natural resource management had been initiated and was largely manned by former project staff and beneficiaries. Each site offers a different form of organization and has achieved varying levels of technical success, but, most importantly, each has found a way to continue operations even after project support terminated. This network of newly created local environmental NGOs has been federated under a nationwide umbrella organization, the Federation of Rainfed Resource Development Foundations, Inc.

Examples abound. After RRDP terminated, Kiblawan site staff formed the Kiblawan Rural Development Foundation to continue work under a reforestation contract with DENR and two projects with the Asian Development Bank. Former Magdungao staff formed the Bundok Kalinga Foundation with funds from the Save the Children Foundation and UNICEF to train Department of Agriculture, DENR, and Department of Agrarian Reform technicians on community organization and participatory methods in nursery management, seed collection and land use planning. Former Marilog RRDP staff created the Settlements and Livelihood Foundation which has a number of contracts, one on community forestry next to the former RRDP site and is financed by the Asian Development Bank. The Negros Occidental Ecological Foundation, Inc., NFEFI, continues to operate both within and beyond the former RRDP project area. In addition to implementing an ADB community forestry project, NFEFI pursued and obtained funding through grants from the agribusiness giant San Miguel's philanthropic foundation as well as through the local government in the Canloan. RRDP's NGO capacity and accomplishment were recently

showcased in a widely distributed technical publication (Agravante and Salvador 1992)

Continuing support to NGO participation shows promising results at improving relatively simple social forestry systems. For more complex, usually more capital intensive investments, such as commercial timber logging, the technical and material demands generally surpass the NGOs' current capacities. An industrial partner, similar to PICOP, may well be more effective than NGO organizational specialists in such situations. To scale up for the larger community based programs, a new hybrid, the Forest Service Organization, is being tested under the USAID sponsored NRMP. The Forest Service Organization combines lenders, former employees of the timber operators, and residents and of their local communities to launch a sustainable forestry management plan in former TLA areas. It is too early to determine what impact this new type of NGO will have.

========== Box 2 ==========

PARTICIPATORY RURAL DEVELOPMENT IN THE PHILIPPINES

Most Philippines NGOs have focused on welfare assistance and disaster relief. In recent years, many have shifted their attention to development assistance in response to growing rural poverty. Today, registered Philippine NGOs number in the thousands, and range from national affiliates of international organizations to small local community action groups of villagers and farmers.

Some NGOs have proven their ability to recognize and respond to local area needs with appropriate and timely assistance. The most successful NGO activities involve intended beneficiaries in the development process and respond to the felt needs of communities.

NGOs hire project staff in a wide variety of disciplines and give them training in community organization techniques. NGOs screen potential employees to ensure new staff are comfortable with and committed to living in rural areas. NGO staff often live for extended periods in project villages, in contrast to government technicians, and learn local problems and aspirations firsthand.

NGO staff serve primarily as community organizers holding frequent meetings where forest users are encouraged to voice their concerns and share their ideas on how problems can be solved. If the problems require government assistance, training or services, NGO staff will seek out help from the appropriate public agency. NGO organizers also arrange visits by village leaders to nearby sites where such technologies such as timber stand improvement have been adopted to demonstrate firsthand how such changes have been developed.

USAID has supported the new government participatory development approach by providing assistance to registered local NGOs first under the RRDP and more recently through its Private Voluntary Organizations Co-Financing and Enterprise in Community Development Projects. NGOs under this program were encouraged to link their activities with government institutions such as the Department of Agriculture and DENR. USAID funded NGO Projects have focused in agriculture, health, and micro-enterprise development.

========== End Box ==========

RRDP sponsored an array of local training centers that promote upland conservation.

RRDP social forestry field programs have been designated by the DENR as ISFP model sites. RRDP experience shows that management training of rural participants in the basics of hillside conservation is essential to avoiding these mistakes and to the sustained practice of conservation farming and forestry. The most effective RRDP sites are those where farmers received training in how to properly establish and management their upland systems. RRDP established training centers to fill the need. Less expensive training courses have emerged from several of the RRDP project sites which serve as models for courses still conducted by NGOs today.

Some local NGOs have formed their own training programs. Local training centers are now operated by regional NGOs such as Bundok Kalinga Foundation in Iloilo with the farmers' cooperatives in Magdungao and Tagunong. Sogod and Mananga farmers receive training under the supervision of Mag-Uugmad Foundation in Cebu. The local training centers offer courses in tree nursery operation, reforestation, cooperative leadership and financial management as well as topics related to sustainable hillside cultivation.

Technology Introduction

RRDP pioneered several technical and organizational approaches to reforestation.

The uplands can be divided into four principal forest categories each with its own program approach:

1) areas of old growth forest (optimistically termed virgin forests in planning documents) which are slated for protection and in which all logging is officially banned;

2) residual forests which are degraded forests (by logging, fuelwood cutting and gathering) and which are slated for development through community based management arrangements;

3) unoccupied *cogon* grasslands which represent the endpoint of degradation and are subject to expensive rehabilitation through reforestation contracts;

4) cultivated areas which are to be managed through Certificates of Stewardship contracts under the Integrated Social Forestry Program and include at least 20 percent tree cover.

In practice, these differing categories and the application of technologies and practices appropriate to each become intermingled. The lack of clear and distinct differences blurs the separation USAID was attempting to make when it shifted from RRDP which was focussed on categories three and four to NRMP which focusses on categories one and two. For example, in RRDP's Baciwa Watershed sub-project in Negros Occidental includes 250 hectares of agro-forestry (type 4), 250 ha of contract reforestation (type 3), and 500 ha of pure protection (types 1 and 2). The agro-forestry area included cropland and forest technologies.

When appropriately applied, the combination of community organization, institutional integration, and forestry technologies such as appropriate species selection, nursery development, enrichment planting, ANR, TSI, strip brushing, and multi-story cropping appear to work and could go a long way to restoring the productivity of deforested upland watersheds throughout the country (especially when complemented by environmentally sound agricultural practices on surrounding croplands).

The technologies exist and have been adapted, but for many reasons their application has been uneven. Lack of harvest plans and benefit sharing arrangements are a source of uncertainty. Enrichment planting consists of adding economically valuable species to a forest habitat in order to enhance its economic potential. Rattans, bamboos, and timber species were frequently used in RRDP sites. In the Baciwa sub-project, where these species were planted in a site whose management plan called for complete protection but where the local population reported sale of non-timber forest products as their prime income source, a situation that typifies the contradictions and uncertainties affecting RRDP's efforts to develop appropriate social forestry technologies.

In highly degraded secondary forests, assisted natural regeneration, ANR, provides an alternative to traditional reforestation which attempts to use climax species without first encouraging pioneer or early successional species. ANR in effect mimics the dynamics of humid forests and can reduce costs while increasing survival rates by shading out competitive grasses and reducing risk of fire damage. Frequently, "nurse" species are planted around a desirable seedling of a climax species. Nurse species are later thinned and can provide intermediate income. The

team observed a wide range of combinations of nurse and climax species which were not always technically sensible.

Multistory cropping refers to the practice of creating "artificial forests" composed of desirable plants in the canopy, understory, and at the ground level. Rattans, bamboos, black pepper, fruit and timber trees with various ground crops were observed. In Masaraga, DENR prevented the project team from using the fibrous abaca to speed reforestation. The banana-like abaca is 95 percent water and provides an excellent microclimate for regeneration of other species. It could serve in firelines to protect other areas. Income from the fibrous pulp which can be harvested every three months after the first two years would return a projected 16,000 pesos per ha per annum. Development of this system was held up because DENR feared that abaca would threaten DENR jurisdiction. They felt it would be seen as an agricultural species and thereby invite other government agencies such as the Department of Agriculture to intervene in the area's "forests."

Timber Stand Improvement and strip brushing have also been promoted under RRDP. They are appropriate in a variety of contexts. Strip brushing involves clearing bands of undesirable brush to accelerate regeneration of overstory species. Timber stand improvement consists essentially of thinning out poorer specimens to favor better individuals. Implementation capacity of NGO's can serve as limitation to technological success. For example, erosion threatened an area where the team observed vertical bands of cleared vegetation in Kiblawan, at and early stage community forest management site. The local NGO had done a remarkable job at community organization lower on the slopes but there as well, technical limitations of the forestry staff was evident in plantations which had not been properly thinned. follow-through by the foresters was insufficient.

Despite some of the growing pains noted in the above discussion, the incorporation into the pilot programs of RRDP of a diverse range of technical practices and tree species has been remarkable. To help insure quality in the application of these new methods, RRDP developed training manuals for subjects such as agro-forestry and assisted natural regeneration.

RRDP's effort to test and introduce multiple species trees as part of upland conservation farming and forest management have had mixed results.

Technology introduction to the farmer has been carried out exclusively through NGOs, who have done a creditable job. Technologies from worldwide have been discovered, tried, modified and presented with surprising effectiveness to thousands of upland rural participants. Those technologies actually practiced by the NGO members themselves, such as arousing interest, initiating meetings, conducting meetings, resolving group differences, etc., have been

well learned and well taught, as a rule. Because of personal interests and time limitations, NGO leadership technically has not been as successful as has their socioeconomic leadership.

An obvious example is species selection. Almost without exception, reforestation at sites visited emphasized Melina, Mangium, Bagras, and/or Falcata. Of those, only Falcata (the least-used in most areas) first came to prominence in the Philippines, although Bagras is also a native. The single character shared by those species is abundant and frequent seed production, accompanied by varying but relatively easy seedling production and establishment. The same statements are true for hedgerow species, Giant ipil-ipil, Kakawate, Rensoni, and Flemingia. But using other species required more initiative and thus more concern and knowledge, and few were tried.

Professionals have debated a great deal over the desirability of various tree species in recent years, much of it on tenuous grounds. One contentious issue is the use of exotics, against which two major complaints are made: 1. The exotics are not adapted to the local site conditions, so are a waste of resources to plant them. 2. Exotics are adapted too well and crowd out the desirable but less vigorous native species.

In fact many exotics introduced by competent technicians are well adapted, offer advantages not easily obtained from indigenous species and are both worth while and non-destructive. One such is Melina, *Gmelina arborea*. There has been little or no tree improvement of melina in the Philippines, and the form is some of the worst in the world. Improvement could be accomplished very quickly, either by importing genetically superior seeds or by careful selection of those already present. In the meantime, melina is easily propagated, provides good timber and outstanding pulp, provides a favored food for parrots and macaws, deer, and rodents, and has never been reported as invasive of the natural forest. It is a strong mineral pumper (withdraws minerals from the subsoil and deposits them in the topsoil), has an unusually dense and fibrous root mat so holds soil better than most trees, grows very rapidly on appropriate sites, and has attractive flowers. Many other exotics are also present including common cultivars such as corn, wheat, beans, coffee, and chocolate and domestic animals such as cattle and horses. While useful, exotic species cannot replace the great many desirable native flora and fauna.

Similarly, every species has genetic drift and drift towards abundant seed production is found virtually everywhere that artificial regeneration is practiced. Unfortunately, heavy seed production is normally accompanied by precocious fruiting and branchy stems, both dysgenic in timber trees. No one with whom it was discussed made any attempt to select mother trees for superior characteristics, although some recognized the theoretical desirability of doing so.

RRDP-extended forestry practices were sufficiently complicated to require the provision of initial and follow-on technical support and material incentives, especially when carried out on public lands.

Communal reforestation, group planting on communal (government) lands, was carried out at many locations, always by participants paid in cash or in kind; that is, by fertilizer, seeds or seedlings of more desired crops. The job was done adequately. Where all outside support had been terminated for a year or longer, ongoing maintenance was not observed. Even during the years when outside support was forthcoming, fire and grazing animals were problems. Individual tree planting on private lands, however, had fewer fire and browsing problems during project implementation and was still receiving care and maintenance regardless of the presence or absence of post-RRDP support.

RRDP research teams discovered that upland farmers obtained less than half of their income from farming and lacked labor and capital to carry out more intensive agro-forestry practices. RRDP staff tested the concept of enriched fallow -- planting contoured rows of leguminous trees and nitrogen-fixing cover crops to halt soil erosion and prevent regeneration of hard-to-remove brush during the fallow period. When forest remnants existed, RRDP carried out assisted natural regeneration and timber stand improvement with technical support and material incentives required by participants. Enrichment planting was rare, however, rattans and bamboo and even tree ferns were being introduced into some sites.

Thinning, the first income producing operation, was not observed in RRDP timber stands, but was known of and planned as soon as feasible, particularly at Kiblawan with its 4.5 year old Melina plantations. Neither NGO foresters nor villagers, including the Kiblawan site, knew the essentials of thinning. Direct observation of forest stands universally confirmed that technical assistance on both thinning and pruning were necessary and lacking.

From the CSC holder's perspective, social forestry involved the integration of agroforestry systems on croplands with reforestation on lands unsuited to cultivation. RRDP staff helped locate farmer groups locate and distribute seeds and seedlings for nitrogen fixing tree varieties and establish and operate tree nurseries (Box 3). At some project sites, staff introduced livestock dispersal programs and forage crops that could be integrated with and reinforce the agro-forestry activities. At some sites RRDP also promoted reforestation for stabilizing hillsides and for fuel or construction wood.

========== Box 3 ==========

Sloping Agricultural Lands Technology (SALT)

Typically, SALT is an agro-forestry scheme based on cultivation of food crops in alleys between hedgerows of perennial multi-purpose, nitrogen-fixing trees planted along the contours of cultivated hillsides. The hedgerows or vegetative strips are set four to six meters apart forming alleyways where annual or perennial crops can be cultivated. A simple surveying tool (an A-frame or water tube) is used to determine the correct contour.

The deep rooted trees or grass hedgerow species are planted in double rows close together within the row (trees 30 cm apart) to form a living barrier to hold the soil above. The hedgerow takes up 20-25% of the field area and is pruned every 30-45 days. A well managed leguminous tree hedgerow produces 30 tons per hectare of green manure (wet weight) annually.

Properly established and managed SALT-based cultivation systems stop soil erosion. To work, hedgerows must be laid out on contours to form a protective barrier to slow and channel water run-off. SALT systems use the erosive force of water run-off to leveling terraces that form between the hedgerows. Terraces slow down water movement allowing greater infiltration. Organic matter builds up because the top soil is not lost, further improving soil fertility and water holding capacity. Organic matter makes more nutrients available that otherwise would be held by the soil.

========== end box ==========

RRDP developed mixes of technical elements that were appropriate for a specific site locations.

Figure 2 provided a schematic overview of the upland topographic profile. RRDP theoretically targeted the lower slopes of what are termed "brushlands and other land uses" where extensive cultivation is prevalent and integrated social forestry with associated contract reforestation is the solution. Further upslope the figure depicts residual dipterocarp forests and indicates sustainable forest management approaches as the appropriate solution. In reality, the team found a complex patchwork of interrelated forest, grassland, and cropland habitats. This patchwork required a blend of technologies and a wide range of technological options to be brought to bear on the given set of problems. Despite the constraints of its project design, RRDP proved to be fairly adaptable in bringing in a range of potential solutions.

Depending on the site a variety of technologies and tree species were available. As RRDP progressed, implementors became more and more sensitive to varying planting materials and techniques and gradually branched out from the limited species generally made available through DENR nurseries. In Bicol, private nurseries began offering shade and fruit trees which matched the multistory systems

being adopted in that area. It became a regional focal point for their distribution.

In Kiblawan, American mahogany became popular in upland systems and melina was planted in shared private wood lots in the valleys. In the San Miguel site in Cagayan d'Oro, most of the contract reforestation had been rejected in favor of private wood lots. One commercially oriented farmer had planted expansive melina wood lots which because of site specific micro-nutrient deficiencies grew in a stunted and twisted fashion. His neighbors had taken to teasing him about his bonsai tree plantation for export to Japan indicating a fair degree of sensitivity to different species and site considerations.

Overall, when efforts were focussed, preferably by complete watershed, the implementation appeared most successful. In Cebu, for example the watershed had become a mosaic of different land uses with reforestation including plants noted for food production, other for rapid growth, and others for their eventual economic value. Given the short life of the project, follow through to refine systems was insufficient. Timber trees, for example, require advice at least through the time of second thinning.

Awareness and Education

The RRDP conducted education and awareness activities for upland development aimed at all levels of clientele. To raise environmental consciousness and enhance the managerial and technical skills of human resources, three strategies were employed. These were formal training courses, model or demonstrations farm visits, and group meetings in communities.

RRDP reached thousands of farmers, line agency personnel, and project staff with training in introduction, spread and use of rapid growing tree species for upland planting.

Both RRDP engaged in a wide array of educational activities for their own project staff, line agency personnel (including administrators), farmer leaders, and farmers. Over 15,000 extension agents and farmers at roughly thirty RRDP supported sites throughout the Philippines received courses on agro-forestry management with modules on soil and water conservation with animal integration, multi-story tree and crop systems and enhanced fallow systems.

Earlier project reviews have given high ratings to RRDP training activities from the standpoints of course content, methods of presentation, course materials, participant selection and caliber of resource personnel and appropriateness of the subject to the needs of the clientele (USAID 1989). One interesting evidence of the impact of training is the number of trained RRDP staff who have used

their skills to form their own NGOs or serve as trainers or researchers after completing their work under the project.

RRDP developed farmer-to-farmer training through site visits and group meetings as a key method of increasing awareness and transferring knowledge about upland conservation forestry practices.

Demonstration Visits. To reinforce the short training courses and highlight specific farming practices and technologies, farmer leaders of community work groups together with site project staff went to visit farms in such places as Bansalan, Davao del Sur; Guba, Cebu; and Silang, Cavite. Bansalan, for example, was a favorite site for visits as it showcases specific technologies for sloping agricultural land and surrounding woodlands.

Some project sites held farmer-run trials and demonstration of specific technologies which were the objects of cross-farm visits. A very effective teaching technique employed in such sites was the farmer teaching other farmers what worked in his farm under what conditions. In addition, a few project sites become demonstration places for silvicultural techniques, e.g., assisted natural regeneration (ANR).

The farmers interviewed were highly aware of the effects of hedgerows and multi-story cropping in conserving soil and water. The effectiveness of site visits was not only on farmers but also on project site implementors. The visits reinforced their technical skills. The visits to other project demonstration sites also provided the opportunity to share lessons and discuss issues with fellow site implementors.

RRDP experience demonstrates that the extension of hillside conservation practices to farmers works best when a "hands-on" approach to training is taken. Moreover, farmers appear to learn better from other farmers. Most training programs emphasize a four-phased training process that includes: 1) farmer visits to demonstration farms; 2) group practical sessions where hillside conservation farming systems are established on a pilot farm; 3) follow-up technical help; and 4) periodic on-going courses on integrating hillside conservation with income earning farm enterprises.

RRDP training programs also emphasized leadership and management skills for greater control of their upland community development. This training in confidence building increased farmers' participation in group discussions and farmer meetings but also trained those that would be farmer leaders for new community-based organizations. Cooperative leaders also received financial management training.

RRDP experiences demonstrated the value of involving farmers as trainers, and there is evidence that this practice is followed by NGOs still working in upland forestry.

Limited financial resources allowed for only a few farmers to visit demonstration sites. These were often the leaders of farmer groups. After going on cross-farm visits these farmer leaders shared what they learned with the members of their work group. The sharing was done in two ways: one was a description of what was seen and learned in a meeting of the farmer's group, and the other was the trials on his farm of some of the technologies learned. During group meetings for such purpose the project site staff complemented the farmer leader in sharing the learning.

Former RRDP staff, trained in forestry conservation and community organization techniques continue to work actively in social forestry programs.

One of the more subtle RRDP impacts have been the scores of Philippine staff employed by the projects who now are operating, work for or have formed their own NGOs and private consulting firms active in upland conservation and development work. These former Philippine RRDP staff carried with them the training and hands-on experience that is helping make these NGOs and firms more viable. Other Philippine project staff now work for government agencies.

Decentralization of forestry programs in the Philippines, has opened up positions for forestry extension staff in local municipal governments. Former RRDP staff have also taken advantage of these opportunities. Since employment is discretionary, local mayors and other officials hire foresters because of their experience and likely usefulness in meeting specific local needs.

The team met with former RRDP staff who are employees of the nation-wide NGO, Oriental Integrated Development Corporation Incorporated, based in Manila which is a subcontractor of a World Bank funded DENR project. A former RRDP consultant, has formed a NGO based in Cebu which specializes in upland projects focused on reforestation and rehabilitation of a key watershed. Former RRDP staff have formed regional NGOs in Magdungao, Marilog, Kiblawan, Bicol and Negros Occidental. Others work in key government posts, and still others are connected to the ongoing NRMP.

Policy Reform

RRDP catalyzed the role-shift of DENR from policing against forest abuse to promoting community-based forest management.

Except in old-growth forests, DENR has abandoned its hopeless battle to guard millions of hectares and launched programs enlisting and assisting the upland households in improving agricultural

methods, reducing deforestation, conserving soil and water, and reforesting areas not suitable for permanent agriculture. One of the first steps in this effort is based on the GOP's adoption of a "people oriented" forestry program in the 25 year Master Plan for Forestry Development. This policy shift catalyzed by lessons learned from RRDP lead to an upgrading of the ISF program nationally, thereby paving the way for rapid expansion under grants and loans from a number of donors. Department Administrative Order 97 (December 1988) formalized the new social forestry principles learned from RRDP and other pilot programs. The lessons from RRDP's model ISFP sites have been incorporated in the principles laid out in the Forestry Master Plan.

RRDP and later NRMP provided analytical and policy support to clarify the issues of access, ownership and tenure arrangements for the uplands.

Tenure for community forests, as for any land use, is a thorny issue which must be solved if sound practices are to be obtained. Despite efforts of USAID and others, the situation remains ambiguous. In the search for tenure solutions, a profusion of different mechanisms for allocating ownership and use rights in the uplands has resulted. Forest tenure must look at minimum tenure period of at least two harvest cycles, which can be more than a single human lifespan. Any lesser tenure invites problems and postpones solutions. The most frequently adopted solution is freehold ownership, whether by individual, cooperative, or corporation. The only viable alternative, although uniformly less effective, is government lease. In the latter case , a government organization --such as DENR-- effectively maintains ownership and provides detailed supervision.

Under NRMP, USAID continues to help the Philippine government implement a recent policy shift toward providing upland cultivators with more secure access to upland areas. Through "certificates of stewardship" individual upland households, community organizations and small firms, are now gaining long-term (25-year) "rights" to designated public upland areas for farming and forest products use if they can demonstrate the willingness and ability to use these lands in a sustainable fashion. The adoption of forest management practices qualifies upland households for land access under the DENR Comprehensive Agrarian Reform Program (CARP).

RRDP identified and framed the tenure problem in upland areas, but because of design limitations in the project there was little leverage to actually reform existing policies. Subsequent programs such as ADB's Forestry Sector Program and NRMP build on RRDP's work by conditioning fund transfers on tenure reform measures.

4. EVALUATION FINDINGS: PROGRAM IMPACT

The evaluation assessed whether the RRDP goals have been achieved from three standpoints:

- Practices -- did target groups adopt more sustainable ways of using and managing forests and trees in upland environments?
- Biophysical conditions -- to what extent have or will these changes in forest use practices lead to improvements in the biological and physical conditions of their land and water resources?
- Socioeconomic conditions -- did more sustainable land and forest resource use improve the livelihood and well-being of project participants?

Impact on Practices

Most farmers have modified the upland social forestry model to suit their site-specific land conditions and labor constraints.

RRDP assumed at the outset that contract reforestation and community forestry were perfected practices and technologies and could be introduced as sets of "cookbook" tree planting and management rules. As argued above, project staff later recognized that the pace of adoption accelerated when farmers were given more freedom to adapt the model to site conditions.

The basic approach at all individual project locations (RRDP sub-projects) was to establish what were called model sites, although they were usually sites with at least one model practice rather than a single farm modeling all or many practices. Oddly enough, there was no unanimity among the various reports consulted on number of sites established. There were at least 27 and perhaps as many as 35 sites, located in at least 10 provinces, 21 municipalities, and 45 barangays, on all of the major islands except, probably, Palawan and Samar.

Tree planting methods fell into three major categories:

Multistory forest farming. Multistory farm forestry was best exemplified in the Jose Panganiban site where farmers had settled in a logged over patchwork of forest remnants and grasslands. Here they had established an under-story of shade cacao, local fruit, rattan, and others overlain by native trees and planted timber

species such as Mahogany Dapdap, Mangium, Lansones, Coconut, Pili, Breadfruit, Jackfruit (15 - 30 m). Ground cover consisted of Camote, Pineapple, Yam, Ginger, Gabi with citrus, wet rice, and tilapia fish ponds outside the canopy. Similar systems were in evidence in Masaraga also in the Bicol region.

SALT and variations. Classic SALT technology anticipates gradual terrace development as soil movement is arrested by hedges; includes establishing contour hedge rows; single for conservation only, double for fertility maintenance/improvement. Pruned periodically for firewood, fodder, green manure: Leucaena spp., Kakawate, Desmodium spp., Flemingia spp. Planting permanent crops between &/or in hedges: Citrus and other fruit trees, construction timber, windbreaks, posts, soil improvement.

Planting short term crops for subsistence and sale. Like pre-SALT hillside farming, which promotes soil movement to the nearest hedge; yields are equal or slightly inferior compared to shifting agriculture in the early years. If double hedgerows are pruned frequently and the material applied properly to the alleys between hedges, directly or as manure, yields normally rise to new levels about the third to fifth year: corn, upland rice, beans, squash, camote, et al. Management includes coppicing/pollarding the hedgerows, replanting if gaps develop, spreading green or animal manure, and caring for permanent and annual crops as needed. As should be obvious, SALT is labor intensive and, in fact, requires more labor during the early years than does shifting agriculture. Its adoption and sustained practice is primarily by those who have small hillside farms and no easily accessible alternate employment.

Reforestation is reestablishing trees on land where trees once grew. The most common reforestation is for timber trees. Although timber may not be the most valuable product or service, it is commonly the principal saleable commodity.

Planting young trees or sowing seed was observed in solid blocks of regular shape or irregular, as along meandering streams. Planting was also done in narrow bands or lines, as along roads or boundaries or for windbreaks. Less commonly, trees were widely spaced, especially for shade in pastures and fields.

Care was the equivalent of care given any agricultural crop, but generally much less intensive. Weeding was commonly in a narrow ring around each tree; fertilization and irrigation were very unusual; thinning to remove inferior stems to provide more growing space for those remaining, as well as timber stand improvement, removal of inferior, older and larger trees, were both rare.

Harvest depended on the products desired. Wood from the stem was the most common product, but foliage, resin, flowers, fruit, were also harvested from the trees. Non-timber products such as water, orchids, flowers, and game animals are more commonly

harvested from the forests under the CFP than in former RRDP sites.

Biophysical Impacts

The actual biophysical impact on the Philippine uplands during the life of the project was limited.

RRDP was implemented in two phases or cycles as termed by the project. Cycle I (1982-1987) focussed on only four DENR-administered sites. In these sites sub-projects were implemented as a mechanism to "develop institutional and policy frameworks for community-based natural resource management" (USAID 1992). Cycle II expanded coverage to an additional 17 sites several of which included separate reforestation contracts. RRDP awarded only five reforestation sub-projects. Three went to "non profit" NGOs and two to "for profit" firms. At the end of the second phase, RRDP counted 16 operational sites, the remainder having been dropped for reasons cited elsewhere (such as local government incapacity). In addition to the over 3,500 ha in agroforestry systems, a total of 1,497 hectares were reforested. This equals 86% of the 1,738 ha targeted. Results can be broken down according to approach as follows:

- Conventional Reforestation - 997 ha
- Assisted Natural Regeneration - 318 ha
- Agroforestry - 182 has

RRDP constructed and rehabilitated trails (165 km), buildings, and nurseries (7) which further contributed to the biophysical impact.

Indirectly, the project affected a wider area. This was accomplished largely through the greater effectiveness of DENR staff and environmental NGOs in implementing social (including community) forestry programs after RRDP. Even a generous argument could advance no more than 50,000 ha of forested land affected out of a potential six to nine million. However, the methods were tested over most of the sites existing, with differing racial groups, and with a variety of crops, trees, cultures. In every case, the sites actually treated were improved, lives of participating farmers and families were improved, and the possibilities of change were made firm.

Species choice across the sites showed less variety than the site variation may have called for. To some degree, traditional DENR proclivities may have limited experimentation. However, the positive benefits of tree planting are less dependent on species choice than is commonly assumed. Virtually all trees affect soil, conservation, and water in a very similar manner. Even the much-touted nitrogen-fixing trees only add a little more nitrogen to the soil than do other species. A few years ago, none of the grasses were known to fix nitrogen; now we know many do (Briscoe et al. 1988). White mulberry has not been shown, yet, to fix nitrogen, but the leaves

have a higher nitrogen content than do most legumes. Until there is a known reason to change, tree species can be chosen on the basis of products, appearance, site adaptability, growth or other criteria of seeming importance. General adverse ecological effect has not been demonstrated for any tree. Even the parasitic sandalwood (*Santalum album*) is well-liked and favored in some areas.

The ultimate impact of RRDP will therefore depend on the success of the processes it has set in motion with respect to technical capacity of NGOs and DENR, awareness of local resource users to new potential land uses which involve trees and reforestation of degraded lands, and to the availability of necessary incentives to keep the processes moving that lead to increased adoption of social forestry technologies and practices. Although time will be the ultimate judge, the evaluator's task of determining attribution will become increasingly difficult. The team observed a number of encouraging signs that RRDP's impact on forest quality and cover may go beyond the few thousand hectares counted as project outputs.

In Baciwa watershed in Negros Occidental, for example, the local NGO, NFEFI, has mobilized a coalition of local politicians, local business, the DENR (CENRO), and even the local military. This group not only continues activities initiated under RRDP but assures that illegal logging in the entire Northern half of Negros is continually monitored. In this respect several shipments had been confiscated; military personnel caught in collusion with illegal loggers were removed from their posts, and the NFEFI group was seeking ties with other environmental NGOs in neighboring Negros Oriental to extend protection and coverage to the remaining forests in the entire northern mountains. Local residents are gaining confidence in reporting violations and developing a sense of ownership of the forested areas now under community management. Civil government involvement took two forms. Administration of the project site had been assumed by the Bacolod Water District. The local DENR officer, himself a former RRDP staffer, provided strong technical support especially in facilitating CSC allocation. This type of advocacy did not stop at the local level. NFEFI President, Gerardo Ledesma, took such experiences to the national level through participation in NGO forums and involvement with such national NGOs as the Haribon Foundation.

Another encouraging sign was the capacity of local users groups to undertake reforestation activities without a project. The Marilog Farmers' Association in Davao City had contracted directly with the DENR to reforest an additional 50 ha beyond what was planted during the project. Similarly, the Magdungao Agroforestry Farmers Association, Inc. continues to implement tree planting activities under a variety of project and contracting mechanisms. Magdungao is a Cycle I site and local biophysical impact is plainly visible. Thirty hectares of timber species, mostly mahogany and eucalyptus, are integrated with contour hedgerows and multistory

cropping systems. Individuals are beginning to replicate woodlots and plant timber species in multistory systems as they make understory enrichment plantings of bamboo. Similar trends were observed in the Bicol sites. It was not possible to quantify this spread within the sites. More importantly, each of these sites serves as a training center for other areas. Spread beyond the actual sites of the combination of private and communal woodlots in association with multistory cropping was reported by NGO and farmer informants and is likely to be taking place.

Socio-economic Impact

Participating upland households have gained skills, experience and confidence in their ability to organize to plan and undertake social forestry activities.

At sites visited by the evaluation team, participating social forestry program households uniformly reported that their energies invested in tree replanting and local forest management were generating tangible economic and social dividends. Respondents' major complaints were the shortage of seedlings to further expand their planted areas. They also complained of the irregularity of technical assistance and at times the limited capacity of community organizers to answer their forest management questions.

That local forest user groups were concerned about getting more seedlings and technical support from DENR and local NGO community development groups was taken as evidence that social forestry investments were seen as positive activities for improving their long-run well-being. At some RRDP locations, simple forest products enterprises - rattan furniture, construction wood -- were already emerging. Healthy stands of mahogany trees -- though some poorly thinned to maximize timber yield were further evidence that participating households found the intermittent forest management tasks as worthwhile investments of their labor.

Of course, the above findings are anecdotal at best. The RRDP reached only an estimated 2,220 upland families with forest management technologies that were applied over little more that 3,500 hectares at the time of project termination in 1991 (USAID 1992). There has been no comprehensive post project monitoring to determine how many upland families and how many more hectares of land have been incorporated into RRDP based forest management systems in subsequent years.

The only currently available indicators of spread impact are the number of CSC's issued annually since RRDP implementation during which slightly over 700 CSC's were being issued. GOP records indicate that CSC's are were being issued at the rate of 20,000 to 40,000 annually in 1991 and 1992 just following RRDP completion and prior to this evaluation. Unavailable are figures on what forest management practices were taking place and on how much land of new

CSC holders. The rapid expansion of CSC's, which appears to be constrained more by the issuing capacity of the DENR than by interest of applicants, suggests that a process is now in motion that offers promising new socio-economic opportunities for upland households.

5. EVALUATION FINDINGS: PROGRAM PERFORMANCE

While the real and potential impact of USAID support for hillside conservation farming in the Philippines, continues to be a matter of some speculation, there is clearer evidence from the evaluation findings about how well the program was conducted. Specifically, it is possible to ascertain how well the program performed from the standpoints of:

- Efficiency -- the value of social and private benefits from program investments by USAID and the GOP
- Effectiveness -- how program benefits have been shared among the various groups of target participants
- Sustainability -- the likelihood of program continuation after USAID funding has ended.
- Replicability -- the scope for spontaneous and induced spread beyond the program areas

Program Efficiency

The expansion of social forestry activities among upland households suggests that participants find their investments of land and labor are producing positive benefits.

The evaluation found evidence that the main constraints to the spread of upland social forestry investments were the shortage of planting material -- tree seedlings -- and the procedural delays involved in gaining access to CSC's. Even without the benefit of training and technical help, upland households were calculating that it was productive to combine a limited amount of surplus family labor with marginal land to introduce and maintain small individual or community stands of trees would have prompt and positive pay-back. At the time of the evaluation some of the more enterprising households were already beginning to derive income from selling seed and tree seedlings from their own nurseries to supply demand that could not be met from government or regional NGO seedling stocks.

Further social forestry expansion must take place before the total net returns of participating households and communities approach the value of USAID and GOP investments.

The $ 11.1 million RRDP investment by USAID and the GOP can be expected to produce both direct private benefits to participating

upland households -- in the form of income for forest products -- and indirect public benefits to the broader community of upland and lowland inhabitants -- from such contributions as improved watershed quality, reduced damage from flooding and siltation of irrigation and hydro-power reservoirs.

The evaluation did not calculate either total net private or public benefits to compare with project investments because the lack of solid financial information makes such estimates impossible. Estimates of private costs and returns were thwarted by no cost and returns data on social forestry activities. The lack of trend data on the growth of program participants also made it difficult to project future growth of program benefits.

The evaluation can state that to generate positive net private and social benefits from project investments does not require a large number of present and future program participants. Taking a very conservative $100 per hectare present value of future net income from upland forest resources as a proxy for participant benefits, RRDP social forestry activities would need to reach only 111,000 hectares of land, a relatively small portion of the roughly 7.1 million hectares potential forested area in the country. The evaluation concludes, therefore, that a positive rate of return on USAID and GOP RRDP investments is quite possible if the social and technical constraints limiting the spread of improved tree seedlings and secure land access through CSC's are removed.

Program Effectiveness

By targeting upland areas, RRDP have reached the lowest income rural households as well as many ethnic groups.

The concentration of most RRDP activities in upland rainfed areas has assured that those farmers reached would be in the lowest income groups nationally. Even well-to-do upland farmers are poor by the standards of average lowland irrigated rice producers. Because upland areas are mostly public lands, only in exceptional cases did project benefits to accrue to absentee landlords.

A more serious equity issue arises when low-income upland farmers attempt to improve their systems by moving into tree farming or harvesting of forest products. RRDP activities have reached tribal groups as well at several project sites -- the Kalauan and Marilog included Bula'an and Bagobo tribesmen, respectively. At Bamban, RRDP introduced agroforestry and reforestation practices to the nomadic Balugas and thereby strengthened tenurial claims of this indigenous group.

RRDP have engaged rural women in active management and leadership of hillside conservation farming groups.

In upland communities women are truly equal partners, and often more numerous than men. In the Philippines, women often have the dominant voice in the home and in community organizations. Recognizing this fact, the RRDP included women in participatory problem solving and priority setting (Riggs, et al. 1989). Village women wanted more cash income earning opportunities close to their homes and families. To respond to this interest RRDP project staff at some sites worked to include fodder species to support livestock fattening enterprises around SALT-based cultivation systems. In Magdungao the forest users' cooperative established a women's organization that also became involved in getting better health care services for the village. Women earned money for the cooperative by catering training courses.

In Sogod, as elsewhere, during the dry season many of the adult males in the project area relocated for extended periods to Cebu to take jobs as wage laborers in construction, transportation or fishing industries. With many men away, local organization meetings participants averaged more than 60% women. Many officers of the community cooperative were women. The team visited Sogod during a training course where most of the trainers and trainees were women.

Program Sustainability

Despite its short project life, the RRDP's complex and revolutionary social forestry program made significant progress at insuring sustainability.

In almost every site where implementation had succeeded under the project, some form of follow-on activity was observed. NGOs and universities provided continuing support usually with bare bones support. In some sites, local NGOs were effective enough to attract international PVO, other donor, or local funds. Local NGOs were also able to bid for and win contracts with the local government to implement social, community, and contract reforestation activities, sometimes in the same sites but always in the same regions as RRDP activities.

Farmer involvement in the programs continued beyond the project. Some farmers have formed cooperatives which are evolving toward direct contracts with local governments (i.e. no project or NGO intervention). Many "model" farmers under RRDP now serve as trainers and consultants to farmers in new sites being funded under other non-RRDP projects. This helps to sustain not only the technical commitment of rural folk who modified their practices because of RRDP, but adds financial and organizational impetus to the local communities as well. In one site, cross-site farmer training was so frequent that the local women had formed an organization to accommodate and feed visiting farmers.

Incorporating the RRDP lessons, ISF is featured in the Forestry Master Plan and thus receives continuing support under DENR programs. These developments lead former DENR Secretary Fulgencio Factoran to declare 1990 a banner year for Integrated Social Forestry. 104,942 hectares involving the issuance of 40,925 CSCs were affected. Associated cadastral surveys and land reform efforts are opening the way for credit programs. For example, in 1990 alone the Land Bank of the Philippines identified 64 sites for forest based livelihood projects.

Integrated Social Forestry (ISF) includes long-term (25+25 years) tenure, technical and modest material assistance, and institution building. Except for the tenurial arrangement and the uncertainty in access to the benefits of improved management, this is a well-conceived and reasonably well executed combination of practices. All that is really needed for important, useful, and sustainable results is continuity of the same technical and modest material assistance originally provided, with appropriate shifts in emphasis as the forests mature.

From a technical standpoint, RRDP's accomplishment thus far is analogous to providing a farmer with seed, teaching him to sow it, then wishing him good luck. With the proviso (under present tenurial arrangements) that his or her forest and tree products may be seized as they mature. A forestry project that terminates before young trees reach second thinning is a prelude, not a program. The ISF marks a sound beginning to a successful forestry program.

A frequently heard criticism was that, "USAID pulled the plug too soon." Serious consideration should be given to focusing development on a very few complete watersheds for long enough to accomplish biophysical sustainability, at a relatively low but continuing support level. This would permit the refining of technical training and capacity building for forestry technicians in DENR, in local NGOs and in farmer groups. It would also permit the planning and carrying out sustainable harvesting of forest resources which would help secure or reinforce local participation and commitment to the social forestry program. To some extent this unfinished business is being picked up by NRMP, but the temporal and spatial discontinuity of the two efforts has not been ideal for insuring sustainability.

Motivated and competent RRDP staff were critical to sustaining community based conservation forestry activities.

RRDP experiences show that several seasons are required before resource users receive significant benefits from tree planting. The evaluation team observed project staff with a wide range of community organization, communications and practical forestry skills in the sites visited. Because of personal backgrounds, and time limitations, NGO leadership technically has not been as successful

as has their socioeconomic leadership. Project and non-project sites with the greatest technical support were most likely to show results. The project staff in these sites were foresters with community organizing skills.

The project staff at other sites were motivated but less technically equipped to address many of the sylvicultural problems associated with sustainable social forestry programs. They lack the ability to give sound advice to older experienced farmers and to gain their respect and participation. Tending to draw on book knowledge they learned in school, project staff at these project sites failed to respond to many farmer questions in a manner that encouraged the spread of tree planting.

An obvious example is the issue of species selection. NGO staff reported that they used the species because that was what they were provided, or that was what was specified in the contract.

Social forestry efforts whether for communal or individual tree planting on private lands were much better maintained when the technical support was still in place. Maintenance of fire protection activities provide a good indicator of local commitment.

Communal contract reforestation frequently failed as a forest conservation strategy when it was not linked to an economic stimulus or employment program.

Although a few watersheds showed effective reforestation over small areas as a result of the common practice of allotting reforestation contracts. Most of the areas of contract reforestation observed by the team were in poor condition. Participants had gained no sense of ownership from the effort, nor did local governments and other implementing organizations. These projects were expensive as well. The costs were prohibitive: 20,000 versus 7,000 pesos per hectare for assisted natural regeneration.

Individual wood lots were observed to be relatively more successful than contract plots. In a few instances, private owners had banded together to joint private plots. This approach appeared successful in Kiblawan where it had been adopted as the preferred reforestation model.

Pump-priming subsidies are an expensive burden on DENR for sustaining and expanding social forestry programs.

Using subsidies to pay for labor contributions by community members in social forestry programs, the so-called pump-priming strategy, calls into question the financial sustainability of the participatory approach as it is being applied in the Philippines. Subsidies attract local residents into the country's various social forestry programs by offering employment for rehabilitative actions

(ANR, TSI, nursery work, and tree planting) or for social welfare activities (school and spring box construction). The intent is to reduce the dependency of rural households on illegal logging while strengthening efforts at local organization and collaboration in sustainable resource management activities.

The RRDP experience pointed to the danger that these initial subsidies would drive the program, create dependency, and thus skew the motivation for participation taking place. In the best cases, NGOs helped local organizations to "tax" some of the pump-priming funds to build a local capital base. In the worst case, farmers burned over reforested areas in order to secure additional employment replanting the same area. In RRDP project areas where residual forests were generally absent or thoroughly degraded, project wages provided the only immediate sources of income for forestry participation and may have been necessary to catalyze the community organizing process. In recent community forestry sites, standing resources are more abundant and offer the possibility of generating immediate revenues from forest improvements such as thinning.

This all suggests that social forestry subsidies, while possibly justified where they provide external benefits such as improved watersheds, still require careful consideration as an incentive mechanism. One estimate for community based forestry programs suggest that the three year average cost of community organizing, training and access to knowledge and expertise, and planning amounts to a minimum of 2.3 million Philippine pesos. When pump-priming is added, these costs more than double to over 5.0 million (Guiang 1993).

Program Replicability

RRDP provided a replicable development model (or at least a point of departure) that has been used by other donors and government programs.

The RRDP's social forestry program marks a sound beginning for successful forest conservation. Although RRDP reported distribution of under 1,000 CSCs, it is generally recognized as having catalyzed the reinvigoration of the ISFP program. Taking CSCs as a proxy for the ISFP, the results are impressive. Between 1988 and 1992, DENR has issued more than 120,000 new CSCs. Much of this has been made possible by the ADB program loan. Additionally, a good portion of the 1.5 million ha removed from TLA authority and redesignated for community forestry stands to benefit from the momentum behind social forestry that was engendered by RRDP.

Many of the lessons learned by RRDP in its social forestry work in the Philippine uplands have been replicated and expanded in the country's Community Forestry Program (CFP).

The RRDP model that has been used by other donors and government programs. The CFP (See Box 4) encompasses a more recent complementary effort to support social forestry in the Philippines. The core of the program revolves around a model of community based forest management. Ironically, it remains bureaucratically and operationally distinct from the older Integrated Social Forestry Program (ISFP) that RRDP supported (along with the Ford Foundation's Upland Development program and others). CFP now receives funding from USAID (through the NRMP), the Swedish government, and the ADB's first forestry loan. While the CFP unites program elements supported by multiple donors, it remains somewhat of a bureaucratic adjunct relative to the ISFP which has over a dozen years experience in working with upland communities.

The rationale for creating a separate distinct organizational home for replicating RRDP's pioneering social forestry efforts derives from the expressed intent to replace the TLA system of management in the larger and still somewhat intact residual forests. These were generally located up slope from the deforested cogon grasslands targeted by RRDP and ISFP. In practice, ISFP and CFP both require a similar range, although perhaps a different mix, of technical options and community organization skills. This is one reason that former RRDP NGOs are actively involved in implementing the CFP. In one site, Kiblawan, the team observed households participating simultaneously in both programs.

========== Box 4 ==========

The Philippines Community Forestry Program

The Philippine government's Community Forestry Program is aimed at the management of fragmented residual and old growth forest areas, including grasslands and brushlands, by rural communities acting as a whole. At present, the upper limit per community is 1000 hectares and depends in large part on how much management is to be carried out.

Where the intent of community forest management is strictly silviculture the planning and execution are relatively straightforward. Many farmers and NGOs are familiar with the necessary methodology. A majority of the RRDP sites carried out contract reforestation satisfactorily while support continued; many also carried out assisted natural regeneration, enrichment planting, and timber stand improvement.

Protection, with a large part of the community financially involved, is accomplished largely by the users group itself. Size of area is to set by the number of workdays (male or female) that the community can contribute, and not arbitrarily. The principal problem is that little or no income is generated by initial silvicultural investments, unless there are donor funds to pay --in

cash or kind--for work accomplished. One trained and experienced forester can provide sufficient detailed technical assistance (including management plans) for 20-30 thousand ha, in 1, 10, or 30 different community forests, so long as travel is not excessively slow or expensive.

Is community forestry a solution, or partial solution, to deforestation? It is in Scandinavia and Nepal and can be in the Philippines. For silviculture, most of the skills are well known, there are many NGOs knowledgeable in the administrative and social expertise, and experienced in their transmission. Most are weak technically but, mentioned above, one good technician can assist a number of villages.

One critical issue will probably be adequate financial support until the village forest can produce valuable commodities on a continuing basis. Except where a residual forest in good shape makes up perhaps half the village forest, support will be needed.

Also a concern are harvesting arrangements. Presumably such services will develop to satisfy the demand, but a specific forest must be harvested to recompense the workers of the associated village.

========== End Box ==========

The value of integrating CFP with ISF has received increasing recognition. Absent this integration, community based approaches appear to be tentative ad hoc strategies of DENR. At the time of CDIE's evaluation, efforts were underway to bring about an integration of the two programs. This step would not only streamline a fragmented bureaucracy but would pave the way for ongoing efforts to rationalize the present tangle of forest tenure and licensing arrangements. Although the link to RRDP may not be explicit, credit is certainly due to the project for setting the process of consolidation and replication in motion.

The expanded role of NGOs in forestry implementation brought about by RRDP's experimentation with different approaches encouraged the ADB to expand NGO involvement under its forestry sector program loans.

The first two forestry sector loans benefitted from guidance by some of the same technical assistants and national experts who had worked on RRDP. They helped transfer RRDP's lessons on NGO effectiveness to the $240 million (with matching Japanese funds) committed in 1988 to launching ADB's program. Prior to 1988, RRDP represented almost all NGO involvement in forestry sector. The ADB program loan permitted the NGO experience to be replicated by 1)

funding the establishment of NGO desks in each regional office of DENR, and 2) helping DENR to clearly define guidelines, terms of reference, and field procedures for NGOs, and 3) defining criteria for accreditation. Although some quality and capacity issues remain with respect to accreditation and NGO selection, NGO participation provided a key element in enabling the ADB program to affect some 664,000 ha in its first five year period.

Those RRDP participants with restricted holding within the open upland domain were more inclined to adopt social forestry practices than those with opportunities to clear remaining public uplands or to cultivate lowland irrigated areas.

At some locations in the Philippines today, sufficient uncleared upland areas remain to support the practice of slash and burn agriculture. Because the fallow regeneration period should last up to 15 years, a farm family needs access to over 10 ha of land to cultivate on a rotational basis. Each year new fallow land is cleared and burned releasing the nutrients needed for crop fertility and old depleted soils are allowed to "rest" and go fallow for an extended period of regeneration. With continuous encroachment, land available for extensive cultivation has steadily decreased to the point where sustainable fallowing is no longer possible. Farming at this point is more intensive and farmers become highly receptive to tree planting and soil and water conservation technologies that can improve their upland holdings.

Some upland households also cultivate irrigated lowland crops. In fact their upland areas may be used only to absorb their labor during the off season, to graze cattle or harvest fuelwood. They do not have the time or interest in setting up or managing agroforestry and forestry systems. Households in San Miguel and Magdungao have significant lowland holdings in which they devote the greater majority of their time and resources. As the lowlands now are much more productive than the uplands greater priority is given to lowland rice and sugarcane than to upland crops. In Tabango some farmers had rainfed lowland parcels to which they devoted their attention in the rainy season.

The best and most frequent conservation forestry adopters are those RRDP participants with the fewest alternative livelihood activities.

The team found that where alternative opportunities exist upland households earn a significant part of their income from off-farm enterprises such as migrating to jobs in nearby cities in the dry season or engaging in seasonal harvesting of abaca or sugarcane. Others have trades as carpenters or fishermen. Once the farmland becomes highly eroded more time may be spent on off-farm employment. There may be less interest in social forestry program because household heads may be out of town during training periods or during organizational periods.

Male heads of households in Bontoc and Sogod were absent for significant periods during the year and forest management was of secondary priority to them. In Sogod most of the farmers were women as many men worked in nearby Cebu City. Even minimum wage for unskilled labor seemed preferable planting and managing forests on eroded hillsides. Farmers in Bontoc seasonally work in abaca plantations. Farmers at some project sites worked in nearby urban areas during seasonal slack periods: San Miguel farmers went to Tacloban, Magdungao farmers went to Iloilo and Roxas Cities, Kiblauan farmers to Digos.

6. LESSONS LEARNED

Several lessons emerge from this evaluation as guidance for similar programs in the future or in other country settings. Among the most apparent of these lessons are the following:

Conservation forestry programs should be introduced first in upland locations with characteristics that make them the best candidates for adoption.

Programs seeking to introduce conservation forestry in the uplands should select initial sites that have conditions most conducive to adoption. Most willing to adopt reforestation practices are those in areas where there is little other land to farm or few available off-farm employment options. Locations that are promising candidates for adoption of improved forest management are those where the forest cover was relatively intact and a strong cash enterprise was linked with them to compete successfully with alternative uses of rural dwellers' time.

The challenges of developing the country's forest lands need to be addressed comprehensively. Focussing first on deforested cogon grasslands under RRDP and then on residual forests under NRMP accentuates a largely artificial distinction and perpetuates the multiplicity of legal and institutional instruments employed by DENR (result is focus on process, plans, concepts, organizational structures, i.e. acronym soup, rather than on translating the program into positive biophysical impacts.)

In the absence of positive political will, technically sound forestry approaches can only partially meet the challenges brought on by Philippine deforestation.

Technical and ecological awareness and action are best brought about by complementary strategies; there is no one "best". Strong community organization enhances people's planning, decision, and action in upland resource management, and is a necessary foundation for community and individual responsibility, consensus, and empowerment. It requires a good mix of commitment, hard work, and technical capability to successfully facilitate organization and implementation among forest communities.

If environmentally sound forestry practices are to be engendered and sustained, it will be necessary for access to the benefits of improved management to be assured for more than one harvest cycle.

More secure land access (titles, land use certificates) enable adoption, if only because government agents focus their efforts on

land certificate holders. Occupant ownership maybe desirable but it is not essential. Tenure continuity is absolutely essential given the lag between tree planting and harvest. Long term forest management requires long tenure. Sustainable farm and forest management systems do not spread where land access is disputed, or disputes erupt as a result of government programs.

Without adequate tenure security and transparency to others, the likelihood of investment and long term success of forestry and tree planting activities is greatly reduced; because of its limited duration, the present CSC can only be a partial solution. Furthermore, farmers have low confidence in revokable government certificates and contracts, regardless of nominal length of agreement.

Systematic hands-on training at all levels must be built into upland social forestry programs.

Virtually all government and non-government organizations in natural resources are much more effective at creating and multiplying organizations and plans than in implementation. Few upland households will adopt better forestry management practices without training. Moreover, 1-day and 2-day lectures, practicums or "demonstration farm" visits may be useful for exposure and awareness raising but are insufficient for sustained practice of conservation farming. Sustainable upland conservation forestry takes hold best where farmers are involved in hands-on establishment and management. Farmer-to-farmer training -- that may be as simple as learning while employed by other farmers in establishing sustainable upland agro-forestry systems -- appears highly effective for learning the skills of good hedgerow planting and maintenance and reforestation and forest management techniques.

Upland forest management systems need an "economic engine" for sustainability and spread.

Upland households live on a very thin margin. They can make significant long-term investments (such as tree planting) only if there is an accompanying short-term compensation. Upland conservation forestry and agroforestry prospers and spreads best where farmers and local communities have linked it to profitable cash enterprises, e.g. harvest of alternative forest products, fruit trees, livestock raising, fish farming, or woodlots. Farmers can be encouraged to grow and market hedgerow seed and seedlings which enforces their own interest in conservation farming while supplying planting materials for others. Where not integrated with cash enterprises, upland agro-forestry, reforestation, and improved management of remnant forests have been abandoned or have failed to expand. When the lag between investment and net positive benefit streams is too long, short-term incentives may be needed.

7. OUTSTANDING ISSUES

The evaluation leaves unanswered several important questions which will require further examination before it can be concluded that the Philippine experience at introducing sustainable hillside conservation farming systems is a workable model of environmental management. As pertains to the Philippine context itself, the evaluation has raised two areas of concern:

Does pump-priming end up distorting the motivations of NGOs, local government units, participants, and technical service staff undermining the development goals of the intervention?

Pumping funds into the local economy if all members do not equally benefit can create envy and antagonism. At the implementation end, tardy cash flow lowered production, morale, and confidence, thus wasting money. "GRINGOS" or "government induced NGOs" had arisen to take advantage of the pervasive reforestation contracts. These nominal organizations placed far more importance on landing contracts than implementing them. Even when well-meaning as was NFEFI's work in the Mt. Canloan National Park and buffer zone, the process can be subverted. There, nearly five hundred hectares of replanted area had been burned over by the resident contractees who, while expecting additional employment for replanting were clearing the adjacent native forest for kaingin and wet rice fields.

Accordingly, greater effectiveness would follow where subsidies for local actions are kept to a minimum and convincingly justified when they are used. Upland farmers live are usually poor and live at simple subsistence levels. They can make significant long-term investments (such as tree planting) only if there is an accompanying short-term compensation. This argues for sound program design which reflects stakeholder interests and for supervision to continue until practices can be self-supporting.

Commercial forestry versus conservation forestry and forest habitat preservation policies .... what is the proper mix? To what extent is public versus private ownership of upland areas conducive to forest conservation?

Ownership and tenure are not clear or certain in much of the uplands, neither on private nor on "government" lands. The official attitude still appears to be continued adherence to "Non-Disposable, Non-Alienable" public domain lands for approximately half the country, despite a complex mishmash allocating various types of tenure to squatters. Tenure continuity is absolutely essential to investment in sound management. Where uplands are suitable to agriculture, the refusal to simplify and clarify tenure, followed

immediately by ownership transferal, with clear zoning restrictions as necessary, is a major and continuing obstacle to sustainable land management. Sustainable farming on lands above 1000 m and on slopes exceeding 18% is occurring. Such lands should be recognized *de jure* and removed from the "forest" estate. As a general rule, all pertinent government services should be free to operate in the uplands and do so in relative harmony with other services.

Ownership, as well as tenure, have yet to be clarified throughout the uplands despite persistent need for strong efforts to prevent unchecked patronage and blatant distortion of the reformist intent.

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APPENDIX A

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 impact on local conditions and practices to produce favorable long-lasting changes in the bio-physical environment and on the socio-economic welfare of cooperating countries. This Appendix describes the process used to test this hypothesis in USAID social forestry programs.

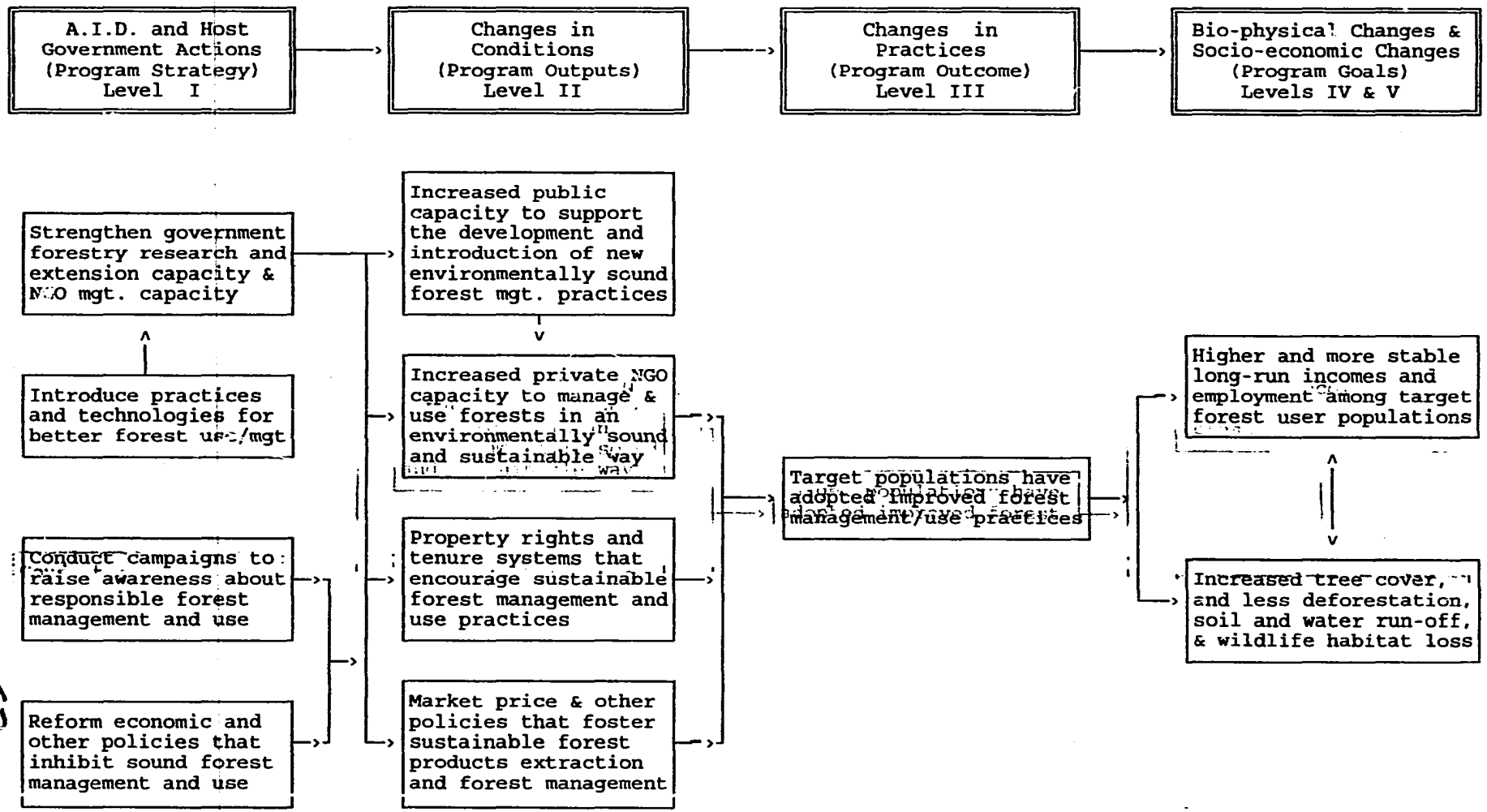
Impact - How much?

The assessment seeks to establish plausible association between USAID program strategies or activities and changes in environmental quality, natural resource management and socio-economic 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 the Philippines the evaluation has gathered and examined "impact" information to determine whether the USAID RRDP project accomplished its goals of increasing sustainable local forest management. The evaluation examines the relationships between environmental impact and RRDP program strategies using a five-level analytical framework. (Figure A-1.)

In the analytical framework, Level I lists the "**program strategies**" that USAID and the Philippine government employed in implementing social forestry programs receiving USAID support. In the case of the RRDP these strategies include: building community level research, training and extension institutions, introducing new sloping agriculture lands, fostering awareness and formulating public policies that support local forest management.

At Level II, "**program outputs**" are the conditions that have resulted from implementing these strategies. They could include: the staffed, equipped and functioning regional forestry officers, new training curricula designed and implemented, newly formed local NGOs, new tree species being used, and management practices identified as sustainable, and changed policies and/or regulations affecting locally managed forests.

Figure A-1: Framework for Assessing the Impact of USAID Forestry Programs



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

Level IV and V "**program goals**" constitute the biophysical and socio-economic changes resulting from the adoption of Level III program outcomes or practices. Level IV and Level V goals can be viewed and mutually supportive.

For the purposes of the evaluation, Level IV "**bio-physical goals**" are the specific environmental objectives of the program being assessed, e.g., increased tree cover, and less deforestation, soil and water run-off, and wildlife habitat loss.

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

Performance: How well?

In answering the second question, "How?", 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 those USAID and host government program 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 to project investments.

To assess program **effectiveness**, the evaluation examines how well project sponsored technologies and services (e.g., training) are reaching intended target groups and whether there is equity or bias in access by participating target groups. Effectiveness indicators include trends in the patterns in delivery of services according to the make-up of target groups (e.g., gender or socio-political status).

The examination of **sustainability** is important at all program levels (Figure A-1). For example, will new (Level II) conditions created with USAID assistance continue or will they be reversed? Will target participants continue to employ newly introduced (Level III) practices? Will new (Level IV) forest management systems thrive over the long-run? Will increased (Level V) incomes, profits and jobs continue after USAID and host government support is withdrawn? Evidence of sustainability includes the continuation of activities, regulations, price structures and institutions

beyond the termination of USAID technical and financial assistance either on their own "internal" momentum or with host government or with other donor assistance. The principle measure of sustainability is the number of beneficiaries continuing to employ project promoted practices after USAID support had ended and the nature of added government and donor support provided USAID initiated activities. Indicators of bio-physical sustainability include trends an inventory of tree species and soil quality in target areas including evidence of any pest damage or effects of soil or water deficiency.

To determine the **replicability** the evaluation examines whether conditions and practices, promoted by the program, have spread beyond the target areas and whether such spread is "spontaneous", occurring among participants by "word of mouth" or other means without further outside support, or "induced" by public, private or donor agencies which have picked up on an USAID supported concepts and introducing them elsewhere. Replicability indicators include number of similar activities supported by local or international agencies outside the program target area and population; number of participants outside the target area that have adopted in sum or in part USAID sponsored practices.

Data collection procedures

CDIE employs a variety and primary and secondary sources of data and information to construct the chain of events linking program activities and resulting observed effects and impacts, to examine major evaluation issues, and to identify lessons learned.

In preparation for the field work CDIE collected and analyzed relevant secondary data and information that are available in Washington or in host countries from a range of sources including project documents, technical reports, and special studies that are available with the Agency's Development Information System.

In the Philippines the evaluation team reviewed studies and reports conducted by host government agencies, private voluntary organizations, and international institutions. The team was fortunate to discover a number of comprehensive surveys and reports that had just reached completion as part of the preparations for the new five-year plan in the Philippines and for the recently held UN Conference on Environment and Development. Because acquisition of primary data was also called for, the assessment team also visited a number RRDP field sites to make visual confirmation of changes that have occurred since USAID support began and to conduct key informant interviews as part of its primary data collection.

The extent of forest management was determined for each of the ten sites which the evaluation team visited. "Adoption" rates were calculated on a four-point qualitative scale of ranking compiled from four qualitative criteria. The criteria are:

- Share of community members participating in social forestry.
- Share of potential hillside areas in project forests.
- Degree to which forest management practices were followed
- Degree to which forests were generating benefits (e.g. revenues, products).

The evaluation team collected data from farmers at the ten sites to examine how extensively they adopted and how well they executed erosion containment practices and adopted soil fertility enrichment techniques. The evaluation examined possible determinants across the ten project sites for their relationship with rates of adoption based on project reports, site visits, an interviews with key staff and farmers.

The RRDP sites varied in physical features and socio-economic conditions as well as in the level and composition of program interventions aimed at fostering adoption. Physical features and socio-economic conditions examined at each site include:

- Physical features
  - Rainfall patterns and rainfall levels
  - Soil acidity
  - Degree of erosion and slope
  - Amount of nearby uncleared forest or uncultivated lands
- Socio-economic conditions
  - Land access and tenure
  - Farm size and farm fragmentation
  - Availability of family and local labor
  - Employment opportunities in lowland cultivation and off-farm labor markets
  - Degree of social cohesion and sense of community

The evaluation was able to control for most of these physical features and socio-economic conditions by selecting ten sites for analysis here that were relatively homogeneous in these features.

APPENDIX B

PLANT SPECIES OF THE PHILIPPINE UPLANDS

BOTANICAL NAME	USES	COMMON NAME	FAMILY[1]
Acacia anuera	Tbr	Anuera	Mimos
Acacia auriculiformis A.Cunn.	Tbr	Auriculiformis	Mimos
Acacia confusa	MP	Ayangile	Mimos
Acacia dealbata	MP	Wattle,silver*	Mimos
Acacia decurrens	MP	Wattle,green	Mimos
Acacia farnesiana	MP	Aroma	Mimos
Acacia mangium Willd.	Tbr	Mangium	Mimos
Acacia mearnsii	Chem	Wattle,black	Mimos
Acacia nilotica	Tbr	Babul	Mimos
Acacia tortilis	Tbr	Thorn,umbrella	Mimos
Acacia villosa	MP	Villosa	Mimos
Acer niveum Blume	Tbr	Laing, Tio, Baliag**	Acer
Adenanthera intermedia Merr.	Tbr	Tanglin	Legum
Adenanthera microsperma	Tbr	Saga, Tanglin,Java	Legum
Afzelia rhomboidea Vid.	Tbr	Tindalo	Legum
Agathis alba Foxw. SYN A.phil	Tbr	Almaciga	Araucar
Agathis dammara	Tbr	Almaciga, Damar	Araucar
Agathis philippinensis Warb.	Tbr	Almaciga SYN A.demm	Araucari
Aglaia domestia Pellegrin	Frt	Lanzones, Langsat	Meli
Alangium meyeri Merr.	Tbr	Putian	Alangi
Albizia falcataria SYN Para. falc.		Falcata	Mimos
Albizia lebbeck Bth.	MP	Langil, Siris	Mimos
Albizia lebbeckoides Bth.	MP	Kariskis, Malaghani	Mimos
Albizia procera Bth.	Tbr	Akleng-parang, whSir	Mimos
Albizia saman	Tbr	Raintree, Saman	Mimos
Aleurites moluccana Willd.	Oil	Lumbang, Candlenut	Euphorbi
Aleurites trisperma	Oil	Bagilumbang	Euphorbi
Alnus acuminata	Tbr	Alder, Aliso	Betul
Alnus japonica Steud.	MP	Alder,Japanese	Betul
Alnus maritima	MP	Alder,coast	Betul
Alnus nepalensis	MP	Alder,Nepal	Betul
Alstonia macrophylla Wall.	Tbr	Batino	Apocyn
Alstonia scholaris R.Br.	Tbr	Dita	Apocyn

Amaranthus spinosus	Fod	Uray	Amaranth
Amorphallus campanulatus	Fod	Pongapong, Bagong	Araceae
Anabaen azollae	Nfx	Azolla	
Anacardium occidentale L.	Frt	Kasui, Cashew, Kasoy	Anacardi
Anacardium ovatum	Frt	Pili	Anacardi
Ananas comosus	Frt	Pineapple	Bromeli
Annona cherimolia	Frt	Cherimoya	Annon
Annona cherimoya x squamosa	Frt	Atemoya	Annon
Annona diversifolia	Frt	Ilama	Annon
Annona montana	Frt	Soursop,mountain	Annon
Annona muricata L.	Frt	Guyabano, Guanabana	Annon
Annona purpurea	Frt	Soncoya	Annon
Annona reticulata	Frt	Custard-apple, Anona	Annon
Annona squamosa	Frt	Atis, Sweetsop	Annon
Anthocephalus chinensis Rich.	Lbr	Kaatoan bangkal	Rubi
Antidesma bunius	MP	Bignai	Euphorbi
Apis cerana	Fd	Honeybee,Asian	
Apis mellifers	Fd	Honeybee,European	
Arachis hypogea	Fd	Peanut	Legum
Ardisia squamulosa	Tbr	Tagpo	Myrsin
Areca catechu	Fd	Bunga, Palm,betel	Arec
Artocarpus altilis	Frt	Rimas, Breadfruit	Mor
Artocarpus blancoi	Frt	Antipolo	Mor
Artocarpus camansi	Frt	Kamansi	Mor
Artocarpus heterophyllus Lam.	MP	Nangka, Jackfruit	Mor
Artocarpus odoriatissimus	Frt	Marang, M.-banguhan	Mor
Averrhoa bilimbi L.	Frt	Kamias, Bilimbi	Oxalid
Averrhoa carambola L.	Frt	Balimbing, Carambola	Oxalid
Avicennia spp	MP	Api-api	Avicenni
Azadirachta indica A.Juss.	MP	Neem, Margosa Meli	
Bambusa arundinacea	MP	Bamboo,indian	Poa
Bambusa blumeana Schultes	MP	Kauayan-tinik, Spiny	Poa
Bambusa muheplix	Con	Bamboo,dwarf	Poa
Bambusa spinosa	Con	Kawayan	Poa
Bambusa vulgaris Schrad.	MP	Kauayan-kiling	Poa
Basella alba	Fod	Alugbati, Grana	Basell
Bauhinia monandra	Fod	Fringon	Caesalpini
Bauhinia purpurea	Fod	Fringon-morado	Caesalpini
Bauhinia variegata	Fod	Alibangbang	Caesalpini
Bischofia javanica Bl.	Tbr?	Tuai	Euphorbi
Bixa orellana L.	Spi	Achuete, Annato	Bix
Blumea balsamifera	Med	Sambong	
Blumeodendron philippinenseM&R	Tbr	Salungan	Euphorbi
Boehmeria nivea Gaud	Fib	Ramie	Urtic

Bos bubulus ??	MP	Carabao, Buffalo	
Bos indicus	Fd	Cattle,Asian	
Bos taurus	Fd	Cattle,European	
Bougainvillea spectabilis	Con	Bougainvillea	Nyctagin
Brachiaria decumbens	Fod	Grass,signal	Poa
Brachiaria mutica	Fod	Grass,Para	Poa
Brachiaria ruziziensis	Fod	Grass,ruzi	Poa
Breynia rhamnoides	Tbr	Matang-hipon	Euphorbi
Broussonetia luzonica Bur	MP	Himbaba-o	Mor
Buchania arborescens		Baling hasai	Anacardi
Caesalpinia sappan	MP	Sibukau	Caesalpini
Cajanus cajan L.	MP	Kadios, Pigeonpea	Fab
Calamus manillensis	Tbr	Littoko	Arec
Calamus merillii	Tbr	Rattan, Palasan	Arec
Calamus ornatus	Tbr	Limuran	Arec
Calliandra calothyrsus Meissn.MP		Caliandra	Mimos
Calliandra hematocephala	MP	Fire-ball	Mimos
Calliandra tetragona	MP	Caliandra,white	Mimos
Calophyllum blancoi Pl&Tr.	Tbr	Bitanghol	Guttifer
Calophyllum inophyllum	Tbr	Bitaog	Guttifer
Cananga odorata Hook.	Oil	Ilang-ilang	Annon
Canarium asperum	Tbr	Pagsahingin	Burser
Canarium luzonicum A.Gray	MP	Piling-liitan, Pili	Burser
Canarium ovatum Engl.	MP	Pili	Burser
Capra	Fd	Goat	
Carica papaya L.	Frt	Papaya	Caric
Cassia alata	MP	Palo-China, Akapulko	Caesalpini
Cassia fistula	Orn	Shower,Golden	Caesalpini
Cassia javanica	Orn	Antsoan	Caesalpini
Cassia occidentalis	MP	Cassia	Caesalpini
Cassia siamea Lam.	MP	Balayong tindalo	Caesalpini
Cassia spectabilis DC	MP	Antsoan-dilau	Caesalpini
Cassia sturtii	Fod	Sturti	Caesalpini
Castanopsis indica	MP	Katus (Nepal)	Fag
Castanopsis javanica A.DC.	MP	Gasa	Fag
Castanopsis philippinensisVid.	MP	Philippine-chestnut	Fag
Casuarina equisetifoliaForst.	MP	Agoho (de playa)	Casuarin
Casuarina glauca	MP	Agoho,swamp	Casuarin
Casuarina nodiflora Thurnb.	MP	Agoho, Mt.	Casuarin
Casuarina rumphiana Miq.	NFx	Agoho de monte	Casuarin
Ceiba pentandra	MP	Kapok	Bombac
Celtis luzonica Warb.	Tbr	Magabuyo	Ulm
Celtis philipensis	Tbr	Mala-ikmo	Ulm
Centrosema pubescens	Fod	Centro	Legum

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Chloris gayana	Fod	Grass,rhodes	Poa
Chrysophyllum cainito L.	Frt	Caimito, Star-apple	Sapot
Chrysophyllum cochichinensis	Frt?	Saling-gogon	Sapot
Chrysophyllum macroptera	Frt	Kabuyaw	Sapot
Chrysopogon aciculatus	Fod	Amorseko	
Cinchona succirubra	Med	Cinchona	Rubi
Cinnamomum camphora	Oil	Camphor	Laur
Cinnamomum mindanense Elm.	MP	Kalingag, Cinnamon	Laur
Cinnamomum verum J S Presl.	Spi	Kanela	Laur
Citrus grandis Osbeck	Frt	Lukban, Pomelo,	SuhaRut
Citrus hystrix	Frt	Kabuyaw-kitid	Rut
Citrus limon	Frt	Lemon	Rut
Citrus madurensis Lour.	Frt	Kalamansi, Lemoncito	Rut
Citrus microcarpa	Frt	Kalamunding	Rut
Citrus nobilis	Frt	Mandarin	Rut
Cocos nucifera L.	MP	Niog, Coconut	Arec
Coffea arabica L.	Bev	Kafe, Coffee	Rubi
Coffea robusta L.	Bev	Kafe,Kongo	Rubi
Colocasia esculenta	Fd	Gabi, TaroAnacolɔsa	Araceae
Cordia dichotoma	MP	Anonang	Ehreti
Corypha elata Roxb. SYN.	MP	Buri palm	Arec
Corypha utan?/ulan Lam.	MP	Buri, Ebus	Arec
Cratoxylon sumatranum		Paguringon	Clusi
Crotalaria pallida	Con	Crotalaria	Fab
Crotalaria juncea	Fib	Sunheap, Crotolaria	Fab?
Cryptomeria japonica	Tbr	Cedro,Japanese	Taxodi
Cubilia cubili		Kubili	Sapind
Cyathea arborea ?	MP	Fern,Giant, F.,tree	Cyathe
Cymbopogon citratus	Cons	Grass,lemon, Tanglad	Poa
Cymbopogon naudus	MP	Grass, Citronella	Poa
Cynodon plectostachysus	Fod	Grass,African star	Poa
Dacrydium elatum Wall.	Tbr	Likinai	Podocarp
Dacryodes rostrata HJLam	Tbr	Lunai	Burser
Delonix regia	Orn	Firetree	Caesalpini
Dendrocalamus merrilianus Elm.	MP	Bayog	Poa
Dendrocnide crassifoli Chew.	Tbr	Sagi, Lipand,giant	Urtic
Derris indica	Chem	Tublin	Fab
Desmanthus vergatus	Fod	Desmanthus	Mimos
Desmodium discolor	MP		Fab
Desmodium distortum	MP		Fab
Desmodium gyroides DC	MP	Koer, Karikut-rikut	Fab
Desmodium rensonii	MP	Mani-manihan,Rensoni	Fab
Dicanthium aristatum	Fod	Alabang x	
Digitaria decumbens	Fod	Grass,pangola	Poa

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Dioscorea alata	Fd	Ubi, Yam	Dioscore
Dioscorea esculenta	Fd	Tugui, Yam	Dioscore
Dioscorea hispida	Fod	Nami, Kalut	Dioscore
Diospyros mindanensis Merr.	MP	Ata-ata	Eben
Diospyros philippinensis Gurke	MP	Mabolo, Kamagong	Eben
Diospyros pilosanthera Blanco	Tbr	Bolong-eta	Eben
Diplodiscus paniculatus	Con	Balobo	Tili
Dipterocarpus caudatus Foxw.	Tbr	Apitong,Tail-leafed	Dipterocar
Dipterocarpus grandiflorus Blc	Tbr	Apitong	Dipterocar
Dipterocarpus gracilis Blume	Tbr	Panau	Dipterocar
Dipterocarpus kerii King	Tbr	Malapanau	Dipterocar
Dipterocarpus spp	Tbr	Luan, red	Dipterocar
Dipterocarpus warburgii Brand.	Tbr	Hagakhak	Dipterocar
Dolichos lablab	Fod	Batao, Hyacinthbean	Legum
Dracontomelon dao Merr.&Rolfe	MP	Dao	Anacardi
Dracontomelon edule Skeels	MP	Laniko, Lamio	AnaMP Durio zibethinus
Murray	Frt	Durian	Bombac
Dysoxylon arborescens Miq.	Tbr?	Kalimutain	Meli
Elaeagnus philippinensis	Frt	Alingaro	Elaeagn
Elaeocarpus calomala Merr.	Tbr?	Kalomala	Elaeocarp
Elaeocarpus cumingii Turcz.	Tbr	Hunggo	Elaeocarp
Elaeocarpus ramiflorus Merr.	Tbr	Malaropit	Elaeocarp
Endospermum peltatum Merr.	Tbr	Gubas	Euphorbi
Engelhardia apoensis Elm.	Tbr	Apo lupisan	Jugland
Enterolobium cyclocarpum	MP	Earpod	Mimos
Equus caballus	Wrk	Horse	
Erythrina crista-galli L.	MP	Dapdap-palng,coral	Fab
Erythrina fusca Lour.	MP	Anii	Fab
Erythrina indica Lamb.	MP	Dapdap	Fab
Erythrina orientalis Merr.	Con	Dapdap	Fab
Erythrina poeppigiana OF Cook	MP	Dapdap	Fab
Erythrina stipitata Merr.	MP	Lubang dapdap	Fab
Erythrina subumbrans Merr.	Tbr?	Rarang	Fab
Erythrina variegata L.	Con	Dapdap,mottled	Fab
Erythrophloeum densiflorum	Tbr	Kamatog	Fab
Eucalyptus camaldulensisDehnh.	Tbr	Camaldulensis	Myrt
Eucalyptus deglupta	Tbr	Bagras	Myrt
Eucalyptus globulus	Tbr	Bluegum	Myrt
Eucalyptus grandis	Tbr	Grandis	Myrt
Eucalyptus robusta	Tbr	Robusta	Myrt
Eucalyptus rostrata	Tbr	Eucalyptus, Rostrata	Myrt
Euphoria cinerea	Frt	Alupag	Sapind
Eurya spp.	Fd		The
Eusideroxylon zwageri		Tambulian	Laur

Ficus nota	Con	Tibig	Mor
Flacourtia rukam	Frt	Bitungol	Flacourti
Flemingia congesta	SYN.	Flemingia	Fab
Flemingia macrophylla Blume	MP	Tuptupi	Fab
Gallus gallus	Fd	Chicken	
Garcinia mangostana	Frt	Mangosteen	Clusi
Gigantochloa levis Merr.	Con	Bolo	Poa
Gliricidia sepium Kth.	MP	Kakawate	Fab
Gmelina arborea Roxb.	Tbr	Yemane, Melina	Verben
Gnetum gnemon	Frt	Bago	Gnet
Gonystylus macrophyllus A Shaw	Tbr	Lantan-bagyo	Thymelae
Guazuma ulmifolia	MP	Guazuma, Guacimo	Sterculi
Hevea brasiliensis	Latex	Rubber,Para	Euphorbi
Hibiscus cannabinus	Fib	Kenaf	Malv
Hibiscus rosa-sinensis	Con	Gumamela	Malv
Hibiscus tiliaceus	Con	Balibago	Malv
Hopea foxworthyii	Tbr	Dalingdingan	Dipterocar
Hopea helferi	Tbr	Yakal	Dipterocar
Hopea philippinensis Dyer	Tbr	Gisok-gisok	Dipterocar
Horsfieldia megacarpa ?	Tbr	Yabnog, Yabnob	Myristi
Imperata cylindrica	Con	Cogon	Poa
Indigofera tinctoria	Con	Tayum	Legum
Inocarpus fagifer	Frt	Kayam	Fab
Intsia bijuga O.Ktze	Tbr	Ipil, Malaipil	Caesalpini
Ipomea aquatica	Fd	Kangkong(upland)	Convovul
Ipomea batatas	Fd	Camote	Convovul
Kingiodendron alternifoliumM&R	Tbr	Batete	Caesalpini
Kleinhovia hospita	Fod	Tan-ag	Sterculi
Koordersiodendron pinnatumMer.	Tbr	Amugis, Baraba	Anacard
Lagerstroemia speciosa	Con	Banaba	Lythr
Lansium domesticum SYN Aglaia	Frt	Lansones	Meli
Lantana camara L.	Med	Lantana, Kantutai	Verben
Leucaena diversifolia Bth.	MP	Ipil-ipil,Acid	Mimos
Leucaena leucocephala de Wit.	MP	Ipil-ipil, Leucaena	Mimos
Litchi chinensis philippinensis		Alupag-amo	Sapind
Litchi chinensis	Frt	Lichi, Licheas	Sapind
Lithocarpus apoensis Rehd.	Tbr	Mt Apo-oak	Fag
Lithocarpus bennettii Rehd.	Tbr	Pangnan, Katiban	Fag
Lithocarpus boholensis Rehd.	Tbr	Bohol oyagan	Fag
Lithocarpus bulusanensis ?	Tbr	Tikala, Tilalod	Fag
Lithocarpus pruinosa Blm.	Tbr	Ulayan, Wax-oak	Fag
Litsea leytensis Merr.	Tbr	Batikuling	Laur
Litsea perottetii F.-Vill.	Tbr	Marang, Batiuling,wh	Laur
Livistona rotundifolia Mart	MP	Anahau, Palm,fan	Arec

Lycopersicon esculentum	Frt	Tomato	Solan
Macaranga tanarius Muell.	Tbr	Binunga	Euphorbi
Macroptilium atropurpureum	Fod	Siratro	
Mallotus multiglandulosus pend	Tbr	Alim	Euphorbi
Mallotus vicinoides		Hinla-umo	Euphorbi
Mangifera altissima Blano	Tbr,Frt	Paho, Pahutan	Anacardi
Mangifera indica L.	Frt	Mangga, Mango	Anacardi
Mangifera philippinensis	Frt?	Paho	Anacardi
Manihot esculenta	Fd	Cassava, Kalibre	Euphorbi
Manihot utilissima SYN?	Fd	Cassava	Euphorbi
Manilkara achras	Frt	Chico, Sapodilla	Sapot
Manilkara zapota van Royen	Frt	Chico	Sapot
Maranta arundinacea	Fd	Uraro, Arrowroot	Marant
Mastixia philippinensis Wang.	Tbr	Apanit	Corn
Melia azedarach L.	Tbr	Paraiso	Meli
Melia dubia Cav.	Tbr	Bagalunga	Meli
Mimosa scabrella	Tbr	Bracaatinga	Mimos
Moringa oleifera Lam.	MP	Malunggai	Moring
Morus alba L.	MP	Mulberry	Mor
Muntingia calabura L.	MP	Datiles, Manzanilla	Elaeocarp
Musa paradisiaca L.	Frt	Plantain	Mus
Musa sapientum L.	Frt	Saba, Banana,Lakatan	Mus
Musa textilis	Fib	Abaca	Mus
Myristica philippinensis Lam.	Tbr?	Duguan	Myristic
Nauclea orientalis L.	Tbr	Bangkal	Rubi
Neonauclea bartlingii	Tbr	Lisak	Rubi
Nephelium lappaceum L.	Frt	Rambutan	Sapind
Nephelium mutabile Blume	Frt	Kapulasan	Sapind
Ochroma pyramidale	Tbr	Balsa	Bomb
Ocotea usembarensis	Tbr		Laur
Octomeles sumatrana Miq.	Tbr?	Binuang	Datisc
Olea ferruginea	Tbr		Ole
Olstoria macrophylla	Con	Batino	
Ormosia calavensis	Tbr	Bahai	Fab
Oryza sativa	Fd	Rice	Poa
Palaquium luzoniense Vid.	Tbr	Nato	Sapot
Palaquium merrillii Dub.	Tbr	Dulitan	Sapot
Palaquium montanum Elm.	Tbr	malakmalak-bundok	Sapot
Pangium edule Reinw.	MP	Pangi;<u>seeds poison</u>	Flacourti
Panicum maximum	Fod	Grass,guinea	Poa
Panicum purpurascens	Fod	Grass,para	Poa
Panicum stagninum	Fod	Bungalon	Poa
Paraserianthes falcatariaNiel.	Tbr	Sau,Moluccan,Falcata	Mimos
Parashorea plicata Brandis	Tbr	Bagtikan	Dipterocar

Parinari corymbosa Miq.	Tbr	Liusin	Amygdal
Parkia roxburghii G. Don	Tbr	Kupang	Mimos
Paspalum conjugatum	Fod	Kulape	Poa
Passiflora edulis	Frt	Passion-fruit	Passiflor?
Peltophorum pterocarpus	Tbr	Siar	Caesalpini
Pennisetum clandestinum	Fod	Grass,kikuyu	Poa
Pennisetum purpureum	Fod	Grass,napier	Poa
Pentacme contorta Merr&Rolfe	Tbr	Lauan,white	Dipterocar
Persea americana Mill.	Frt	Avocado	Laur
Petersianthus quadrialataMerr.	Tbr	Toog, Tuog	Lecythid
Phaseolus aureus Roxb.	MP	Mungo	Fab
Phoebe sterculioides Merr.	Tbr	Kaburo	Laur
Phyllocladus hypophyllusHook.	Tbr	Dalung	Podocarp
Piliostigma malabaricum Bth.	Con	Alibangbang	Caesalpini
Pinus caribaea Morelet	Tbr	Pine,caribe	Pin
Pinus kesiya Royle	MP	Pine,Benguet	Pin
Pinus merkusii	Tbr	Pine,Mindoro	Pin
Piper nigrum	Spi	Blackpepper	Piper
Pithecellobium dulce Bth.	MP	Kamachile	Mimos
Pittospermum pentandrum Merr.	MP	Mamalis	Pittospor
Podocarpus imbricatus R.Br.	Tbr	Igem	Podocarp
Podocarpus philippinensis Foxw	Tbr	Malakauayan	Podocarp
Podocarpus spp	Tbr		Podocarp
Pometia pinnata	MP	Malugai-liitan	Sapind
Pongamia pinnata Merr.	Tbr	Bani	Fab
Portulaca oleracea	Fod	Ulasiman	Portulac
Pouteria campechiana	Frt	Tiesa	Sapot
Prosopis spp	MP	Prosopis	Mimos
Prunus cerasoides	MP	Paiyan (Nepal)	Amygdal
Prunus grisea Kalkman	Tbr	Lago	Amygdal
Psidium guajava L.	Frt	Bayabas, Guava	Myrt
Pterocarpus grandiflora	Tbr	Narra,prickly	Fab
Pterocarpus indicus Willd.	Tbr	Narra	Fab
Pterocymbium tinctorium Merr.	Tbr	Taluto	Sterculi
Pueraria javanica	Cons	Kudzu,tropical	Legum
Punica granatum	Frt	Granada	Punic
Pygium vulgare Merr.SYN Prunus	Tbr	Lago	Amygdal
Reutealis(Aleurites) trisperma	Oil	Bagui lumbang	Euphori
Rhizophora apiculata	Tbr	Bakauan lalake	Rhizophor
Rhizophora mucronata	Tbr	Bakauan babae	Rhizophor
Rhizophora stylosa	Tbr	Bakauan bato	Rhizophor
Rhododendron spp	Con	Malagos	Eric
Rollinia deliciosa	Frt	Biriba	Annon
Rottoellia exaltata	Fod	Aguingay	

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Saccharum officinale	Fd	Tabu, Sugarcane	Poa
Saccharum spontaneum	Con	Talahib	Poa
Saga adenonthera	Fd	Saga	Arec
Salmalia malabarica	Tbr	Malabulak	Bombac
Samanea saman Merr.SYN Albizia		Saman	Mimos
Sandoricum koetjape Merr.	Frt	Santol, Buri	Meli
Santalum album	Tbr	Sandalwood	Santal
Sauropus androgenus	Fod	Malunggay,Japanese	
Schima wallichii	MP	Chilaune (Nepal)	The
Schizostachyum lima	MP	Anos	Poa
Schizostachyum lumampao Merr.	Tbr	Buho	Poa
Securinega flexuosa Mueller	Tbr	Anislag	Euphorbi
Serialbizia acle	Tbr	Akle	Mimos
Sesbania bispinosa	MP	Sesban,prickly	Fab
Sesbania formosa	MP	Formosa	Fab
Sesbania grandiflora Poir..	MP	Katurai	Fab
Sesbania sesban Merr.	MP	Sesban	Fab
Shorea agsaboensis Stern	Tbr	Tiaong	Dipterocar
Shorea almon Foxw.	Tbr	Almon	Dipterocar
Shorea falciferoides Foxw.	Tbr	Yamban	Dipterocar
Shorea gisok Foxw.	Tbr	Yakal-gisok	Dipterocar
Shorea guiso Blume	Tbr	Guijo	Dipterocar
Shorea hopeifolia Sym.	Tbr	Kalunti	Dipterocar
Shorea negrosensis Foxw.	Tbr	Lauan,red	Dipterocar
Shorea ovalis	Tbr	Lauan	Dipterocar
Shorea philippinesis Brandis	Tbr	Mangasinoro	Dipterocar
Shorea polita Vidal	Tbr	Malaanonang	Dipterocar
Shorea polysperma Merr.	Tbr	Tangile	Dipterocar
Shorea robusta	Tbr	Sal	Dipterocar
Shorea squamata Dyer	Tbr	Mayapis	Dipterocar
Shorea talura	Tbr	Lauan	Dipterocar
Sindora inermis	Con	Kayugalo	Caesalpini
Sindora supa Merrill	Tbr	Supa	Caesalpini
Solanum melanga	Veg	Eggplant	Solan
Sonneratia alba	Fod	Pagatpat	Sonnerati
Spathodea campanulata	Orn	African-tulip	Bignoni
Spondias pinnata Kurz	Frt	Libas	Anacardi
Spondias purpurea L.	Frt	Sineguelas	Anacardi
Sterculia foetida	Con	Kalumpang	Sterculi
Stylosanthes guyanensisCV Cook	Fod	Stylo	Legum
Sus domesticus ?	Fd	Swine	
Swietenia macrophylla King	Tbr	Mahogany,bigleaf	Meli
Swietenia mahogani	Tbr	Mahogany,small-leaf	Meli
Syzigium cumini Skeels	Frt	Duhat	Myrt

Syzigium curranii	Frt	Lipote	Myrt
Syzigium jambos	Frt	Tampui, Roseapple	Myrt
Syzigium malaccensis Merr.&Per	Frt	Yambu, Malay-apple	Myrt
Syzigium samarangense	Frt	Makopa	Myrt
Syzygium aqueum	Frt	Tambis	Myrt
Talauma angatensis F.Vill.	Tbr	Malapinya	Magnoli
Talinum triangulare	Fod	Talinum, Espinacas	Portulac
Tamarindus indica L.	Frt	Sampalok, Tamarind	Caesalpin
Tarrietia sylvatica	Tbr	Dungon	Sterculi
Tectona grandis L.	Tbr	Teak	Verben
Tephrosia candida	Con	Tefrosia	Legum
Terminalia bellirica	Tbr		Combret
Terminalia calamansanai Rolfe	Tbr	Malakalumpit	Combret
Terminalia catappa L.	MP	Talisai, Almendro	Combret
Terminalia chebula	Tbr	Myrabolan	Combret
Terminalia citrina Roxb.	Tbr	Binggas	Combret
Terminalia copelandii Elm.	Tbr	Lanipau	Combret
Terminalia ivorensis	Tbr	Idigbo	Combret
Terminalia microcarpa Decne.	Tbr	Kalumpit	Combret
Terminalia nitens Presl.	Tbr	Sakat	Combret
Theobroma cacao L.	Bev	Cacao, Chocolate	Sterculi
Tilapia nilotica et al.	Fd	Tilapia	
Titania diversifolia	Fib	Sunflower,wild	Composit
Toona calantas	Tbr	Kalantas	Meli
Toona sureni	Tbr	Danupra	Meli
Trema orientalis Blume	Tbr	Anabiong, Malagangao	Ulm
Trichilia sp	MP	Abanico	Meli
Triplaris cumingiana	Tbr	Palo-santo	Polyg
Tristania decorticata	Tbr	Malabayabas	Myrt
Vatica papuana ?	Tbr	Tawili, Tawi-tawi	Dipterocar
Vatica sangachapoi Blanco	Tbr	Narig	Dipterocar
Vigna radiata	Leg	Mungbean	Legum
Visna sinensis	Fod	Cowpea	Legum
Vitex negundo	Med	Lagundi, Chaste tree	Verben
Vitex parviflora A.Juss.	Tbr	Molave	Verben
Vitex turczaninowii Merr.	Tbr	Lingo-lingo	Verben
Wallaceodendron celebicum	Tbr	Banuyo	Mimos
Wikstroemia sp	Fib	Salago, Siapo	Thymelae
Wrightia lanite	Con	Lanete	Apocyn
Xanthosoma saqittifolium	Fd	Takudo, Yautia	Araceae
Zea mays	Cer	Corn	Poa ?
Zingiber officinale Rosc.	Spi	Luya, Ginger	Zingiber
Ziziphus jujuba	Frt	Manzanitas	Rhamn
Ziziphus mauritiana	Frt	Jujube, Ber	Rhamn

Ziziphus talanai Merr.	Tbr	Balakat	Rhamn
	Fr	Luviluvi,Mt. cabbage	
	Fib	Nipa palm	Arec
	Fd	Pandan	
	Fd	Squash	Cucurbit

To conserve space, the suffix "aceae" is omitted from all family names. Mimos, for example, is actually Mimosaceae.

* A second word not capitalized and following a comma without a space modifies the name; i.e., Wattle,silver means Silver Wattle.
** A second word capitalized and following a comma then a space is a separate name; i.e., Laing, Tio has two different names, Laing and Tio.

USES:

Bev = beverage Cer = cereal Con = conservation
Fd = food Fib = fiber Frt = fruit
Leg = legume food MP = multipurpose Nfx = nitrogen-fixing
Oil = oil Orn = ornamental Spi = spice
Tbr = timber prod Veg = vegetables

Principal climatic types:

1: Pronounced wet and dry seasons.
2: No dry season; maximum rain Nov - Jan.
3: Seasons not pronounced; drier Nov - April.
4: Rainfall about evenly distributed.

The following are the principal sources consulted for botanical and common names. There is disagreement of both among the authors cited, but there is no commonly accepted authority, to the writer's knowledge, and there is unlikely to be one in the foreseeable future. However, the above yields a close approximation.

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APPENDIX C

FORESTRY TERMS

Alayon	Neighborhood work group
ANR	Assisted Natural Regeneration. Removal of competing grass, vines, weeds, or inferior trees to improve the development of small trees of high potential value.
Artificial Regeneration	Trees planted or sowed by people.
Barangay	Local village political unit.
Carabao	Water buffalo.
Communal Forestry	Forestry on lands with tenure in common.
Community Forestry	Forestry of, by, and for rural residents in which benefits are shared jointly.
Contract Reforestation	Private sector planting of trees under contract, usually from DENR
Dipterocarp	Tree belonging to the Dipterocarpaceae family; most important group of timber trees in the Philippines.
Enrichment planting	Planting high value trees in natural forest at specific locations where none occur naturally.
Exotic	Not native; of foreign origin, as American mahogany growing in the Philippines.
Forest Plantation	Group of deliberately planted trees.
ha	Hectare; 2.47 acres
Hardwood	Hardwood in the Philippines means heavy Wood; more than approximately 0.5 specific gravity.
Kabisig	"Linking Arms" livelihood program: government, NGO, and individuals working

	together
Kaingin;	Kainginero Tagalog term widely used in Philippines to denote shifting agriculture, often slash-& -burn but not always; farmer practicing kaingin.
Non-timber product	Any forest product except wood; Rattan, orchid, fern, fruits & nuts, medicine,
Residual forest	Partially logged; biggest and best trees cut.
SALT	Package of labor intensive methods for economical & productive farming of sloping land with soil and water conservation and maintenance or improvement of fertility.
Shifting agriculture	Clearing and farming an area for one or a few years, then moving to a new area and repeating. Requires low labor and other inputs but large gross area. Sustainable with low population (not < 10 ha per family, usually) but disastrous with high population (< about 5 ha per family) on sloping land.
Softwood	Softwood, in the Phils., means light wood; less than approximately 0.5 specific gravity.
Tenure	Continuing right of access & use.
Timber Stand Improvement Species	Removal or deadening of inferior trees to improve development of better trees.
Virgin forest	Never logged.

APPENDIX D

PERSONS CONTACTED

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