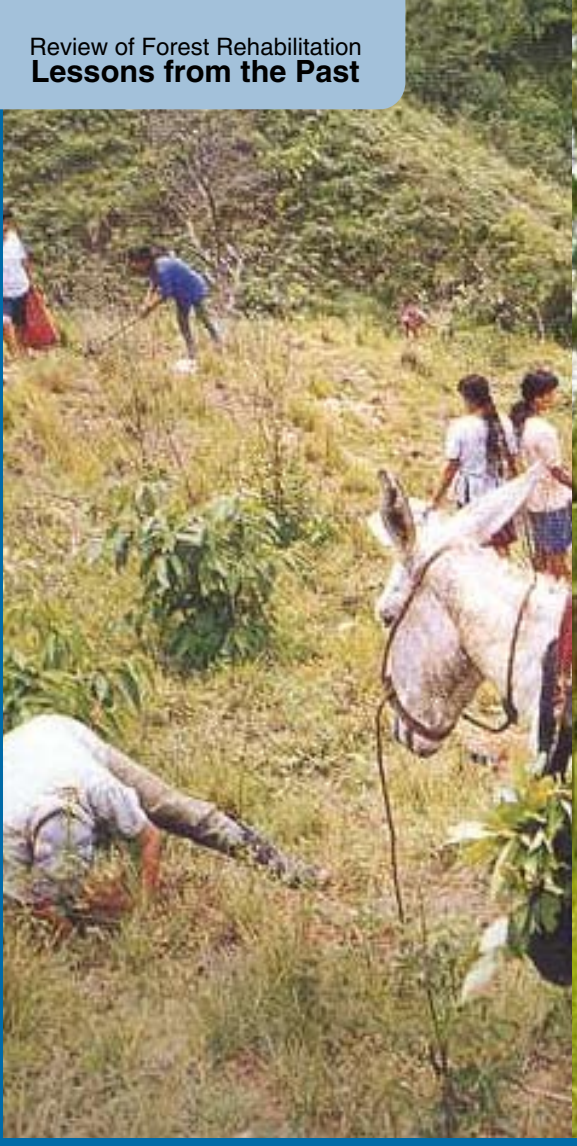
Review of Forest Rehabilitation
Lessons from the Past



One century of forest rehabilitation in the Philippines

Approaches, outcomes and lessons

Editors

Unna Chokkalingam
Antonio P. Carandang
Juan M. Pulhin
Rodel D. Lasco
Rose Jane J. Peras
Takeshi Toma

The Center for International Forestry Research (CIFOR) is a leading international forestry research organization established in 1993 in response to global concerns about the social, environmental, and economic consequences of forest loss and degradation. CIFOR is dedicated to developing policies and technologies for sustainable use and management of forests, and for enhancing the well-being of people in developing countries who rely on tropical forests for their livelihoods. CIFOR is one of the 15 Future Harvest centres of the Consultative Group on International Agricultural Research (CGIAR). With headquarters in Bogor, Indonesia, CIFOR has regional offices in Brazil, Burkina Faso, Cameroon and Zimbabwe, and it works in over 30 other countries around the world.

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Preface

Many tropical countries have achieved economic growth at the expense of converting their forests. Some of those countries have prospered and others remain impoverished despite converting their forests. Both have the will now to restore some of their lost forest cover and commit resources to this end.

Forest rehabilitation is not a new phenomenon. But as tropical forest conversion continues seemingly unabated, rehabilitating degraded landscapes is likely to become more and more important. Countries individually or collectively will increasingly turn to rehabilitation to undo the negative consequences of diminishing forest cover. Countries that had or still have large forested areas, like Brazil, Indonesia, Vietnam, Philippines and China, have initiated programs meant to restore millions of hectares.

Forest rehabilitation is a major concern for the Center for International Forestry Research and its partners. Future benefits from forests will in many places only be assured if forests can be successfully rehabilitated. Downstream water quality and flows, biodiversity conservation, raw material supply and forest-based income for the poor will depend on it. CIFOR has since its beginning undertaken research programs and projects that address forest rehabilitation.

This report is one of six emerging from the study 'Review of forest rehabilitation: Lessons from the past'. This study attempted to capture the rich but under-utilised experiences of many years of forest rehabilitation in Brazil, China, Indonesia, Peru, Philippines and Vietnam, and make this information available to guide ongoing and future rehabilitation efforts. The study was carried out with generous contributions from the Government of Japan.

We present this and the other five study reports in the hope that the lessons they contain will be relevant for people who are concerned about tropical forests, and that as a result societies will continue to enjoy the benefits that tropical forests can provide.

Markku Kanninen
Director Environmental Services and Sustainable Use of Forests Programme
CIFOR

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This study was conducted as part of the larger CIFOR Research project 'Rehabilitation of degraded tropical forest ecosystems' funded by the Government of Japan. Our appreciation to the College of Forestry and Natural Resources, University of the Philippines Los Baños (UPLB CFNR); the Forest Management Bureau, Department of Environment and Natural Resources (DENR FMB) Philippines; and the Forestry and Forests Product Research Institute, Japan for their critical support for the overall project. Thanks in particular to Dean Ramon A. Razal of UPLB CFNR, and Director Romeo T. Acosta and For. Mayumi Natividad of DENR FMB, for their assistance with data gathering and participation in the many workshops conducted. Thanks also to Director Marcial C. Amaro Jr. for DENR FMB's continued support of this study.

The authors would like to express their sincere gratitude to the project managers, community representatives, and staff of various government and non-government agencies who participated patiently in the surveys and provided relevant project documents. Thanks to the DENR regional staff for coordinating our field visits and assisting us with data gathering. Thanks are also due to the community and private sector representatives, and staff of various government and non-government agencies who shared their perspectives in the workshops in Regions III, VII and XI. Our thanks to Dr. Myrna Carandang from UPLB CFNR and the Leyte State University in Visca, Baybay for workshop support.

Georg Buchholz, Rex Victor O. Cruz, Chip Fay, David Kaimowitz and Ramon Razal provided valuable comments and suggestions to improve this report. Popi Astriani and Tina Taufiqoh at CIFOR assisted with database organisation and statistical analysis. Claire Miller provided editing support and Ramadhani Achdiawan provided statistical advice.

Our thanks to the numerous people in CIFOR, World Agroforestry Centre (ICRAF), The World Conservation Union (IUCN), Food and Agriculture

Organization of the United Nations (FAO), German Technical Cooperation (GTZ), World Wide Fund for Nature (WWF) and elsewhere who helped develop the original project design and survey questions across the six study countries — Philippines, China, Vietnam, Indonesia, Peru and Brazil. We are grateful to all the individuals and agencies in the Philippines who responded to CIFOR's preliminary questionnaires or shared their insights during our initial visit and via e-mails. Last, but most importantly, our sincere thanks to Paolo Pasicolan, Isabela State University and Leonida Bugayong, UPLB CFNR for kindly facilitating CIFOR's initial visit to the Philippines.

Glossary

ADB	Asian Development Bank
CBFM	Community-Based Forest Management
CENRO	Community Environment and Natural Resources Officer
CFNR	College of Forestry and Natural Resources
CIFOR	Center for International Forestry Research
CSC	Certificate of Stewardship Contract
DENR	Department of Environment and Natural Resources
ENRO	Environment and Natural Resources Officer
E.O.	Executive Order
FAO	Food and Agriculture Organization of the United Nations
FIDA	Fibre Industry Development Authority
FLMA	Forest Land Management Agreement
FMB	Forest Management Bureau
FSP	Forestry Sector Projects
FSP I	Forestry Sector Project Loan I
FSP II	Forestry Sector Project Loan II
GIS	Geographic Information System
GOP	Government of Philippines
GTZ	German Technical Cooperation
ICRAF	World Agroforestry Centre
IEC	Information and Education Campaign
IFAD	International Fund for Agricultural Development
IFMA	Industrial Forest Management Agreement
IPRA	Indigenous Peoples Rights Act
ITTO	International Tropical Timber Organisation
IUCN	The World Conservation Union
JBIC	Japanese Bank for International Cooperation
KfW	German Development Bank
LGU	Local Government Unit
LOI	Letter of Intent

NAMRIA	National Mapping and Resource Information Authority
NCIP	National Commission for Indigenous People
NFP	National Forestation Program
NGO	Non-Government Organisation
NIPAS	National Integrated Protected Areas System
NLPCA	Nonlinear Principal Components Analysis
NTFP	Non-Timber Forest Product
OECF	Overseas Economic Cooperation Fund
OGA	Other Government Agencies
PACBRAMA	Protected Area Community Based Resources Management Agreement
P.D.	Presidential Decree
PICOP	Paper Industries Corporation of the Philippines
PMS	Presidential Management Staff
PO	Peoples' Organisation
SALT	Sloping Land Agricultural Technology
SIFMA	Socialised Industrial Forest Management Agreement
TLA	Timber Licence Agreement
UPLB	University of the Philippines Los Baños
USAID	United States Agency for International Development
WWF	World Wide Fund for Nature

Barangay	A village; the smallest political unit in the Philippines and often corresponds to a village or town district.
Kaingin	Swidden agriculture.
Sinamay	Fine hand-woven natural fibre made from abaca plant. Very popular for natural gift packaging and wrapping, accents to floral designs, angel wings and skirts among other products.

Chapter I
Introduction

Unna Chokkalingam[1], Antonio P. Carandang[2], Juan M. Pulhin[3] and Rodel D. Lasco[4]

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Forest cover is decreasing or very low in many tropical landscapes following decades of logging, fire and other human disturbances. At the same time, there are large and growing areas of degraded forest lands[1] that need to be rehabilitated to again provide forest goods and services and meet local livelihood needs. National, international, local and private agencies have invested in innumerable rehabilitation initiatives in the tropics. Some countries such as China and the Philippines started earlier than others. Some countries are winding up large programs and others are initiating them. The initiatives have differed in scale, objectives, costs, implementation strategies, and in how much they considered socio-economic and institutional aspects. Lots of money has been spent, but have these efforts actually increased forest cover, helped impoverished upland communities, enhanced biodiversity and environmental services, or contributed to meeting timber needs? Did they address the underlying degradation causes and were the rehabilitated areas maintained in the long term? What are the most promising approaches? Which ones can be replicated at low cost by local institutions and actors? Which ones are self-sustaining at the local level? What enabling factors are required to sustain the efforts?

[1] By degraded forest lands, we mean formerly forested grasslands, brushlands, scrublands or barren areas.

This report reviewing forest rehabilitation in the Philippines is part of a larger study by the Center for International Forestry Research (CIFOR) and national partners to assess efforts across six countries to try and answer the above questions and derive lessons for planning and guiding future efforts. The countries are Peru, Brazil, Indonesia, Vietnam, China and the Philippines. The study aimed to increase the chances of success for future rehabilitation efforts by identifying the approaches that contributed to longer-term sustainability and positive outcomes for different stakeholders. The CIFOR team designed and used common methods to be able to compare approaches, outcomes and influencing factors across the study countries. But the methods were modified as necessary to fit the specific country contexts.

The Philippines, like many other Asian countries, lost its forest cover rapidly through heavy logging, upland migration and agricultural expansion over the last century (Chapter II). Up to 59 percent (9.3 million ha) of the country's official forest lands could be non-forested at present, with grass or shrub cover, or under cultivation. Large populations depend on the upland forests and forest lands for their livelihoods. The country faces timber shortages and relies on imports to meet a large proportion of its demand. Heavy flooding and landslides occurring almost annually are often attributed to deforestation and fuel calls for halting logging and rehabilitating degraded forest lands. Given the current state of the Philippines' forest lands and the demands placed on it, rehabilitation will continue to remain

Open landscape in the KALIWA watershed project site. (Environmental Forestry Programme, CFNR, UPLB)

high on the agenda. Forest rehabilitation is one of the major programmes in the 'General Program of Actions for the Forestry Sector from 2005-2010', recently drafted by the Department of Environment and Natural Resources (DENR).

Rehabilitation efforts in the Philippines started very early, almost a century ago, and have gone through many phases. The efforts were meant to restore forest cover, provide environmental services, supply timber, and more recently contribute to local livelihoods. Many different institutional and technical approaches were used. Meanwhile, their outcomes and impacts on the environment and local livelihoods remain unclear. The common perception is that the efforts were largely a failure, with little to show on the ground and logging and livelihood pressures continuing to degrade remaining forests and forest lands.

This report presents the results of the Philippines study which had three components:

a) A national-level review of forest rehabilitation using the literature and inventory data.
b) Detailed characterisation and analysis of 46 sample projects, their outcomes and influencing factors in three selected regions using technical, ecological, socio-economic, financial and other parameters.
c) Consultative workshops in the three focal regions to understand the perspectives of key actors involved in rehabilitation projects.

The main objective of the study and this volume is to enhance the success and sustainability of forest rehabilitation efforts in the Philippines, with enhanced production of forest goods and services and positive outcomes for local communities by:

- Assessing the characteristics and outcomes of past rehabilitation efforts
- Identifying and disseminating the most promising approaches that could sustainably supply the targeted goods and environmental services, while benefiting local communities, and
- Determining the enabling factors and actions different stakeholders must undertake to move forward.

The nation's long rehabilitation history and its evolution in response to changing national and international conditions and ideologies, the sheer number of initiatives, the diversity in project size and methods, and the wide range of biophysical and socio-economic settings, present opportunities for learning many useful lessons to guide and sustain future efforts and ensure positive outcomes. Likewise the range of experience in the Philippines will provide useful lessons for other tropical countries as well. Underlying concerns and motivations driving rehabilitation efforts are often similar across nations.

1. Terminology and scope of the review

Numerous concepts have been used in the literature to refer to regrowing trees on formerly forested lands: rehabilitation, restoration, reclamation, reforestation and afforestation. Scientists, policy makers, practitioners and the public media tend to use these terms loosely and interchangeably. However, different authors define the terms relatively consistently based on the objectives, approaches used and the type of land targeted (*www.cifor.cgiar.org/rehab/_ref/glossary*). Accordingly:

- Reclamation aims to enhance productivity and little of the original biodiversity. Exotic species are commonly used.
- Restoration tries to recreate the original forest diversity, structure and function.
- Rehabilitation attempts to return the forest to a stable and productive condition, but not necessarily the original diversity, structure and function. It could include native and exotic species. The protective function and many of the ecological services of the original forest may be re-established.
- Afforestation refers to establishing a forest on land without forest cover in the recent past. Some authors suggest that afforestation includes only artificial means while others include planting, seeding and assisted natural regeneration.
- Reforestation refers to establishing a forest on recently deforested lands. Some authors qualify "recent" as < 10 years and others as < 50 years.

The generic term "rehabilitation" is used in the six-country study and in this volume to cover all activities designed to bring back trees on formerly-forested grasslands, brushlands, scrublands or barren areas for productive, livelihood and/or environmental purposes (*www.cifor.cgiar.org/rehab/_ref/study/index.htm*). It includes forest establishment via planting, seeding, assisted natural regeneration and agroforestry. In the Philippines the term "reforestation" covers all such activities and includes planting timber species, fruit trees, bamboo, rattan, and rubber, as well as agroforestry (trees plus agricultural crops) and assisted natural regeneration. Thus, the terms "rehabilitation" and "reforestation" are used interchangeably in this volume.

This study covers rehabilitation activities recorded with the DENR, which are mostly on public forest lands[2] but also include some registered planting on private lands. On public forest lands, rehabilitation is carried out in timberland[3], forest reservations designated for specific purposes and protected areas. This

[2] The term "forest land" refers to all property owned by the national government that is still in the public domain. It is a legal, not a botanical description. In reality, much "forest land" does not contain forests.
[3] Timberland refers to public forest lands zoned for timber production.

study focuses on rehabilitation in the uplands and plains, and not wetlands. The assessment covers various approaches, actors and objectives.

2. Presentation

Chapter II traces the history of forest rehabilitation in the Philippines over the last century, describing the actors, scale, costs, institutional arrangements, driving forces and outcomes as could be inferred from the secondary data and literature.

Chapter III uses empirical data from 46 rehabilitation initiatives across three study regions and six project implementer groups to assess site-level outcomes and the factors that led to positive or negative outcomes. It also identifies the most promising self-sustaining approaches and incentives that can deliver the required goods, services and livelihood benefits. The three study regions are Region III (Central Luzon), Region VII (Central Visayas) and Region XI (Davao), selected to represent the three larger areas in the Philippines (Luzon, Visayas, Mindanao). The six main project implementers were the DENR, other government agencies (OGA), local government units (LGU), non-governmental organisations (NGO), people's organisations (PO) or communities, and the private sector.

Chapter IV presents the stakeholders' perspectives on key rehabilitation constraints in the three focal regions, and their recommendations for overcoming them.

Chapter V concludes the volume by highlighting the main findings from the study and generating strategic and operational recommendations to policy makers, national and local government agencies, NGOs, POs and farmers' groups, the private sector, donors and research institutions for supporting, planning, implementing and sustaining forest rehabilitation in the Philippines.

Chapter II
Historical overview

Juan M. Pulhin[1], Unna Chokkalingam[2], Rose Jane J. Peras[1], Romeo T. Acosta[3], Antonio P. Carandang[4], Mayumi Q. Natividad[3], Rodel D. Lasco[5] and Ramon A. Razal[1]

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The once lush tropical rainforests of the Philippines have experienced extensive deforestation and degradation over the last century (Pulhin 2003). Simultaneously, small-scale forest rehabilitation[1] efforts have been ongoing since around 1910. Traditionally, government and private companies initiated and implemented rehabilitation activities, but since the mid 1970s international funding began to play a role and many different sectors became involved. Recent projects vary widely in terms of key actors, scale, major objectives, approaches and duration. For instance, projects range from large-scale, government-driven watershed reforestation to small-scale plantations established by non-government organisations (NGOs) and/or peoples' organisations (POs). They also include private individual or company plantations, local government unit (LGU)-initiated plantations, or those established by government agencies outside the forestry sector. More than US$570 million has been spent since the mid 1970s.

[1] See Chapter I for details on rehabilitation terminology.

This chapter provides a broad historical overview of forest rehabilitation in the Philippines and the driving forces and outcomes, as could be synthesised and inferred from the secondary data and literature available at the national level. Much of the information available was in the form of grey literature such as project reports. Larger rigorous empirical studies on outcomes and causal factors for government rehabilitation projects and various non-governmental initiatives are scarce. Forestry Sector Project I (FSP I) and to a lesser extent Forestry Sector Project II (FSP II), have some information on outcomes.

1. Biophysical and socio-economic characteristics

The Philippines is an archipelago of 7107 islands with a total land area of around 30 million ha. The country is divided into 17 administrative regions, divided into 79 provinces, 115 cities, 1499 municipalities and 41,969 *barangays*[2] (Figure 1). Luzon and Mindanao islands occupy about 35 and 32 percent respectively of the total land area (Garrity *et al.* 1991), and, in 2000, contained 80 percent of its 76.5 million citizens (Pro Style Grafix 2004).

Much of the Philippines is hilly and mountainous (Figure 2), with 52 percent of the land area, or 15.8 million ha, officially classified as "forest land", administered by the DENR (FMB 2002)[3]. Most of this land has slopes ≥ 18 percent. Forest lands cannot be certified as "alienable and disposable"[4] and will remain part of the nation's permanent public forest estate according to Section 15 of the Revised Forestry Code of 1975.

The climate is humid tropical and rainfall is generally abundant. Only 10 percent of the country receives less than 178 cm per year (Garrity *et al.* 1991). Mean temperature in the Philippines excluding Baguio City is 26.6^{0}C (*www.pagasa.dost.gov.ph/cab/statfram.htm*). Temperature differences are mostly due to variations in elevation, ranging from 8^{0}C in Baguio City at 1500 m above sea level to 30.8^{0}C in Jolo province at sea level. Garrity *et al.* (1991) noted that the Philippines has comparatively favourable soils for a tropical country. Thanks to the soil's relatively young age, and volcanic, limestone, or alluvial origin, they are generally not too weathered. However, steep slopes, high precipitation, and frequent, extremely heavy rainfall over short periods due to typhoons cause serious soil erosion in some places.

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[2] Barangay - the smallest political unit in the Philippines and often corresponds to a village or town district.

[3] The term "forest land" refers to all property owned by the national government that is still in the public domain. It is a legal, not a botanical description. In reality, much "forest land" does not contain forests.

[4] Alienable and disposable lands refer to lands that have been officially classified as not needed for forest purposes. They are open for conversion to alternative use.

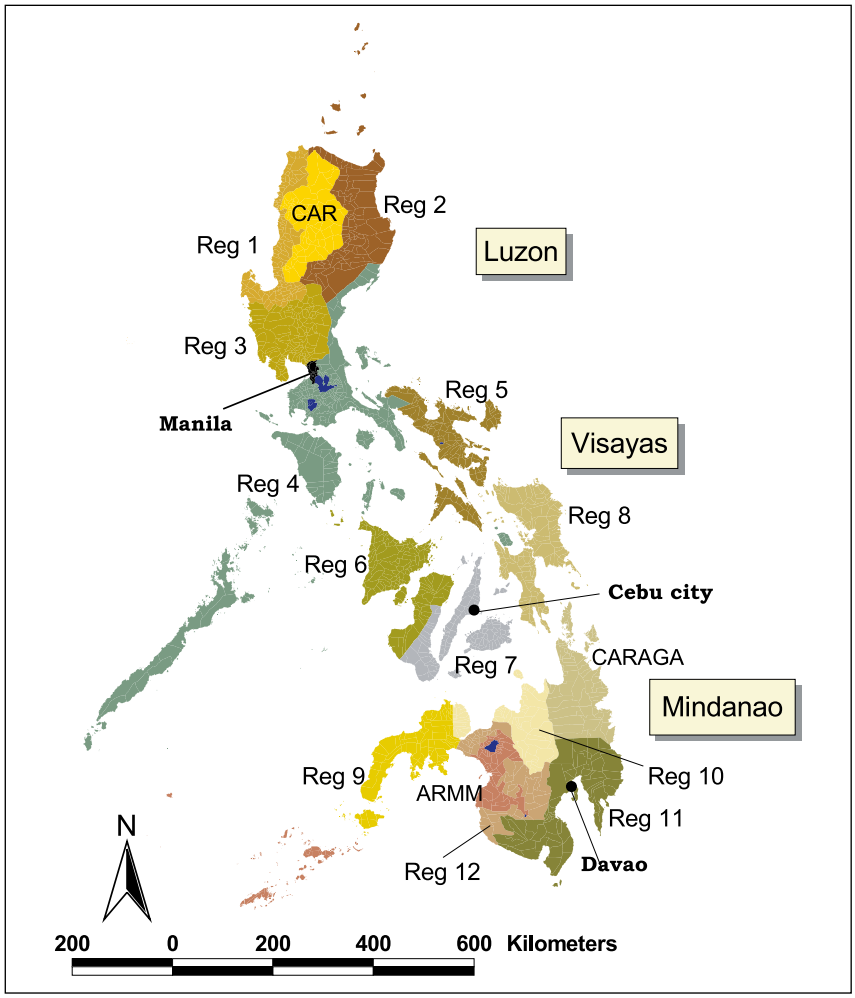


Figure 1. Administrative regions of the Philippines
Data source: Center for International Earth Science Information Network

Sajise (1998) estimated that more than 20 million people live in the uplands, with around 11 million residing within the official forest lands[5] (Cruz *et al.* 1992). Most are totally or partially dependent on forest lands and resources for their livelihood and are among the "poorest of the poor" (FDC 1985, World Bank 1989). The population falls into two classes: indigenous and migrant. The indigenous groups, comprising more than five million people, invoke ancestral rights to the land (Contreras 1991). They have lived there for generations, and traditionally practiced long-rotation swidden agriculture locally called *kaingin*.

[5] Cruz estimated 11 million people in a 1986 study by counting only the population of the 69 percent of the upland municipalities that lie entirely within mountainous areas. She further discounted for an estimated 25 percent of urban and other alienable and disposable land.

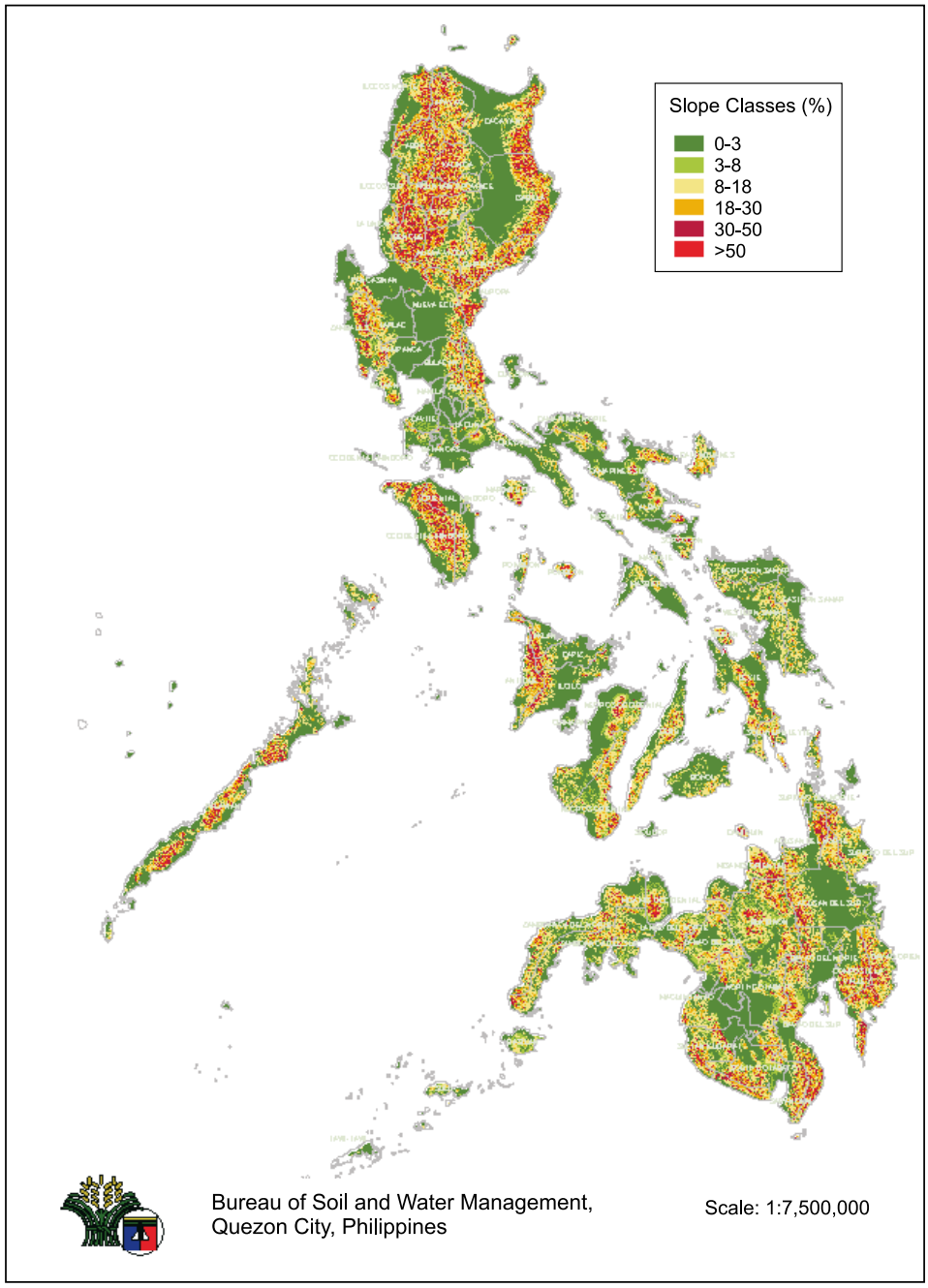


Figure 2. Slope map of the Philippines
Source: *www.fao.org/AG/AGL/swlwpnr/reports/y_ta/z_ph/phmp231.htm*

However, population growth and diminishing area available for cultivation have led to reduced fallow lengths, rendering *kaingin* less sustainable.

Migrants started to move into the area as early as the late 19th century[6] (FDC 1985), but a massive influx began in the 1960s and peaked between 1980 and 1985, when a net migration rate of 14.5 percent was recorded (Cruz *et al.* 1992). Most migrants were driven into the uplands by landlessness and a dearth of employment opportunities (Porter and Ganapin 1988, Cruz *et al.* 1992). Limited knowledge of the upland ecosystem and limited land for cultivation prevents them from practising appropriate farming techniques such as allowing for fallow periods (Tucker 1987 as cited in Porter and Ganapin 1988). Recent forest rehabilitation initiatives have involved the participation of both indigenous and migrant populations using incentives such as secure land tenure, employment, and other livelihood benefits.

2. Forest cover change and degraded forest lands

The Philippines has had an unrelenting onslaught on forest resources, leading to its current diminished and degraded state. When the Spanish colonisers entered the archipelago in 1521, about 27 million ha or 90 percent of the country was covered with lush tropical rainforest (Lasco *et al.* 2001). Kummer (1992) identifies population growth and the spread of commercial crops as the most likely causes of deforestation during the Spanish regime.

In 1900, about two years after the Americans substituted the Spanish, about 70 percent or 21 million ha was still forested (Garrity *et al.* 1993, Liu *et al.* 1993). The Americans introduced the first modern logging operations in 1904 when the Insular Lumber Company was granted a 20-year renewable concession to log approximately 300 km² of rich dipterocarp forest in Northern Negros in the Visayas (Roth 1983). Dipterocarp lumber (otherwise known as the "Philippine mahogany") was introduced to the world market. By 1940, 163 sawmill and logging companies were operating nationwide with a total investment cost of P30,116,550[7] (de la Cruz 1941). About 40 percent of the investment was owned by Americans, 33 percent by Filipinos, and the remaining shared among the Chinese, British and Japanese. American colonial records in 1920 state that 19 million ha or 64 percent of the country was covered with forest (Bautista 1990). Between 1934 and 1941, however, forest cover declined to around 17 million ha or 57 percent of the land area (Table 1).

[6] For instance, historical records indicate that early settlers started to occupy the Mt. Makiling Forest Reserve area in 1898 to 1899 (Cruz et al. 1991).

[7] Conversion rate roughly 50 Philippine Pesos for one US Dollar.

Table 1. Change in forest land area by forest type (million ha), 1934-2003

Forest Type	1934a	1934b	1941	1969a	1969b	1976	1980	1988	2003
Old-growth dipterocarp	10.7	11.1		4.4	5.3	3.67	2.99	0.99	
Closed forest									2.56
Open forest									4.03
Commercial forest			13.52						
Non-commercial forest			3.72						
Residual dipterocarp, Second growth	n.a.	2.5		3.4	3.3	n.a.	n.a.	3.41	
Broad-leaved forest	2.5								
Pine (*Pinus*)	0.5	0.5		0.3	0.2	n.a.	n.a.	0.24	
Seasonal molave (*Vitex parviflora*)	0.4								
Seasonal without molave	0.4								
Mangrove	n.a.	0.3		0.2	0.3	n.a.	n.a.	0.14	0.25
Forest plantation									0.33
Bamboo	0.03								
Mossy, unproductive	0.7	2.6		1.7	1.8	n.a.	n.a.	1.14	
Sub marginal								0.54	
Mid-mountain	1.9								
Total forest area	**17.18**	**17.0**	**17.24**	**10.0**	**10.9**	**8.1**	**7.4**	**6.46**	**7.17**
% of country area	**57.3**	**56.7**	**58.22**	**33.3**	**36.3**	**27.0**	**24.7**	**21.5**	**23.9**

Sources:

- Except for 1941, figures for 1934 to 1988 are as compiled by Bautista (1990) as follows:
  - 1934a: Ganapin (1987). Based on official data of former Director of Forestry Arthur Fisher
  - 1934b: Revilla (1988). Based on forest map
  - 1969a: Bonita and Revilla (1977). Based on large-scale photographs
  - 1969b: Extrapolated from the data in DENR, Philippine Forestry Statistics
  - 1976: Forest Management Bureau
  - 1980: Forest Management Bureau
  - 1988: Philippine-German Forest Resources Inventory Project, Natural Forest Resources of the Philippines
- 1941 figures are from the de la Cruz article (1941) in The Philippine Journal of Forestry
- 2003 figures generated by the National Mapping and Resource Information Authority and the Forest Management Bureau, based on land satellite ETM images from 2002 and 2003 (FMB 2004)

Forest cover continued to decline after World War II (Table 1), although estimates of the deforestation rate vary. A national inventory conducted in 1982-88 by the RP-German Forest Resources Inventory Project of the DENR Forest Management Bureau (FMB) estimated forest cover at 6.46 million ha or 21.5 percent of the total land area in 1988 (Bautista 1990).

The 1990 Master Plan for Forestry Development estimated previous forest loss based on available information (DENR 1990). Between 1934 and 1990, the country lost 10.9 million ha of forest cover, equalling an average annual loss of 194,000 ha (Table 2). Of this area, 10.37 million ha, or 95 percent, was converted

to other uses while 0.52 million ha was damaged by logging. From 1934 onwards, the loss rate increased dramatically until it peaked at 300,000 ha per year in the decade 1965-75. The rate then gradually declined to 100,000 ha per year from 1985-90.

Table 2. Forest cover loss (in 1000 ha) from 1934-1990

Description	1934-1945	1945-1955	1955-1965	1965-1975	1975-1985	1985-1990	Total 1934-90	Average annual loss
Starting cover	17,000	15,700	13,900	11,600	8600	6600		
Less losses due to:								
• conversion	1260	1740	2200	2835	1880	460	10,375*	185
• Logging damage	40	60	100	165	120	40	525**	9
Total losses	1300	1800	2300	3000	2000	500	10,900	194
Final cover	15,700	13,900	11,600	8600	6600	6100		

Reference: Based on secondary data interpretation by the 1990 Master Plan for Forestry Development.
* Total forest cover loss
** Damage out of 5.3 million ha logged

The main causes of deforestation and land degradation after World War II include intensive logging (both legal and illegal) and agricultural expansion (partly linked to upland migration). Commercial logging tended to begin the process by opening up the forests and providing access roads for agricultural expansion. The underlying causes can be traced to structural forces such as (a) the elite's control of wealth in the lowlands and uplands, and large-scale exploitation of forest resources for private gain, and (b) inequitable access to land and assets for the majority, high population growth, and lack of urban job creation leading to poverty, migration and dependence on forests and uplands (Porter and Ganapin 1988, Kummer 1992, Cruz *et al.* 1986).

In 2003, the National Mapping and Resource Information Authority (NAMRIA) and the FMB generated a set of land/forest cover statistics using LANDSAT ETM images from 2002 and 2003 (FMB 2004). The analysis used harmonised land/forest cover terms and definitions in accordance with international standards (FMB 2004). Results show that the total forest cover in 2003 was about 7.2 million ha or 24 percent of the country's land area. The new figure is 11 percent higher than the 1988 forest cover of 6.5 million ha. Out of the 7.2 million ha, 6.5 million ha were found within forest land while the remaining 0.65 million ha were within alienable and disposable lands. Open forests constitute four million ha, closed forests 2.5 million ha, plantations 330,000 ha and mangroves 250,000 ha respectively. Much of the remaining forest is in the MIMAROPA, the Cagayan valley, the Cordillera Administrative, the Central Luzon and Eastern Visayas regions, in that order.

DENR attributes the increase in forest cover to the slowdown in commercial logging due to a logging moratorium in several provinces, a shift in logging from old-growth to residual forests in the early 1990s, log and lumber export bans, and accelerated public and private reforestation efforts (Defensor 2004). Also, many timber licence agreements (TLAs) expired and non-performers were cancelled in the early 1990s. The implementation of Industrial and Socialized Industrial Forest Management Agreements (IFMA and SIFMA) were expanded, covering most areas where TLAs had expired. In 1995, Community-Based Forest Management (CBFM) was adopted as the national strategy for managing the country's forest lands. These policy shifts and initiatives are also believed to have contributed to increasing the country's forest cover (Mayumi Quintos-Natividad, personal observation).

Others argue that natural old-growth and secondary forests continue to decline because of logging and expanding frontier agriculture (David Kummer, personal communication; Guiang 2001), and the forest cover increase is primarily due to regrowth vegetation and plantations established through reforestation projects and spontaneous tree growing by farmers and others. Agroforestry and fruit trees may also be included in the estimates.

Imperata grass-covered uplands. (Photo by John Turnbull)

If 6.5 million ha or 41 percent of the officially designated forest land is under some sort of tree-based vegetation at present, this leaves 9.3 million ha of forest land without forest cover. Many of these areas devoid of forest cover will need to undergo rehabilitation for ecological and socioeconomic purposes such as soil and water protection, biodiversity conservation and livelihood development. According to Esteban (2003), the FMB believes that 12 million ha should be ideally under forest cover, leaving a potential rehabilitation target of 5.5 million ha.

3. Evolution of national rehabilitation initiatives

For the purpose of this analysis, the history of national rehabilitation initiatives is divided into three periods: the colonial period (1910-1945); post-war, government-initiated projects (1946-mid 1970s); and, multi-sectoral efforts (mid 1970s-present). Annex 1 summarises the key characteristics of rehabilitation in these three periods.

3.1 Rehabilitation during the colonial period (1910-1945)

The first recorded rehabilitation initiative dates back to 1910 when the country's first Forestry School (now the College of Forestry and Natural Resources) was established in Los Baños, Laguna, Luzon. By 1916, students and the academe had experimented with about 600 species in the School nursery and plantation as part of silvicultural classes. The same year saw the Government's initial attempt to extensively plant barren lands, with the Philippine Legislature appropriating P10,000 under Act 2649 to reforest an aggregate 4095 ha in the Talisay-Minglanilla Friar Lands Estate in Cebu province. According to Orden (1960), the project started by evicting people considered as "squatters" and hostile to the project and planting 73 percent of the area. Lack of funds, however, halted the work for some time, resulting in local people returning to the area to make clearings and plant ipil-ipil (*Leucaena leucocephala*) and other fast-growing tree species.

In 1919, the Magsaysay Reforestation Project was established in Arayat, Ilocos, and Zambales, all on Luzon. This was followed by the establishment of a Cinchona plantation in Bukidnon (Mindanao) in 1927 and three other reforestation projects until 1931. From 1910 until 1936, meagre government funds limited rehabilitation efforts generally to experimental planting, small plantations, and studies on suitable species and seed treatment to hasten germination. More extensive reforestation took place from 1937 to 1941 when the Government appropriated funds for larger-scale activities. A special office was established under the Director of Forestry to inspect new projects. The Makiling Reforestation Project was established at this time.

Makiling Forest Reserve in 2004. (Photo by Takeshi Toma)

At the outbreak of World War II, 35 projects were in operation covering 535,000 ha. The projects were mostly located on Luzon, involving 11 sites in Northern Luzon, 14 in Central Luzon, and one in Southern Luzon. Six sites were located in Visayas and three in Mindanao. Sizes varied from 378 ha in Iloilo in the Visayas to 2696 ha in Mountain Province in Northern Luzon. Of the targeted 535,000 ha, 26,660 ha were fully planted. In addition, nurseries covering 24 ha with an annual capacity of 17 million seedlings were established in the reforestation sites.

From 1910 to 1941, a total of about P3.57 million (Annex 1) was spent on reforestation including nursery and plantation establishment and maintenance. This amounted to around P134/ha. The Government was the main actor and the main objectives were research, regreening barren lands and providing environmental services to the public. The projects were to be long-term reforestation sites managed by the Bureau of Forestry. Government appropriations were the primary funding source. Communities were not involved and in one case they were actually evicted. During the Japanese occupation, a large portion of the established plantations was destroyed. Only 15 percent or 4000 ha of the original plantations survived the war.

3.2 Post-war, government-initiated rehabilitation (1946-mid 1970s)

From 1946 to June 1948, very limited funds were made available for reforestation. As a result, only 29 of the 35 projects operating before the war were reopened. Work was mostly confined to rehabilitating nurseries, recovering looted equipment and tools, reconstructing infrastructure, building fire lines, and cleaning plantations (Orden 1960). Reforestation activities started in earnest again in July 1948 when Republic Act 115 made available a new and permanent funding source to revive reforestation initiatives halted during World War II. To support reforestation projects, the Act levied charges for each cubic metre of timber removed for commercial purposes from any public forest. By 1960, the Government had planted 55,381 ha and spent P20,267,375 since 1916. This translated to a cost of P581/ha from 1947-60.

In 1960, the Reforestation Administration was created under Republic Act 2706. From 1960 to 1972, reforestation projects increased from 57 to 91 (presumably including those established during the pre-war period), with a cumulative total of 182,000 ha planted (Esteban 2003). Of these projects, 46 were in Luzon, 31 in Visayas and 14 in Mindanao. In 1972, the Reforestation Administration was integrated with the Bureau of Forestry, Parks and Wildlife Office, and Southern Cebu Reforestation Project under Presidential Decree (P.D.) 1. In the same year, Letter of Instruction No. 3 integrated reforestation activities into the mandate of the then Bureau of Forest Development. From 1973-74, DENR planted a further 10,781 ha.

In summary, until 1974, the Government rehabilitated a modest area (161,714 ha) at little cost and using casual labourers. They established plantations of mainly indigenous species. The main objectives were to regreen barren lands, offset deforestation, and compensate for the timber industry's declining supply of raw materials from natural forests. Very minimal information exists on survival of these plantations and other outcomes. Hyman 1983 (as cited by Magno 1994) stated that the projects performed poorly due to inadequate funding, technical inefficiencies and corruption.

Forest occupants were generally evicted as they were considered to be the main culprits responsible for destruction and a hindrance to rehabilitation. With a few exceptions such as the Paper Industries Corporation of the Philippines (PICOP) which planted trees on its own and in partnership with farmers, the Government failed to engage the timber companies in reforestation activities on the vast forest lands allocated to them for logging. Private sector engagement was minimal because there were limited efforts compelling them to rehabilitate, and natural forest timber was still plentiful and available at little cost. The rehabilitation efforts thus failed to

address the underlying causes of degradation: a) logging excesses, and b) livelihood needs and inequitable access to resources of growing upland populations.

3.3 Multi-sectoral rehabilitation efforts (mid 1970s-present)

To stem the high forest depletion rate and enhance forest rehabilitation, the Government sought new approaches involving the private sector and civil society. P.D. 705, issued in 1975, required nationwide reforestation activities with private sector participation. P.D. 705 defined the forest lands to be reforested as those with barren, grass or shrub cover; denuded areas within forest concessions, reserves and reservations, critical watersheds, national parks and other protected areas; areas covered by pasture leases needing immediate reforestation; and miscellaneous areas such as riverbanks and road right-of-ways. From 1976, the holders of TLAs were given the responsibility to reforest inadequately-stocked forest lands within their concessions. In the same year, the Program for Forest Ecosystem Management was launched, calling for a holistic approach to forest management involving all sectors of society. The following year, P.D. 1153 was issued requiring all able-bodied citizens, 10 years and older, to plant 12 seedlings annually for five consecutive years.

In 1979, Letter of Instruction No. 818 was enacted, compelling all timber licence, lease and permit holders to reforest one hectare of denuded or brush land for every hectare logged. Two years later, Executive order (E.O.) 725 was issued further encouraging industrial tree plantations (ITPs), tree farms (TFs) and agroforestry farms (AFFs) on denuded forest lands through long-term leases. P.D. 705 had stipulated this earlier and P.D. 1559 amended it in 1978. Incentives included low fees and taxes, credit facilities, free technical assistance, and unrestricted exports of plantation products.

By the end of the 1970s, the private sector, government agencies other than the Bureau of Forestry, local government units and citizens were involved in forest rehabilitation efforts as a result of government proclamations issued since 1975. Of the 64,541 ha planted in 1981, 33,834 ha or 52.42 percent was planted by groups besides the forestry department (Figure 3).

The government initiated numerous people-oriented forestry programs in the early 1980s, such as the Integrated Social Forestry Program in 1982 and the Community Forestry Program in 1987. Many of the projects were funded by foreign donors such as the Ford Foundation, World Bank, United States Agency for International Development (USAID) and the German Technical Cooperation (GTZ), and executed by or in collaboration with the DENR. They tended to be small-scale agroforestry and social forestry projects targeted at meeting the livelihood needs of farmers and communities and addressing environmental degradation in the uplands. About the

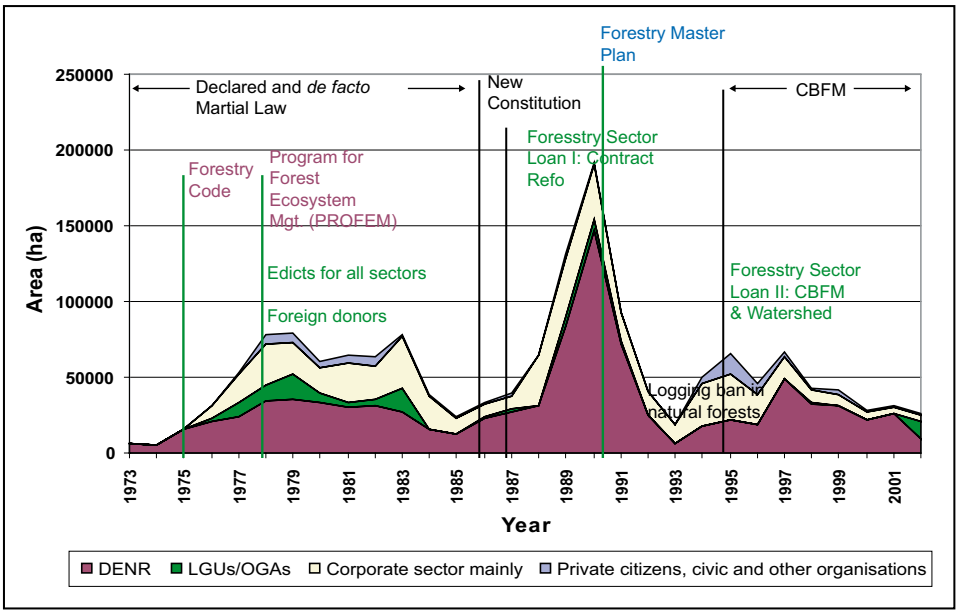


Figure 3. Plantings by all sectors by year, 1973-2002. Adapted from Acosta (2003)

same time, NGOs began pioneering work in forest regeneration and agriculture with upland farming communities. The three main efforts were a mission in southern Mindanao adopting "Sloping Land Agricultural Technology (SALT)", the work of World Neighbours in hilly farming communities, and a mission by Pastor Delbert Rice with the indigenous people in Sta Fe Nueva Viscaya (Ed Queblatin, personal communication). Beginning in the 1980s, the need to address upland poverty and promote livelihood opportunities began to drive rehabilitation efforts, in addition to the traditional objectives of regreening barren lands and producing timber.

After the 1986 "People's Power" Revolution, the country regained its credibility with international funding institutions, enabling it to access huge financial assistance to support forest rehabilitation initiatives (Korten 1994). The major initiatives included the Forestry Sector Projects (FSP) I and II established in 1987 and 1995 respectively under the so-called National Forestation Program (NFP). The NFP aimed to rehabilitate 1.4 million ha nationwide from 1987 to 2000, or an average of 100,000 ha per year (Magno 1994). The long-term target was to reforest 6.5 million ha of denuded lands, including 1.4 million ha of critical watersheds needing immediate rehabilitation (Umali 1989).

FSP I replaced the traditional government-implemented reforestation with "contract reforestation" involving families, local communities, NGOs, LGUs, and the private sector. Under the *contract reforestation* scheme, contractors were paid a fee for reforesting and maintaining a particular area for three years with an

expected survival rate of ≥ 80 percent and an average height of 0.8 m. After the contract period, the area was to be turned over to the DENR.

FSP II was implemented through Community-Based Forest Management (CBFM). Organised communities were contracted to reforest and they were given tenure over the areas they developed. E.O. 263 in 1995 adopted CBFM as the national strategy for sustainable forest management and social justice. This was in response to the government-corporate partnership's inability to arrest forest degradation and address upland poverty and inequitable access to forest resources (Pulhin 2003). The CBFM program unified all the Government's people-oriented programs and projects, including those implemented in the early 1980s. It entrusted local communities with responsibility for forest rehabilitation, protection and conservation, with the promise of equitable access to forest benefits. Some of the earlier *contract reforestation* areas were also placed under PO management through Forest Land Management Agreements that entitled them to maintain and protect the area and share future benefits with the Government at harvesting time. In the long run, many of these areas also became CBFM Agreement sites.

FSP I was funded by a US$120 million Asian Development Bank (ADB) loan with US$120 million counterpart funding from the Overseas Economic Cooperation Fund (OECF) of Japan and US$43 million from the Philippines Government (GOP) (Tolentino 1992 as cited by Magno 1994). FSP II was funded by a US$39.7 million ADB loan, US$55 million Japanese Bank for International Cooperation (JBIC) loan and US$44.57 million GOP counterpart funding. Estimated costs of P20,410.06 for establishing, protecting and maintaining a one-ha plantation over three years were revised to P43,146 per ha under the Loan II component funded by JBIC. The most recent data from the FMB indicates that from 1987 to 2001, a total of P4927 million (US$98.54 million)[8] was spent under the comprehensive site development component[9] of the FSP with 299,000.63 ha planted. This equals an average reforestation cost of P16,423.77 (US$382.47) per hectare over the 14-year duration of the program (NFDO Briefing Kit 2003). The area planted, 299,000 ha, was much smaller than the 1.4 million ha targeted.

[8] This excludes the cost of community organising which is a separate contract under CBFM normally granted to NGOs or assisting professionals to provide technical and social preparation to POs before a comprehensive site development contract is awarded.

[9] Sites under FSP had "comprehensive site development plans", which included timber and fruit tree plantations; agroforestry; other plantations such as rattan, rubber and bamboo; assisted natural regeneration; timber stand improvement and enrichment planting.

Other foreign-assisted projects directed at benefiting farmers and local communities continued through the 1990s to present. These included the Cordillera Highland Agricultural Resources Management Project Reforestation Component (ADB and the International Fund for Agricultural Development (IFAD)); Southern Mindanao Integrated Coastal Zone Management Project (JBIC and Philippines Government); Philippine-German Community Forestry Project - Quirino (GTZ/ German Development Bank (KfW)); Developing Tropical Forest Resources through Community-Based Forest Management (International Tropical Timber Organisation (ITTO)); and, the Low-Income Upland Communities Project (ADB). The DENR administered many of these projects.

The private sector reforested large areas in three periods since 1975: from 1977-84, 1988-90 and 1994-96 (Figure 3). Generally more than 20,000 ha were planted annually during these periods. The series of government proclamations impelled TLAs to reforest from 1977-84 and the logging ban in natural forests motivated TLAs to reforest from 1994-96. Most planting since 1975 was done by TLAs; and ITPs, TFs and AFFs contributed very little. Two new private sector tenurial/management agreements, IFMA and SIFMA[10], were instituted in the 1990s to revitalise the industrial forest plantation program and generate income for smallholders in the uplands. However, private sector efforts have been declining over the last years because TLAs have expired or been cancelled, incentives have been inadequate and policies have been highly unstable. Only 8568 ha were planted under IFMA and SIFMA and 3963 ha in TLAs from 2000-02 (DENR data). The constraints pointed out by the private sector (Acosta 2002, Gayo 2000) include:

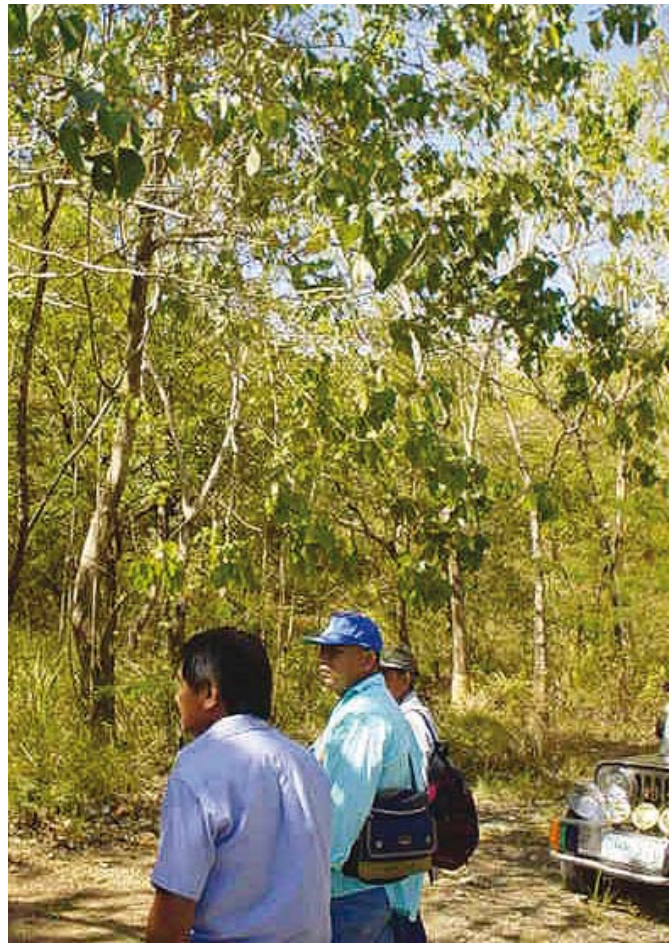
a) Tenure duration is too short to make long-term investments.
b) Obtaining credit is difficult.
c) Development and transport costs are too high to be financially viable.
d) Frequently changing policies affect plans and operations, particularly regarding timber harvesting rights.
e) Marketing support is low.

There have been some new LGU initiatives in recent years (Figure 3). The 1991 Local Government Code empowered LGUs to enforce forestry laws and engage in reforestation projects in partnership with the DENR and communities. Some LGUs in Luzon and Mindanao passed provincial/municipal resolutions appropriating funds to finance CBFM and reforestation projects in their localities. Some successful initiatives include those established by the provincial governments

[10] IFMA and SIFMA grant the private sector the right to develop, manage, and benefit from plantations (and natural forest areas in IFMA II) over a lease period. SIFMA is for smaller areas while IFMA is larger in scale.

of Nueva Vizcaya in Northern Luzon and Bukidnon in Mindanao, and by the municipality of Pilar, Bohol in the Visayas.

In summary, from the late 1970s to 2000, substantial money was invested in forest rehabilitation through both large and small projects, and many different actors were involved. Budgeted costs easily totalled US$570 million or more, with most funding (about 93%) coming from public investment including foreign loans (Annex 1). Foreign grants and private investment make up the remainder. DENR records show a total of 5503 registered CBFM communities or POs from 1975 to the present and around 2200 registered private initiatives (TLAs, TFs, ITPs, IFMAs, and SIFMAs). There were also an undetermined number of DENR regular and special projects, and an undetermined number of projects by LGUs and other government agencies (OGAs) such as the National Irrigation Administration, National Power Corporation, Philippine National Oil Company, Water Districts and Academe. Many were integrated projects, in which rehabilitation was just one component.



Reforestation with *Gmelina arborea* in the Pantabangan watershed. (Photo by Rodel D. Lasco)

They established plantations of mainly (80%) exotic species such as mahogany (*Swietenia macrophylla*), *Acacia mangium*, *A. auriculiformis*, *Eucalyptus* and *Gmelina arborea*. Agroforestry was also important, while assisted natural regeneration and enrichment planting played a smaller role. The main objectives were to regreen barren lands, produce timber, enhance watershed services and address upland poverty. The total area reported as planted from 1975-2002 was 1,597,472 ha, with the bulk (920,962 ha) planted by the DENR; 100,485 ha by LGUs and OGAs; 410,112 ha by timber licence holders; 93,520 ha by other private enterprises and leaseholders; and 72,393

ha by private citizens and civic organisations. FSP I and II contributed to around one-third of the DENR reforestation in this period.

Available limited information on survival of these plantations and other outcomes is summarised in Section 5.1. FSP I performed poorly on many fronts, having failed to address an underlying cause of degradation: livelihood needs and inequitable access to resources of upland populations. FSP II appears to have had more mixed results, and little is known about other government and non-governmental initiatives. Rehabilitation efforts have been declining in the last decade with no new major external funding and inadequate incentives for the private sector.

4. Major driving forces for rehabilitation and shifts in approaches

Scientific, environmental, political, institutional and socioeconomic factors drove rehabilitation of degraded forest lands in the Philippines and the types of approaches used.

4.1 Scientific enquiry

The earliest recorded rehabilitation initiative in 1910 was driven by scientific curiosity. Practical methods for planting trees on *Imperata* grassland areas were tested and suitable species were identified. By 1914, approximately 120 species had been tried in the Forestry School's nursery and plantation, increasing to 600 species by 1916. The trials identified a number of species suitable for reforestation in the area. These included molave, narra (*Pterocarpus indicus*), supa (*Sindora supa*), para rubber (*Hevea brasiliensis*), taluto (*Pterocymbium tinctorum*), kalantas (*Toona calantas*), malaruhat (*Cleistocalyx operculatus*), teak (*Tectona grandis*), mahogany, ipil (*Intsia bijuga*), lumbang (*Aleurites moluccana*), banaba (*Lagerstroemia speciosa*), agoho (*Casuarina equisetifolia*), bitaog (*Calophyllum inophillum*), baguilumbang (*Reutealis trisperma*), akle (*Albizia acle*), tindalo (*Afzelia rhomboidea*), ipil-ipil and kakawate (*Gliricidia sepium*) (Orden 1960).

4.2 Promotion of environmental stability

The promotion of environmental stability also drove early reforestation efforts. Most projects prior to the 1960s were located in established forest reserves, national parks; the watersheds of Agno, Pampanga and Cagayan in Luzon, and other places where problems of flooding, erosion, and soil and water conservation required attention (Orden 1960).

Environmental considerations continued to be a major driver of rehabilitation in the succeeding decades. P.D. 705 as amended by P.D. 1559, identified "denuded or inadequately timbered areas proclaimed by the President as forest reserves and reservations" as target reforestation areas for environmental objectives. These areas included critical watersheds, national parks, game refuges, bird sanctuaries, national shrines and national historic sites. Similarly, one long-term aim of the NFP launched in 1986 was the "restoration and maintenance of a stable, functional and wholesome environment" (Umali 1989).

This objective was reinforced when massive floods occurred, such as in 1991 when the city of Ormoc, Leyte in the Visayas was inundated, claiming 4000 lives and leaving 2000 people missing (Vitug 1993). A similar incident occurred in December 2004 in Quezon and Aurora provinces in Luzon where hundreds of people died and thousands were rendered homeless when heavy rains triggered landslides and flash floods. Though refuted by many scientists, environmentalists and the government widely attributed the floods to forest destruction through logging (media reports for the period). These events spurred the DENR to issue logging suspensions and incorporate rehabilitation into its 2005-2010 Plan of Action for the forestry sector.

4.3 Political factors and funding availability

The Philippines' political milestones and accompanying changes in forestry policies and programs were major driving forces behind rehabilitation post 1970s. Major changes in political leadership affected both public and private efforts. Plantings usually peaked when new government administrations were implementing major forestry programs. For instance, the declaration of Martial Law in 1972 was followed by the issuance of the Revised Forestry Code of the Philippines (PD 705) in 1975. With a fresh policy direction and additional funds allocated to the forestry sector, reforestation activities increased dramatically (Figure 3). The Program for Forest Ecosystem Management was conceived in the late 1970s and implemented in the 1980s. A series of edicts compelled TLA holders, LGUs, OGAs and private citizens to plant trees. Rehabilitation efforts in all sectors peaked during this period. Total reforestation efforts per year were close to 80,000 ha in 1978, 1979 and 1983. Eventually, efforts and enthusiasm waned due to declining financial support from the Government and lack of appropriate incentives to the private sector.

The fall of the Marcos Government in 1986 was followed by the promulgation of the New Philippine Constitution in 1987 and the Forestry Master Plan in 1990. Environmental programs, particularly reforestation, were supported during this period, with FSP I providing fresh funds. Due to failures of past efforts, the regular government reforestation projects were stopped and the *contract reforestation* scheme attempted. The area recorded as planted exceeded the 100,000 ha per year mark and also exceeded the annual deforestation rate for the first time.

The *contract reforestation* scheme showed that contracts with families and communities were more successful. Hence FSP II provided funding to support the CBFM program, which was then strengthened through E.O. 263 adopting it as the national forest development and management strategy. From 1996 to 2003, most government funds for reforestation were channelled to organised communities or POs through comprehensive site development contracts. The last contract payments were made in late 2003 as the sectoral loan finally ended and closed all transactions with the POs.

JBIC has in its pipeline another forestry sector loan for P6.027 billion to rehabilitate some 86,000 ha of denuded forest land in the Philippines. This funding, if it materialises, could again boost reforestation efforts. However, there may be a major shift in approaches since the DENR is contemplating reducing the population in the uplands as part of sustaining the rehabilitation effort (www.denr.gov.ph/article/view/3477). Shifts in the political climate or conflicts could further define or alter the approaches used.

4.4 Imminent timber shortage

The 1950s to early 1970s were characterised by a logging boom in the Philippines. The area under TLAs more than doubled between 1958 and 1970, from 4.6 to 9.4 million ha. Consequently, the annual allowable cut also more than doubled from 7.2 to 15.5 million cubic metres. However, timber started to run out in the 1970s, especially in some parts of Luzon. By the mid-1970s, logging areas in central and western Luzon were either abandoned or covered by logging bans (Boado 1988). The imminent timber shortage contributed to reforestation efforts intensifying in the early 1970s. As already mentioned, the Government initiated some policies and programs to encourage and support timber production:

a) P.D.1153, otherwise known as the "Tree Planting Decree".
b) The Program for Forest Ecosystem Management that established one municipal nursery for each of the 1000 municipalities and increased the role of the Bureau of Forest Development in reforestation.
c) The Energy Farm Program, which required each *barangay* to plant at least two hectares as a community fuel reserve.
d) P.D. 705 and 1559 and E.O. 725 encouraged the establishment of ITPs, TFs and AFFs, and the reforestation of inadequately-stocked forest lands within forest concessions to help supply the raw material needs of forest-based industries.
e) The NFP was to provide adequate industrial timber and fuelwood supply in addition to its environmental and socioeconomic objectives (Umali 1989). The NFP thus targeted reforesting 1.4 million ha from 1987 to 2000.

Areas rehabilitated through the NFP and other government and private sector initiatives contribute little to the country's timber supply at present. Yet, the threat

of a timber famine continues to drive reforestation efforts. The 2003 Revised Philippine Master Plan for Forestry Development has targeted the establishment of 40,000 ha of commercial plantations per year or a total of one million ha over the next 25 years to meet the nation's timber requirements.

4.5 Socio-economic considerations

Socioeconomic considerations are another major rehabilitation driver. Prior to 1982, upland occupants either served as merely labourers or were ejected to make way for government reforestation projects. This caused great animosity between the Government and the upland communities and contributed substantially to the failure of past rehabilitation initiatives.

The emergence of people-oriented forestry programs in the 1980s and the 1990s shifted the emphasis from the traditional approach of "getting the trees on the ground" to "getting the livelihoods of the people off the ground" (Peluso 1992), through their involvement in reforestation and other forestry projects. The major programs believed to have boosted the country's reforestation efforts include the Integrated Social Forestry Program established in 1982, the Community Forestry Program in 1987, and the 1995 CBFM program. Other than providing additional sources of income through participation in the different reforestation activities, these programs also provided incentives and support to upland communities by providing tenure rights over reforested areas and livelihood support. Also for the first time, projects followed a deliberate and participatory planning process in which the communities were involved starting from area identification to development planning, project implementation, monitoring and evaluation. The exact contribution of these programs to the overall rehabilitation effort is yet to be ascertained. However, with CBFM adopted as the national strategy for sustainably developing the country's forest lands, it would be safe to assume that most plantations established by the DENR from 1996 to 2002 — 185,407 ha, according to FMB records — were accomplished through CBFM.

4.6 Institutional dimensions

At least eight major groups of actors drive the processes and outcomes of forest rehabilitation in the Philippines: the Congress, the Presidents, the DENR, LGUs, OGAs, upland farmers/local communities and POs that represent them, NGOs and the rest of the civil society, the private sector, academic and other research institutions, and the donor community. Their roles are presented in Table 3. Since forest rehabilitation initiatives are mostly implemented in classified forest lands, the DENR is the dominant actor in all rehabilitation efforts. However, rehabilitation is a complicated process given the presence of other stakeholders from various sectors and levels of the society and the diversity of their personal and institutional interests and priorities. The dynamic interaction among them influences not only the form but also the substance of forest rehabilitation.

Table 3. Key players and their roles

Key Players	Major Role in Reforestation
The Philippine Congress (Senate and House of Representatives)	The Congress has the mandate to provide the legal framework for forest development and management including reforestation. The last legal framework P.D. 705 (as amended by P.D. 1559), issued 29 years ago, is outdated and does not address the present needs and challenges.
The President	Of the country's five presidents since 1965, President Ferdinand Marcos' Administration issued the most policies relevant to rehabilitation. However, the Forestry Sector Projects were initiated during the administrations of Presidents Corazon Aquino and Fidel Ramos. The administrations of Presidents Joseph Estrada and Gloria Macapagal-Arroyo merely sustained their predecessors' initiatives, particularly FSP.
Department of Environment and Natural Resources (DENR)	The DENR is the main government agency concerned with implementing forest rehabilitation initiatives. It promulgates rules and regulations that translate the generalities of law into concrete terms. The DENR Secretary is responsible for issuing Administrative Orders and Memorandum Circulars that guide the implementation of forest laws or decrees issued by the President. On the ground, outcomes are largely influenced by the dedication and competence of the DENR field offices and staff at the regional, provincial and municipal levels, and their ability to mobilise local support and resources.
Private sector	The private sector holds various leases of public forest lands such as the TLA, IFMA, Tree Farm Lease Agreement, Agroforestry Farm Lease Agreement, SIFMA, Private Forest Development Agreement and Forest Land Grazing Lease Agreement. Different policies mandated these private individuals, corporations or legal entities to be involved in rehabilitating certain areas covered by their leases. This sector's contribution depends on the policy, technical, marketing and related support and incentives available.
Local Government Units	The Local Government Code empowers LGUs to enforce forestry laws and implement reforestation and related forestry projects in partnership with the DENR and local communities. Some LGUs in Luzon and Mindanao have passed provincial/municipal resolutions appropriating funds to finance CBFM and reforestation projects. Successful LGU initiatives include those established by the provincial governments of Nueva Vizcaya in Northern Luzon and Bukidnon in Mindanao and by the municipality of Pilar, Bohol in the Visayas.
Other government and semi-government agencies	These include the National Irrigation Administration, National Power Corporation, and the Philippine National Oil Company, among others, which by virtue of legal arrangements with the Government are also tasked to engage in rehabilitation activities in watersheds under their jurisdiction. More recently, the Department of Finance has been involved in some initiatives in partnership with LGUs under its Community-Based Natural Resources Management Project supported by the World Bank.

Key Players	Major Role in Reforestation
Upland farmers/local communities and POs	This group is composed of both indigenous people and migrants on the ground doing the hard labour of forest rehabilitation. Until the early 1970s they were simply hired as labourers in reforestation projects and did not have tenure security over the land they occupied. More recently, the government encouraged upland farmers and communities to organise themselves into People's Organizations and play a larger role in rehabilitation projects. The government contracts the POs to implement planting, maintenance and protection activities; and may also provide them with tenure security over the land that they have reforested so that they can serve as long-term stewards of the forest resources.
NGOs and the rest of the civil society	NGOs and the rest of the civil society such as religious groups, media, and others, operate nationally and locally. Their influence ranges from providing technical and financial support to POs; policy advocacy; legal assistance especially to indigenous people; implementation, monitoring and evaluation of reforestation projects; and promoting community-level actions and demands. The Local Government Code allowed for civil society to be represented in the governmental and multi-sectoral policy-making bodies such as municipal, provincial and regional development councils as well as on the Protected Area Management Board. Civil Society's advocacy has been instrumental in E.O. 263 (CBFM) and the National Integrated Protected Area System Act of 1992 being passed, both of which include reforestation components.
Academic and other research institutions	Their main contribution lies in promoting science-based policies and programs; providing technical assistance and support; project monitoring and evaluation; critiquing government forestry policies, programs and projects; and producing a new breed of "people-oriented foresters" responsive to the needs of people-oriented reforestation initiatives.
Funding institutions	Multilateral and bilateral funding institutions act as global drivers of reforestation policies and programs in the Philippines. Their instrument of influence includes providing funds and budgetary and technical support. The chief among these are ADB, World Bank, JBIC, USAID, IFAD, ITTO, Ford Foundation, and the governments of New Zealand and Germany.

Source: Modified based on Pulhin (2003)

The degree of engagement of the various actors continues to evolve, shaping the process and outcome of forest rehabilitation along the way. For instance, DENR's inability to promote successful reforestation by itself had led to involvement of the private sector and the civil society in the different government-initiated reforestation programs starting in the late 1970s. Similarly, the availability of funding support from the different financial institutions in the late 1980s to 2000 boosted the country's reforestation efforts, although funding availability did not necessarily result in project objectives being achieved (Korten 1994). Private sector involvement has declined in recent years due to an unstable policy

environment and inadequate incentives. On the other hand, recent innovations among some LGUs could inspire others, like the efforts of Nueva Vizcaya provincial government (located in Region II in Luzon) in watershed management and reforestation. This can in turn influence future reforestation approaches and outcomes. However, most of the above actors are also likely to respond to major changes in the global and national political and environmental climate, which may promote or deter forest rehabilitation and cause shifts in the areas of focus and approaches used.

5. Reported achievements and impacts of rehabilitation

There are at least three major categories of achievements and impacts of rehabilitation in the Philippines: environmental, socio-economic and those relating to forest governance.

5.1 Environmental

The Forest Management Bureau's records indicate that about 1.7 million ha were planted over 42 years from 1960 to 2002 by different sectors. Of these, government sectors planted about two-thirds or 1.15 million ha, with non-government groups planting the rest. However, considerable planting on private land is not yet registered with the DENR. Different sectors have expressed major doubts as to how much of the recorded 1.7 million ha planted from 1960 to 2002 really exists. The information available at FMB is not supported by maps; hence most of the claimed planted areas cannot be easily located on the ground.

The reforestation rate lagged significantly behind the deforestation rate up to 1988. From 1969 to 1988, the nation's forest cover declined from 10.9 million ha to 6.46 million ha — a total reduction of 4.44 million ha over 19 years or an average annual loss of 233,684 ha. This means that the loss rate was more than five times the 41,855 ha, annual average area planted from 1969 to 1988.

However, reforestation projects and spontaneous tree growing by farmers and others have contributed to a forest cover increase of 0.7 million ha from 1988 to 2003. The relative contribution of project-based reforestation to increasing forest cover compared with spontaneous tree growing is undetermined.

FSP I sites had low survival rates three years after planting. Independent studies and field observations provide low estimates of 42 percent and below (UNAC 1992). DENR records show a range of 29-86 percent. FSP II sites may have had higher survival rates; a range of 59-93 percent was recorded by DENR. Recent

FMB records indicate an average survival rate of 71 percent for FSP I and II. Similarly, the 48 cases documented by the Upland NGO Assistance Committee recorded average 75 percent survival three years after plantations were established. While this appears to be relatively high, it does not meet the 80 percent survival rate required by the Government. Esteban (2003) suggests that past reforestation efforts had low short-term survival rates due to pests, fire, poor species selection, site matching, disregard for quality and end use, and poor silvicultural practices. However, survival statistics are not readily available for non-FSP initiatives.

Information is scant on long-term survival and growth beyond the initial establishment period. One threat to long-term survival is that much of the classified forest areas in the uplands are used for farming, and reforestation projects were commonly conducted without the farmers' participation or provision for alternative livelihoods. This was the case also with FSP I. Once projects were completed, local residents commonly cut down or burned the trees to farm or pasture the land again (Rambo and Hamilton 1990). In some cases the deliberate destruction of planted trees was also intended to prolong projects, which generated local jobs.

Pests and diseases pose another threat to long-term survival and vigorous tree growth. This threat is increased by the fact that 75 percent of the area under FSP I was planted with a single exotic species, namely, *Gmelina arborea* (Korten 1994). The species is known to be susceptible to a number of insects, parasites and fungal infections in the Philippines, especially if not mixed with other trees. While the DENR guidelines encouraged the use of multiple species, contractors were compelled to use *Gmelina arborea* and other fast-growing species because they were readily available. With the ambitious targets set by FSP I, contractors had no time to raise seedlings of other species.

Exotic species such as *Eucalyptus*, mahogany and *Gmelina arborea* have been commonly used in rehabilitation projects since the mid 1970s; this raises biodiversity and bio-invasion concerns. A recent study in the Mount Makiling Forest Reserve indicates that planted mahogany has bio-invasive characteristics that can prevent native dipterocarp seedlings surviving, and eventually reduce the area's biodiversity. More recently, however, native species are increasingly used in forest rehabilitation efforts, especially in protected areas.

In terms of environmental objectives, rehabilitation projects were meant to restore forest cover in degraded areas to promote soil and water conservation and moderate floods and droughts by absorbing much of the monsoon rains. However, the actual environmental effects have not been well evaluated. Some anecdotal evidence and field observations suggest that rehabilitating previously

Mahagony plantation. (Photo by Rose Jane J. Peras)

denuded areas has contributed to the restoration and environmental stability of selected sites. In Cebu, the Makiling Forest Reserve in Laguna, an LGU initiative in Nueva Vizcaya, and in some CBFM sites in Luzon, Visayas, and Mindanao, rehabilitation has resulted in some on-site and off-site environmental benefits such as soil and water conservation, improved micro-climate, increased soil fertility, biodiversity and aesthetic values (Pulhin 2005). Lasco and Pulhin (2006) summarize information from a few existing studies showing that tree hedgerow planting in cultivated hillsides has led to reduced soil erosion and surface runoff, and improved fertility in instances.

However, further empirical studies are required to assess the true impacts of rehabilitation projects and forest cover on soil and water conservation and flooding. Links between water and landscapes are complex. The kind of revegetation and management practices undertaken could have a beneficial or detrimental effect on a local scale, and their influence over a large basin is relatively small (FAO and CIFOR 2005).

5.2 Socio-economic

The socioeconomic impacts are both positive and negative. The different efforts have provided additional jobs for upland communities but this is mostly short-term. An assessment of selected reforestation contracts under FSP I conducted by the Upland NGO Assistance Committee revealed limited participation by

local people in decision-making (UNAC 1992). In most cases, contractors made no effort to develop a local people's organisation, and residents were involved only as hired labour. Participation has in some instances contributed to further marginalising the poor. Experiences in various areas showed that payment delays of up to three to six months resulted in the participating communities falling into debt, particularly those that were already economically disadvantaged (UNAC 1992). The relatively wealthier segment appears to have captured the economic benefits associated with reforestation projects (Pulhin 1996).

In some areas, earnings or funds saved from FSP I and II reforestation contracts and other CBFM rehabilitation efforts through cost-efficient operations have been the main source of the POs' capital accumulation, which they used to finance livelihood activities (Pulhin 1999). Generated income has likewise supported PO members to protect and maintain forests even after the end of their reforestation contracts (Tesoro 1999, Borlagdan *et al.* 2001). However, no overall statistics are available in this regard.

With forest communities being recognised as partners in forest development and management through the CBFM program, FSP II and other recent reforestation initiatives have provided tenurial security to the land the communities occupy. This is made possible through CBFM agreements that give POs the legal right

Local children on a reforestation site. (World Agroforestry Centre collection)

to develop and manage their lands and enjoy the benefits without fear of being evicted.

Frequent policy changes such as logging suspensions in response to major floods and other events have adversely affected CBFM participants, who rely on small-scale timber harvesting in the absence of alternative livelihood options. Communities who have been encouraged to take a stake in rehabilitating the country's degraded forest lands have no assured control over the resources they help develop. Also recent orders by DENR to cancel CBFM agreements in eight regions suggest that even the tenure over the land is not that secure after all (*www.denr.gov.ph/article/*).

5.3 Forest governance

Recent initiatives have facilitated various sectors' active involvement in forest rehabilitation and management. This departs from the traditional approach of "reforestation by administration", which created a long history of animosity between the Government and local communities over the former ejecting the latter to establish reforestation projects. The government has initiated a better working relationship with other sectors. This could serve as a basis for future collaborative undertakings towards sustainable forest management. However, the non-government sector's involvement has been declining in recent years due to an unstable policy environment and inadequate incentives.

Experiences gained from different reforestation projects enhanced the institutional capacity of government and non-government sectors to implement rehabilitation initiatives. Both sectors have realised that technical and social preparation are important pre-requisites for successful rehabilitation.

On the downside, the opportunities provided by rehabilitation projects, particularly FSP I, have created room for graft and corruption. While not documented, it is common knowledge that some DENR personnel in the field were involved in anomalous transactions with reforestation contractors either in approving the contract, processing the documents to facilitate fund release, or in monitoring and evaluating the projects. The Government also finds it difficult to manage the payments of the massive loans taken for large-scale rehabilitation leading to high indebtedness (Korten 1994). The loans could not be paid back through direct returns from timber production due to lack of harvesting on most sites and poor long-term survival and maintenance of many FSP I plantations. Timber harvesting is constrained by marketing problems and unstable policies such as frequent suspensions of harvesting rights following environmental and political pressures.

6. Summary

From 1910 up to the mid 1970s, the government conducted some rehabilitation projects at little cost. From the 1970s, many different actors got involved and much money was invested by the government and foreign donors in small and large projects. Most early rehabilitation efforts up to the 1980s made little difference to forest cover and did not address the underlying forest degradation causes — logging excesses and livelihood needs of upland populations. FSP I from 1987 to the early 1990s performed poorly in all aspects. Efforts from the 1990s along with spontaneous tree growing activities increased forest cover significantly, though donor projects had a high and probably unsustainable economic cost. Effects on biodiversity and local communities were mixed with more recent efforts doing better. Positive impacts on soil and water conservation were reported in areas but empirical evidence is needed to support the observations. Policy changes and funding availability largely determined the level and nature of rehabilitation. Efforts by all sectors have been declining in the last decade due to unstable policies, and inadequate funding and incentives.

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Annex 1. Summary of rehabilitation in classified forest lands[10] over time

Period Data Elements	Colonial Period (1910-1945)	Post-war government-initiated rehabilitation (1946-mid 1970s)	Multi-sectoral rehabilitation efforts (mid 1970s-present)
Number of projects	35	More than 90 projects including those established before the war	• 5503 CBFM (mostly involved in reforestation) • Around 2200 private initiatives • Undetermined number of DENR regular and special projects • NGO (no data) • LGU(no data) • OGA (no data)
Project sizes	378 ha to 2696 ha	312 to 38,074 ha	< 1 to 4000 ha
Agencies	Government (School of Forestry in Los Baños, Laguna; Bureau of Forestry)	Government (Reforestation Administration, Bureau of Forestry or Bureau of Forest Development)	DENR; private individuals/corporations (TLAs, TFs, IFMAs, SIFMAs); community/POs; OGAs, NGOs, LGUs, citizens
Major driving forces/ objectives	• Scientific inquiry (trials, studies on seed treatment and suitable species) • Environmental (reforest barren lands, address flooding and soil erosion problems, promote water conservation	• Environmental (reforest barren lands and address flood and soil erosion problems) • Timber supply due to imminent shortage	• Environmental • Imminent timber shortage (supply of industrial timber and fuelwood) • Socio-economic (provide livelihood opportunities, alleviate poverty)
Beneficiaries	Society in general (for environmental protection)	Society in general (for environmental protection), wood industries	Local communities, private sector, NGOs, LGUs and general public
General distribution	26 sites in Luzon, 6 in Visayas, and 3 in Mindanao	In 1972: 46 projects in Luzon, 31 in Visayas and 14 in Mindanao (cumulative from 1916)	All regions

[10] Exceptions include citizen's planting in private lands under P.D. 1153 from 1977 to 1987 and some registered planting on private lands up to a maximum of 72,393 ha.

Period Data Elements	Colonial Period (1910-1945)	Post-war government-initiated rehabilitation (1946-mid 1970s)	Multi-sectoral rehabilitation efforts (mid 1970s-present)
Target area /project coverage (ha)	535,000 ha	166,877 ha (1948-1960) (Orden 1960)	• 6.5 million ha – long-term target of NFP • 1.4 million ha (FSP target from 1987-2000) • Many others (examples: Philippine German Cebu Upland Project 25,517 ha; Southern Mindanao Integrated Coastal Zone Management Project 9210 ha)
Area planted (ha)	26,660 ha (1910 to 1941) (Orden 1960)	17,390 ha (1948 to 1960) (Orden 1960) 132,993 ha (1961-74) (DENR data)	1,597,472 ha (1975 to 2002) (DENR data) • DENR 920,962 ha (1975-2002 –includes FSP) • LGU/OGA 100,485 ha • NG tenurial instruments 503,632 ha (410,112 TLA; 80,766 ITP/ TF/ AFF/ IFMA; SIFMA 3347) • Other private planting 72,393 ha
Major funding sources	Government appropriations	Government appropriations, Republic Act 115 (from concessions harvesting timber)	• Loans and Grants: ADB, World Bank, OECF, JBIC, USAID, Ford, KfW/GTZ, IFAD, ITTO • Government appropriations • Private sector self funding
Total costs	P3.574 million recorded disbursements from 1916 to 1941 (Orden 1960)	P16.693 million recorded disbursements from 1947 to 1960 (Orden 1960)	• FSP I: US$283 million (ADB, OECF, GOP) • US$101 million (World Bank) • FSP II: US$139.27 m (ADB, JBIC, GOP) • The Magdungao agroforestry project: US$0.07 million (USAID, DENR) • Philippine German community forestry project, Quirino: US$8.589 million (GTZ, KfW, GOP) • ITTO CBFM: US$957,135 (ITTO, GOP) • Cordillera Highland Agricultural Resources Management Project Reforestation Component: US$4.66 million (IFAD, ADB, GOP) • Southern Mindanao Integrated Coastal Zone Management Project: US$23.11 million (JBIC, GOP) • Many others

Period Data Elements	Colonial Period (1910-1945)	Post-war government-initiated rehabilitation (1946-mid 1970s)	Multi-sectoral rehabilitation efforts (mid 1970s-present)
Planned/actual cost per ha	P134/ha actual cost	P581/ha actual cost for 1947-60	P 20,140.06, P 24,000, P 43,145 (Planned costs for FSP based on Memo Circulars 1988, 1990 and 2000 for 3-year periods of plantation establishment, protection and maintenance) Actual reforestation cost P16,423.77 per hectare for FSP from 1987-2001
Durations	Continuing	Continuing	• *Contract reforestation* (FSP I): 3 year contract period • Other DENR, OGA, LGU, PO, private sector efforts: continuing depending on fund availability (the last two with tenurial instruments after 1996) • NGO efforts – generally no clear arrangements after project ends
Tenure status	Planted areas were considered as "government land"	Planted areas were considered as "government land"	CBFMA, IFMA, SIFMA, Agroforestry Farm Lease Agreement, Tree Farm Lease Agreement, Certificate of Stewardship Contract, Forest Land Management Agreement, TLA
Methods of revegetation	Trials, small plantations	Plantations	Plantations and agroforestry are most important in terms of coverage and economic benefits to communities. Some assisted natural regeneration and enrichment planting.
Species planted	600 species in silvicultural trials; species both exotic and native (such as molave, narra, supa, para rubber, taluto, kalantas, malaruhat, teak, mahogany, ipil, lumbang, banaba, agoho, bitaog, baguilumbang, akle, tindalo, ipil-ipil and kakawate)	Combination of native and exotic species; native relatively more important *Cinchona spp.*, mahogany, *Alnus spp.*, benguet pine (*Pinus insularis*), rain tree (*Samanea saman*), talisai (*Terminalia catappa*), narra, akleng parang (*Albizia procera*), teak, almaciga (*Agathis philippinensis*), agoho, bamban (*Donax cannaeformis*)	• About 80% exotic species (mainly mahogany, *Acacia mangium*, *A. auriculiformis, Eucalyptus* and *Gmelina arborea*) • Native [narra, malapapaya (*Polyscias nodosa*) and others]

Period Data Elements	Colonial Period (1910-1945)	Post-war government-initiated rehabilitation (1946-mid 1970s)	Multi-sectoral rehabilitation efforts (mid 1970s-present)
Percent survival	15% due to war outbreak	No data available	• 29.61 to 86.76% for FSP I as of 2003 • 59 to 93.48% for FSP II as of 2003 • Average 71% for FSP (FMB records)
Strategies and socio-economic incentives	• Hired labour to reforest • Squatters evicted from area	• Hired labour to reforest • Occupants evicted from area	• Local communities seen as partners in forest development and protection • Provision of tenure instruments starting in the early 1980s • Provision of enhanced livelihood options • Harvest-sharing arrangements
Success/ sustainability	• Plantations destroyed by war • Inadequate funding contributed to limited accomplishments	Inadequate funding, technical inefficiencies and graft and corruption affected the government-managed projects	• FSP I: Some communities burn forest plantations and reclaim their former agricultural lands. Limited species choice - exotic monocultures, pests & diseases, bio-invasion. Family approach most successful. • FSP II: Provision of tenure rights & livelihood options, participatory approaches, devolution of forest rehabilitation and management rights to local communities contributes to success in some CBFM cases. Limited participation in others. Logging bans have negative impacts. • Involvement of corporate, private individual, NGO, OGA and LGU sectors in rehabilitation with some promising innovative experiences. Private sector initiatives are declining due to lack of incentives and unstable policies. • Graft and corruption mar efforts. Difficult to pay back FSP loans. Frequent policy changes hamper timber harvesting.

Chapter III
Outcomes and sustainability: Lessons from the ground

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1. Introduction

The Philippines has had a large number of initiatives to rehabilitate[1] its degraded forest lands[2] over the last century (see Chapter II). These initiatives have evolved in response to changing socio-economic, environmental and political realities; and have varied in scale, objectives, actors involved, funding sources and institutional arrangements. However, the outcomes and long-term sustainability of the efforts have rarely been evaluated.

Since 1960, formal projects and private initiatives combined have supposedly rehabilitated more than 1.7 million ha, but little is known about their status (Esteban 2003, Chapter II). Some claim huge failures with nothing much to show on the ground (Esteban 2003) while others indicate some success with increased forest cover in Cebu and elsewhere (Kummer *et al.* 1994, FMB 2004, Durst *et al.* 2005). Information is scarce on the impacts on biodiversity and watershed functions. Impacts on livelihoods appear varied (Borlagdan *et al.* 2001, Chapter

[1] See Chapter I for details on rehabilitation terminology.
[2] Degraded forest lands refer to official forest lands in a non-forested state, with brush or grass cover, or under extensive cultivation.

II). Timber from rehabilitated areas contributes little to meeting national needs (Acosta 2002, FMB-FAO 2003).

A field assessment of past initiatives is needed to understand project or site-level outcomes and influencing factors, and to draw lessons to guide future efforts. This chapter presents the results of an assessment of 46 forest rehabilitation initiatives, along with a more detailed appraisal of a subset of 13 cases. The initiatives sampled cover six key implementer groups in three selected regions of the Philippines. The study's specific objective was to increase the chances of success of future rehabilitation initiatives by identifying the approaches and incentives that have contributed to longer-term sustainability and positive outcomes for different stakeholders.

The assessment of success and failure is largely based on the observations of the people implementing the initiatives, but this was "triangulated" with information from project documents and evaluation studies from independent groups where available, as well as focus group discussions with communities in 10 cases. Where available, information from the three sources tended to be similar with regard to how much planting was achieved and whether the rehabilitated area was maintained over time. We have also noted and assessed any differences in opinion when they occurred. Rather than talking about absolute unqualified success or failure, this study looks across project types, breaks down the different outcomes and explores objectively the different factors that contributed to them.

The next section of this chapter discusses the methods used. Then we describe the general characteristics and funding of the initiatives, assess the outcomes and explanatory factors, and finally present the lessons learnt from the analysis. Outcomes and lessons are discussed in relation to physical accomplishments and long-term maintenance; environmental, socio-economic, production, marketing and financial aspects; and performance across multiple criteria and regions.

2. Methods

Three regions — Region III (Central Luzon), Region VII (Central Visayas) and Region XI (Davao) — were selected to represent the three larger areas in the Philippines (Luzon, Visayas, Mindanao) with different underlying biophysical, socio-economic and institutional conditions (Figure 1). Chapter IV discusses the characteristics of these regions. The selection criteria included:

a) A large number of rehabilitation initiatives in the area.
b) Many different approaches used.
c) Different degradation and rehabilitation histories.

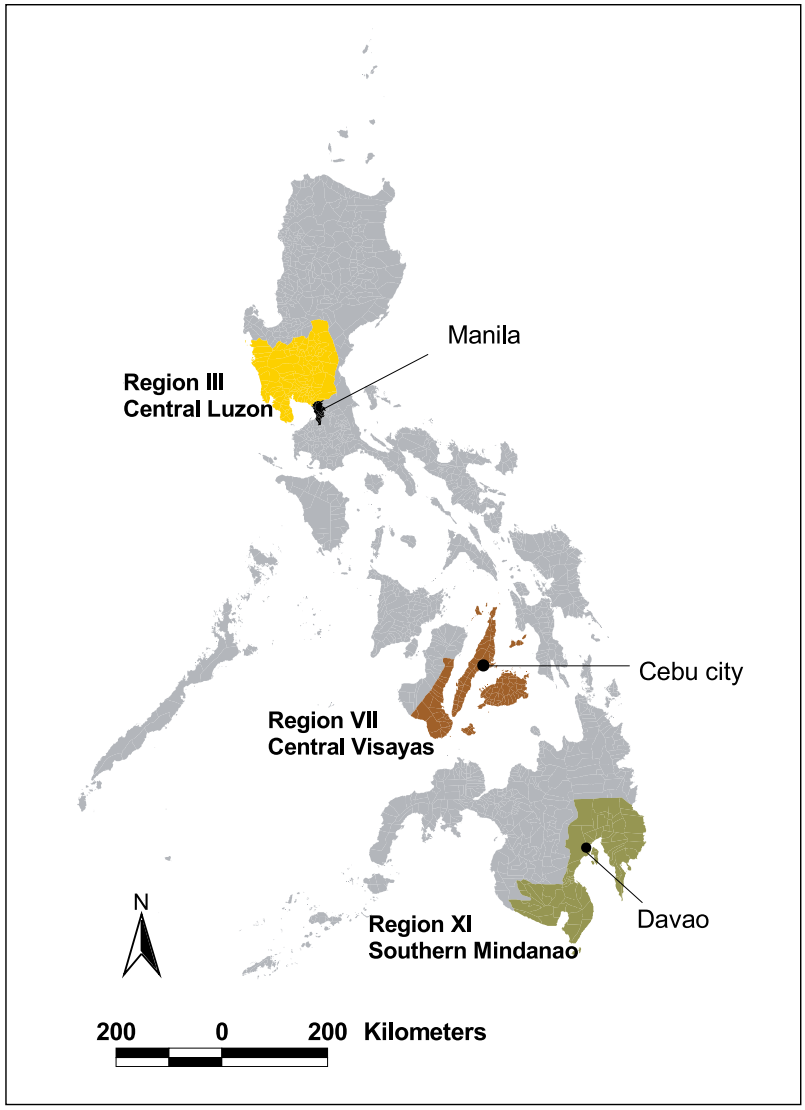

Figure 1. The three regional study areas (Regions III, VII and XI)
Data source: Center for International Earth Science Information Network

Discussions with experts indicated that the type of agency implementing the rehabilitation initiative had a large influence on the approaches adopted and the outcomes, and would serve as a useful criterion for analysis. Six main implementers were identified: Department of Environment and Natural Resources (DENR), other government agencies (OGA), local government units (LGU), non-governmental organisations (NGO), people's organisations (PO) or communities, and the private sector. A stratified sample of 46 project sites was chosen to represent the six main implementers across the three selected regions (Table 1). No project lists were readily available in any region and so selection was based on

local knowledge from the regional workshop participants and DENR staff. The sampling resulted in a roughly equivalent number of projects for each type of implementer (6-10) and each region (13-17), allowing for patterns among groups to be compared. Projects here refer to individual project sites or subproject sites for larger national projects. An example is the Balog-Balog watershed subproject site within the larger national Forestry Sector Project Loan II (FSP II).

Table 1. Distribution of 46 sample projects and subset of 13 case studies across six implementer categories and three regions

Project Implementer	Region III		Region VII		Region XI		Total	
	samples	cases	samples	cases	samples	cases	samples	cases
DENR	3	1	1	1	2		6	2
LGU	3		3	1	2	1	8	2
NGO	1		3	1	3	1	7	2
OGA	3	1	2	1	2		7	2
PO	2	1	5		3	1	10	2
Private	1		3	1	4	2	8	3
Total	**13**	**3**	**17**	**5**	**16**	**5**	**46**	**13**

The sample (see Annex 1 for project list) is well representative of the broader profile of projects undertaken in the Philippines over the years (see Chapter II). It includes:

- Early DENR projects that were the only ongoing efforts before the 1980s.
- Forestry Sector Loan I *contract reforestation* projects (FSP I) implemented by various sectors.
- Recent FSP II community-based forest management (CBFM) projects.
- Other earlier community-oriented projects.
- Independent efforts by LGUs, OGAs and NGOs from the 1980s to present.
- Private sector efforts from the 1980s and 1990s.

Hereafter, individual projects are referred to by their abbreviated names as in Annex 1.

Many agencies were involved in implementing each project but the project was categorised according to the local actor who played the main role. The only exception was the "Family contract" project, where DENR contracted families to rehabilitate; this should have been in a separate "family or household" category, but was classified as DENR. One project, SRMPC, in which the private sector did the initial rehabilitation and then handed over the area to the community for long term management and use, was classified as private.

A questionnaire, database 1, was developed and used to obtain information on the general characteristics of the 46 projects, the site conditions, the implementation process and results. Data were obtained through project documents available in 26 sites, and interviews with the managers or agency heads implementing or most familiar with the projects in all but two instances. In these last two (Balog and Boljoon), DENR staff were interviewed on PO projects because they were earlier classified as DENR projects. In some projects, a DENR staff member was also present at the interviews and provided information. In six projects, group interviews were conducted. Data were gathered on technical, socio-economic, financial and institutional parameters.

For each of the six implementer categories we selected a couple of projects as case studies (Table 1) and used a second questionnaire, database 2, to obtain detailed information on long-term sustainability and production, livelihood and environmental outcomes. Data were gathered through interviews or focus group discussions with implementing agencies and local communities (see Annex 2 for details). The implementing agencies organised the focus group discussions and issued open invitations to the stakeholder groups on the sites. Differences in opinions or perspectives from different stakeholder groups were noted and separated out in the databases. In two cases, Osmeña and Ihan, only 1-2 representatives of the implementers participated in the focus group discussions and thus only community perspectives were available. In the three private sector cases — IFMA 205, Davao ESP and Alsons — only project staff perspectives were available due to an ongoing insurgency or absence of communities in the immediate area. In the two PO cases, Elcadefe and SRMCI, the communities were the implementers. Besides the 13 case studies, specific information on production, livelihood and environmental service outcomes were also available for 16 other projects with evaluation documents: 10 foreign-assisted, three private sector and three DENR projects.

Evaluation and comparative analyses of the data were conducted using mainly simple descriptive statistics, frequency tables and graphs to look for patterns within and across project types and regions, and differences in opinion among stakeholders. Links between the different outcomes and potential contributing factors (such as project activities, site conditions and policies) were explored. Cross tabulations between nominal variables using Chi-square ($p<0.05$) and adjusted standardised residuals were used to identify and test how the nominal variables related to socio-economic and institutional aspects contributed to plantations being maintained in the long term. Mann-Whitney tests were used to identify how the ordinal variables related to production and marketing, financial and management aspects contributed.

Further nonlinear principal components analysis (NLPCA) was used to a) characterise the sample projects according to multiple variables related to physical accomplishments; socio-economic, production and marketing, institutional, financial and management aspects; b) explore relations between projects; and c) identify project groups with similar characteristics. NLPCA allows categorical variables (in nominal or ordinal scale) to be used and can deal with mixtures of variables (Kramer 1991, Kroonenberg *et al.* 1997). The technique reduces the original set of variables into a smaller set of unrelated components or dimensions that represent most of the information and allow the relationships between objects to be effectively interpreted. It uncovers both linear and nonlinear correlations between variables. The analysis used the statistical software SPSS v. 9.0 (SPSS Inc. 1999).

An ordinal variable indicating timber production and marketing prospects and outcomes (PMPO) was devised for use in the multivariate analyses through a simple scoring system as depicted below.

PMPO = Marketing strategy + Market prospects + Harvesting experience; where
Marketing strategy = 1(exists), 2 (none).
Market prospects = 1 (good), 2 (unclear), 3 (poor), 4 (no information).
Harvesting experience = 1 (yes), 2 (young plantation), 3 (trees mature but not harvested).

3. General project characteristics

Many actors were involved in implementing rehabilitation projects on public forest lands in the Philippines: the DENR, OGAs, LGUs, NGOs, communities, private companies, private individual investors and farmer households. Multiple actors implemented single projects (45 percent of the sample). NGOs were involved in supporting most PO projects. LGUs were involved in some DENR, NGO, OGA and PO projects. The DENR was directly or indirectly involved in all projects since it is the primary government agency responsible for managing and administering public forest lands.

Communities or resident farmers were directly involved in decision-making and implementing 37-48 percent of the projects (Table 2). We assessed local community participation in four aspects: a) site selection; b) decisions on rehabilitation methods; c) division of rights, responsibilities and authority; and d) benefit and cost sharing arrangements. Most DENR and private sector projects were not participatory, particularly in benefit and cost-sharing decisions. The most participatory projects were eight PO (excluding PISFFAI and Boljoon), four LGU (CBRMP, CBTF, PNPL, Small Watershed), three NGO (San Agustin, Banika, Ihan) and two OGA projects (PNOC, UDP).

Table 2. Number of projects with medium to high local community participation in decision-making on a) site selection; b) methods; c) division of rights, responsibilities and authority; and d) division of costs and benefits

Project implementer categories	Medium to high participation of local people				Total no. of projects
	In site selection	In methods	In division of rights, authority & responsibilities	In division of benefits & costs	
DENR	1	2	2	-	6
LGU	4	4	3	4	8
NGO	3	3	4	3	7
OGA	3	3	3	2	7
PO	7	9	10	8	10
Private	2	-	-	-	8
Total	**44%**	**46%**	**48%**	**37%**	**46**

Local participation was collapsed into a single nominal variable for statistical analyses indicating good participation in all aspects or including benefit-sharing (13), the other aspects (10) and no aspect (17). This was because projects with medium-high local participation in all aspects or including benefit-sharing tended to have high physical accomplishments and maintain their plantations in the long-term, while the projects with no participation in any aspect did poorly. Projects were too few to asses the effects of participation in only site selection, rights and/or methods.

Projects had multiple objectives, up to about 14 each, including environmental to socio-economic and institutional aspects. Increasing forest cover and soil and water management were the dominant objectives across sectors and regions (Table 3). Agroforestry and local livelihoods were most common in PO projects and in Region VII, the latter having a high population density on forest land, coupled with high poverty levels and dependence on forest products (see Chapter IV). Mainly the PO, private sector and half the DENR projects had timber production objectives. Fuelwood and non-timber forest products (NTFPs) were more important in Regions III and VII than in Region XI where wood and NTFPs were still plentiful. Most PO projects had many objectives.

Five main types of institutional arrangements were detected in the sample projects (Table 4) at the time the rehabilitation activities were implemented. Most DENR and OGA projects were pure government efforts with little participation of local stakeholders. Most PO projects were based on CBFM agreements with DENR. CBFM agreements included "community organising" contracts between DENR and other assisting organisations setting out roles, responsibilities and benefit-sharing. Private sector projects were based on industrial and socialised industrial forest management agreements (IFMA and SIFMA) with the DENR,

Table 3. Sample project objectives

No.	Objectives	% of sampled projects
1	Increase forest cover, regreen bare land, set up plantations	80
2	Watershed management, soil and water conservation	80
3	Provide employment/livelihood and/or increase local income	65
4	Timber production (pole/pulp/sawn/plywood)	41
5	Biodiversity conservation	41
6	Agroforestry	39
7	Community empowerment (capacity building, leadership quality, organisation formation & strengthening)	35
8	Environmental awareness enhancement	26
9	Fuelwood	22
10	NTFPs (rattan, bamboo, etc.)	20
11	Gender equality	20
12	Tenure security	20
13	Integrated production system (aquaculture, agroforestry, livestock)	13
14	Fire control	11
15	Carbon sequestration	11
16	Agricultural assistance	4
17	Nursery and pilot plantation	2
18	Showcase	2
19	Research	2
20	Solid waste management	2
21	Charcoal production	2
22	Protect remaining forest from further degradation	2
23	Improve micro-climate	2
24	Minimise insurgency problem	2
25	Technology transfer	2

whereby the private sector leased the land for commercial forestry and submitted detailed plans for development and use through the lease period. There were six "contract reforestation" projects under FSP I where DENR contracted different parties to reforest an area for a fee and turn it over to DENR after three years. There were eight projects where LGUs, NGOs or OGAs developed independent contracts with resident communities or farmers to rehabilitate an area and share responsibilities and/or profits over the long term. Assistance was provided and, in some instances where timber harvesting was not allowed, farmers or communities could get only non-timber benefits. Different tenure agreements are described in Annex 3.

Most projects (89%) were targeted at benefiting local communities, POs, cooperative members or local farmers, while 37 percent of the projects were also designed to provide environmental benefits to the general public. A single

Table 4. Types of institutional arrangements on sample projects during active implementation period

No.	Institutional arrangements (formal & informal)	Project implementer groups						Total
		DENR	LGU	NGO	OGA	PO	Private	
1	*Pure Government or NGO effort* (may have some informal arrangements with local communities)	5	1	3	5			14
2	*Contracts between DENR and IFMA or SIFMA holders*. Could include informal arrangements with LGUs and communities in area						7	7
3	*CBFM agreements between DENR & POs*. Could have informal arrangements with LGU in area					8		8
4	*Contract reforestation under FSP I*	1	2	1		1	1*	6
5	Farmer-assisted projects		4	2	2			8
6	*Government takes over the claimed cultivated areas* and pays the claimants for rehabilitation activities on those lands for three years		1					1
7	Integrated Social Forestry (Certificate of stewardship Contract - CSC)					1**		1
8	*PO leases land from farmer and shares profits* from products generated in defined ratio			1				1
	Total	**6**	**8**	**7**	**7**	**10**	**8**	**46**

* Then changed to Forest Land Management Agreement (FLMA) and finally a CBFM agreement
** Then changed to *contract reforestation* and finally a CBFM agreement

project could have more than one targeted beneficiary and multiple benefits. DENR projects mainly focused on providing jobs — that is hiring local people to establish plantations (Table 5). Most NGO and LGU projects that aimed to benefit communities sought to provide jobs as well as livelihood schemes[3] and benefits through agroforestry, livestock, diverse crops and fuelwood. In one LGU project, claimants were allowed to intercrop but had to leave the area when the project ended after three years. OGA projects mostly planned to provide employment except for PNOC, WMECP, and UDP which planned to include fuelwood, agroforestry and NTFP production, and/or livelihood schemes.

[3] 'Livelihood schemes' refers to income-generating activities or projects for communities such as rattan gathering and processing, food processing, livestock raising, and setting up convenience stores. Sometimes farming and growing fruit trees are also considered livelihood activities.

Table 5. Incentives offered by the sample projects to the local communities or farmers
Note: A single project could offer multiple benefits

Incentives to local communities/ farmers	Project Implementer Categories						Total
Direct payments for planting + other incentives below	2	4	2	3	10	4	25
Only direct payments for planting or area development to local people	4	2	1	3		3	13
Other incentives only, no payments for planting		2	2	1			5
No direct incentives			2			1	3
Total no. of projects	**6**	**8**	**7**	**7**	**10**	**8**	**46**
Incentives other than payments for planting							
Fruit and/or NTFP production*	1	6	3	4	10		24
Livelihood schemes		1	3	2	9		15
Timber production*		1	1		9	1	12
Fuelwood production*		1	2	2	5		10
Financial assistance & credit facilities		2			3		5
Seedlings and other inputs to farmers		1	2	1		2	5
Profit-sharing with local people		1	1	1		1	4
Environmental payments to farmers		1		1			2
Agricultural projects for employees' income						1	1
Future ecotourism benefits		1			1		2

* Products to be harvested directly by local people.

An LGU (CBTF) and an OGA project (WMECP) paid farmers for not burning the area. However the payments were only made during the project period and did not compensate for long-term opportunity costs. All PO projects except for PISFFAI aimed for a true mix of benefits including agroforestry, timber production, employment, livelihood schemes and fuelwood. Private sector projects primarily aimed to provide returns to the private individual or company investors, but half also sought to benefit communities, mainly through jobs. Davao ESP planned to share 10 percent of its profits with the community. Many projects across sectors allowed intercropping during the first few years.

Target areas varied widely, from one ha to 23,444 ha per project or subproject site. Fifty nine percent of the project sites were < 500 ha, with 33 percent < 100 ha. Only three projects or six percent had a target area of > 4000 ha. Projects or subprojects funded by DENR or foreign loans tended to have larger target areas (61 percent of the 23 projects > 500 ha), compared with projects funded by foreign grants, private sector, LGUs or OGAs (25% > 500 ha).

Most sampled sites were < 1000 m elevation, had rolling to moderately-steep to steep slopes with clay loam to sandy loam soils. They were mostly on public forest land, with five projects having a little "alienable and disposable land"[4]. Within public forest land, most projects were on timberland[5] (74%) while 17 percent were on forest reservations designated for specific purposes (mostly watershed). Five project sites included some protected area. OGA projects were mostly on forest reservations and protected areas, while the other projects were mainly on timberland.

Intensive logging (56 percent of the sites), *kaingin* or slash-and-burn cultivation (56%), fire (52%), fuelwood extraction (41%), grazing (32%) and drought (14%) were the main factors that led to the degradation of the 46 sites to be rehabilitated. The sites had been degraded for < 20 years in 19 projects and > 20 years in 19 other projects. Most project sites (71%) were dominated by open grass, shrub or barren cover (Figure 2). Planted trees, agricultural crops and natural forest formed < 50% cover in 11, 19 and 18 sites respectively. Four sites had significant areas (> 75% land cover) under cultivation by local communities.

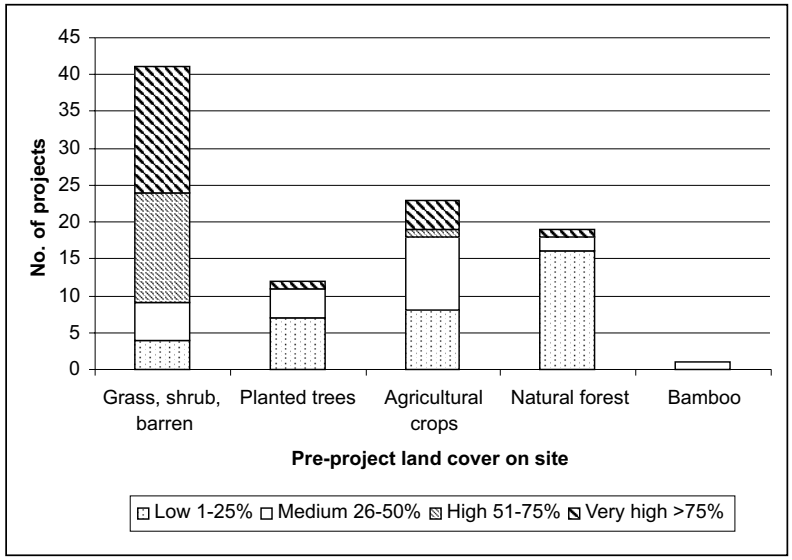

Figure 2. Pre-project land cover on 45 sample project sites with information

[4] Alienable and disposable lands refer to lands that have been officially classified as not needed for forest purposes. They are open for conversion to alternative use.
[5] Timberland refers to public forest lands zoned for timber production.

Fire use in the KALIWA watershed project site. (Environmental Forestry Programme, CFNR, UPLB)

4. Funding for rehabilitation and long-term management

Most DENR, OGA and private sector projects were self-funded while NGO projects were largely funded through foreign grants (Table 6). Various sources funded LGU projects. PO projects in the sample relied mainly on two large FSP II loans from the Asian Development Bank (ADB) and the Japanese Bank for International Cooperation (JBIC) in the mid-1990s to 2003 with DENR providing counterpart funding. In addition, seven ADB-loan funded FSP I project sites were distributed across the implementer categories. Foreign-assisted projects tended to be of short, fixed duration of ≤ 10 years.

Table 6. Funding sources for sample projects

Project Implementer categories	Funding sources									Total no. of projects sampled
	DENR	LGU	NGO	OGA	Comm-unity	Private	Foreign grant	Foreign Loan	PMS*	
DENR	5		1				2	1		6
LGU	3	4					2	3	1	8
NGO	1		2	1	3		5	1		7
OGA	2			6			1	1		7
PO	10							9		10
Private						6		2		8

* Presidential Management Staff

Note: A single project could have been funded by multiple agencies.

Costs per ha rehabilitated were available for 37 projects and actual cost incurred was considered in most samples. Striking differences in cost/ha were visible when analysed across funding sources. Pure government-funded (by DENR, LGU and OGA) projects tended to be ≤ P10,000[6]/ha. FSP loan projects cost more, with the majority falling between P5000 and P30,000/ha. Projects funded through foreign grants and a World Bank loan were much higher at > P30,000/ha. Most private sector projects cost ≥ P20,000/ha. In general, DENR-funded projects tended to rehabilitate large areas at low cost/ha, while foreign loans helped plant large areas at higher cost/ha (Figure 3). LGU/OGA funding helped rehabilitate small areas at low cost/ha while foreign grants and private funding tended to plant limited areas at high costs/ha.

	Low cost/ha	**High cost/ha**
Small target area	LGU/OGA funding	Foreign grants Private sector funding
Large target area	DENR funding	Foreign loans

Figure 3. Comparison of cost/ha versus target area for projects funded through different sources

Budget constraints limited spending on government projects but it may also be that the costs were underestimated and did not include items such as staffing and overheads. Costs in foreign-assisted projects included community organising and other activities that helped sustain the rehabilitation efforts in the long term. These activities are not usually a part of regular government projects. Besides, costs incurred at different times are not fully comparable, since they reflect the value at the time incurred, and not the present value. Therefore, the costing analysis above serves only as a rough indicator.

Many projects (19) depended purely on forthcoming government allocations, grants or loans (including establishing links with different agencies and training to seek funding) to manage the rehabilitated areas in the long term. These included all DENR projects, roughly half the LGU, OGA and NGO projects, and three of the 10 PO projects. Fourteen projects planned reinvestment using returns from timber harvests, alcogas production[7] (Dendro project), and various livelihood

[6] Conversion rate roughly 50 Philippine Pesos for one US Dollar.

[7] Ambitious alcogas production program by the Marcos government, where all state colleges and universities were given timber production projects with timber to be subsequently purchased for alcogas production as an alternate motor fuel (Armas and Cryde 1984). The 1986 revolution toppled Marcos and the program ended.

schemes. These included the private sector and a small proportion of the LGU and PO projects. Five PO projects and one LGU project would attempt a combination of the above two strategies. Five OGA/LGU/NGO projects expected the farmers to adopt and manage the reforestation efforts themselves. One OGA project by the National Power Corporation planned for a percentage of the monthly electric bills to be paid into an environmental fund to be used for reforestation.

5. Project outcomes and explanatory factors

5.1 Physical accomplishments and long-term maintenance

Most projects managed to plant the target area (37 projects planted ≥ 70 percent of the target area) (Figure 4). However, only 28 projects had high average initial survival (≥ 80 %) of species planted. Species-site matching was the main technical problem leading to poor short-term survival and/or growth on 11 sites. Species such as *Gmelina* (*Gmelina arborea*), narra (*Pterocarpus indicus*), mahogany (*Swietenia macrophylla*), teak (*Tectona grandis*) and mango (*Mangifera indica*) in particular succumbed or their growth was affected by cold, drought, poor soils or strong winds. Other reasons for low initial survival included fires on three sites, no maintenance on two sites, and handling and transport damage and farmer disturbance on two sites.

Pests and diseases were not a serious problem on most project sites, thanks to the numerous species planted per site. Few artificial control measures were taken. For the record, 16 types of pests and diseases were noted on 29 projects, the main ones being stem and leaf borers, rats, and psyllids. Psyllids affected the ipil-ipil (*Leucaena leucocephala*) monoculture plantations.

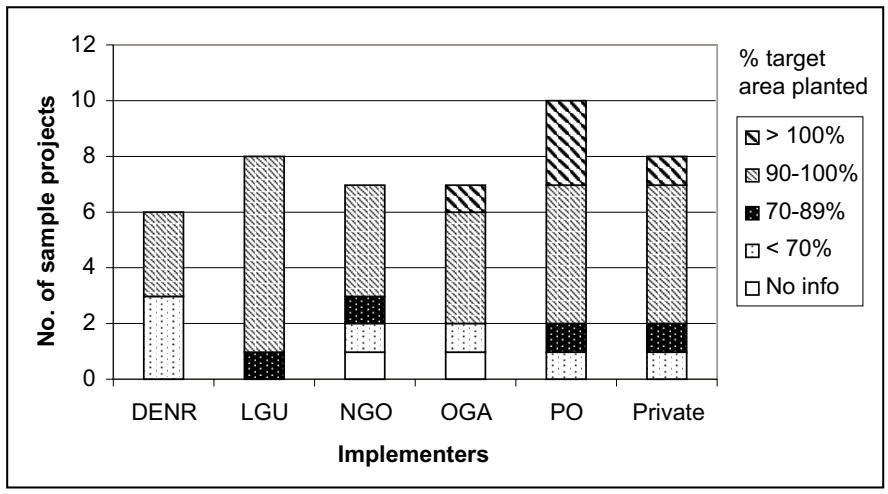

Figure 4. Percent of target area planted by sample projects

In the long-term, 28 projects still retained most of the area rehabilitated while in 12 projects the areas rehabilitated were fully or partially degraded or destroyed. In six projects that were recently initiated it was too early to judge. The 28 projects that retained the area rehabilitated had in common significantly reduced human pressures (24 sites) and continued maintenance and protection (27 sites, although limited by funding on three sites). Human pressures were reduced through protection and/or ensuring local community benefits and stake in the projects. The main patrol and protection measures included foot patrols, firebreaks, forest protection committees, and watchtowers or checkpoints. Maintenance and protection was continued because funding was available and/or managers had long-term plans and direct stake in the projects.

The 12 projects[8] that eventually lost much or all of their plantations included three DENR, three LGU, three OGA, one NGO and two private sector projects. They seem to have failed from just about every perspective — socio-economic, financial, management and production — as indicated below.

- High demand for wood, fuelwood, grazing and *kaingin* continued with associated fires. Six projects had no protection measures except for firebreaks. Eight projects had short-term or unstable funding and were terminated with little or no continued maintenance and protection after their funding ended. One LGU project had low government support and monitoring and was affected by fire. One OGA project could not harvest timber as per plan due to contradictory policies. Two companies in Region XI were affected by insurgency or poor community relations, as well as high operational costs and low market prices not allowing for cost recovery. Six projects had unresolved conflicts over land tenure, encroachment, illegal use, or rebel activity even during the project period.
- Four projects had no information on income changes while the remaining eight provided only short-term employment with no long-term income or other benefits to local communities. Eleven projects had limited to no local participation in decision-making on site selection, methods, rights and responsibilities, cost and benefit-sharing. Six of these were pure government (DENR, LGU and OGA) or NGO efforts and two were private IFMA agreements on public lands with local claims, yet no formal involvement of the communities or claimants on the ground. Two were *contract reforestation* projects under FSP loan I with no planned long-term benefits for local people.

Cross tabulations between nominal variables (See Table 7 for variable categories and codes) using chi-square ($p< 0.05$) and adjusted standardised residuals to test and identify the relations suggest that long-term maintenance of plantations is

[8] Family contract, DVSO, Pasian, CBCR, LGU contract, MTP, Kalinan, Dendro, Pantabangan, WMECP, Alsons and Davao ESP.

positively related to: low degrading pressures[9], CBFM arrangements, high local participation or PO implementation, provision for timber and non-timber benefits and livelihood schemes to communities, positive livelihood outcomes, and no unresolved conflicts. Long-term maintenance was negatively related to unresolved conflicts, poor local participation, providing only short-term employment to local communities, and high degrading pressures. It did not have a strong relationship with tenure security, funding source or implementers other than POs. Mann-Whitney tests showed the three ordinal variables of timber production/marketing prospects and outcomes, long-term management plan, and financial viability were all positively related ($p< 0.05$) to long-term plantation maintenance.

Table 7. Variables included in statistical analysis and categories in each

Variables	Categories & Codes
1. Average % survival in the short term	<60, >60
2. Plantations maintained in the long term	Yes/No – **ply/pln**
3. Degrading pressures	Low/High – **DL/DH**
4. Funding source	**DENR, FG** – foreign grant, **FL** – foreign loan, **LGU, OGA**, **Pvt** – private
5. Institutional arrangements	**FR** – Assistance/contracts with farmers or communities to plant and benefit long-term **CBF** – CBFM & CSC **CR** – *Contract reforestation* **IF** – IFMA & SIFMA **Gov** – Pure government/NGO effort
6. Planned socio-economic incentives (8 categories)	**E** – Employment only **Nt** – Non-timber products only **NtL** – Non-timber & livelihood schemes **P** – Profit sharing **PLNt** – Profit-sharing, livelihood & non-timber **T** – Timber **TLNt** – Timber, livelihood, non-timber **None**
7. Local participation	Good, Some, Low to none – **PG, PS, PL**
8. Land tenure security	Good, Moderate, Poor – **TG, TM, TP**
9. Livelihood outcomes	Good, Poor, Not Applicable – **LG, LP, LNA**
10. Unresolved conflicts	Present/Absent – **UC/NC**
11. Timber production/marketing prospects & outcomes (PMPO)	Scores from 3-10, 3 best. **T3-T10**
12. Financial viability	Scores from 1-9, 9 best. **F1-F9**
13. Long-term management plan	Scores from 1-9, 9 best. **M1-M9**

[9] Degrading pressures refers to human pressures such as excessive logging and fire use that lead to removal or degradation of forest cover.

Considering all physical accomplishments including target area planted, short-term survival and area maintained long-term, PO, private and NGO projects appeared to be doing better than the government projects. Poor performance of government projects can be largely attributed to low community involvement leading to fire and other disturbances and/or insufficient ad hoc financial support, which constrains planting and continued maintenance.

The individual projects assessed in this study generally met their planting targets, but Esteban (2003) indicates that the country's ambitious overall planting targets were not achieved. National plantings fell short overall between 1960 and 1987, were < 50 percent of the national targets under the Master Plan for Forestry Development from 1990-2000, and 75 percent short of the 2001 target. The government set a target of over 500,000 ha for private sector planting from 1991 to 2015, but so far there are few industrial tree plantations.

Esteban (2003) states that information on survival, age classes, growth and yield for the nation's reforestation efforts is limited. Not much is known about the status of the 1.5 million ha said to be reforested by 1995. Performance has largely been measured in terms of target accomplishment and seedling survival; and not on plantation quality, growth and yield and community organising. Chapter II based on a literature review refers to low survival (< required 80%) and major pest and disease problems because of fire, poor species selection, site matching, large areas planted to single species, disregard for quality and poor silvicultural practices.

We found such survival and growth problems in 11 of 39 sites studied, although pests did not appear to be a major issue and most sites had actually planted multiple species. We found that 12 of 46 sites eventually lost much or all of their plantations, but 28 sites still retained most of the rehabilitated area although future sustainability is uncertain on many of them. Esteban (2003) suggests that *contract reforestation* under FSP I was largely a failure with nothing much to show on the ground eventually. This study's data on specific *contract reforestation* project sites supports that conclusion.

Average short-term survival rates reported in the literature for FSP I sites (64-68%), FSP II (average 71% and a high of 93%) and the Pantabangan area (78% in second year) match those found on our FSP I, FSP II and Pantabangan sample sites (DENR and JICA 1987, Baggayan 1996, Chapter II on DENR records for FSP).

5.2 Environmental outcomes

5.2.1 Water and soil parameters

Most projects analysed (38/46) had explicit water and/or soil improvement objectives. Of these, 26 had information on soil and water outcomes. Twelve case studies had detailed information and many FSP II CBFM project final reports included some evaluation based on casual observation. Most projects (33/46) included water and soil conservation measures. Cover cropping (64%), hedgerows (36%), mulching (30%), rock wall (24%), contour planting (18%) and terracing (15%) were the key measures adopted.

Respondents or documents indicated that most projects had neutral to positive effects on soil properties, soil erosion, water quantity, dry season flows, peak flood levels, water quality, landslide frequency or overall soil and water conservation (Figure 5). Four case studies provided information suggesting that water levels increased or become more stable and the sites were now able to supply water to far-off *barangays*[10]. Three case studies referred to observed changes in sedimentation. Responses varied between project staff and local communities in five of the six case studies where both groups were surveyed. Also responses often varied among different community members or project staff when interviewed separately, so consensus in the focus group discussions are considered to be the main responses from each group.

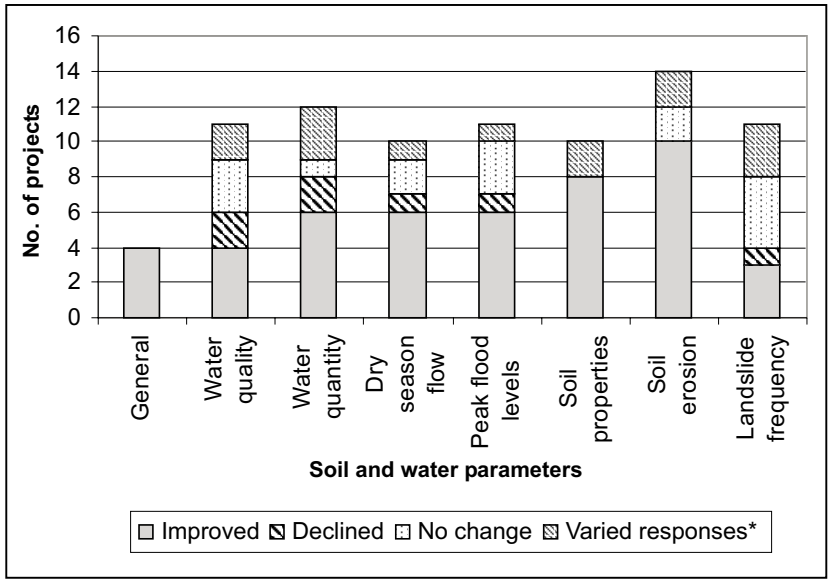

Figure 5. Water and soil property outcomes on sample projects from pre-project to present time

* Varied responses between project managers and local communities as expressed in focus group discussions.

[10] Barangay – the smallest political unit in the Philippines and often corresponds to a village or town district.

Most improvements in water or soil parameters were attributed to tree planting itself, though hedgerows and contour farming were also mentioned (mainly in PO projects), along with strict protection of rehabilitated areas. Declines in services were attributed to *kaingin* cultivation, fire use, illegal wood harvesting (WMECP and SRMCI projects), population increase and climate change.

However, the information on water/soil outcomes is debatable because none of the projects had specific technical evaluations of their impacts on water and soil properties. Information was based largely on manager, community or evaluator's perceptions and responses often differed both between project staff and local communities and within each group.

- In the Family contract project, the communities believed water quality and quantity improved in the short and long term. However, the DENR staff believed the improvement was only short-term. Water levels in the dam did not actually increase but appeared to do so simply because the dam was silting up. Communities also believed there was less soil erosion and landslide frequency whereas DENR staff claimed there was no change.
- In the PNOC project, the communities believed landslides had become less frequent over the long-term whereas the project manager believed the opposite.
- In the Piwardep project, contractors said water quality and soil properties did not change but project managers said soil properties improved and sedimentation was reduced.
- In the San Agustin project, the managers said water quantity, dry season flow, peak flood levels, soil properties, soil erosion and landslide frequency had worsened or not changed, while local communities said they had improved.
- In the Small Watershed project, communities believed there was more water while project managers did not.

Such widespread perceptions of links between forests and water, without much scientific evidence, has been a key driver of Filipino forestry policies, with environmental advocates pressuring the Government to impose nationwide logging bans after major floods. Following the flash floods in Aurora and Quezon provinces in December 2004, the Government imposed a nationwide logging ban on all public forest lands, with no differentiation between protection and production areas, including those with CBFM, IFMA, SIFMA, FLMA and other tenure agreements. A study by the Forestry Development Centre of the University of Philippines at Los Baños (FDC 2005) suggests that the flooding damage had little to do with logging and more to do with the area's geology and the extremely heavy rains, which exceeded the land's absorption capacity. Whole trees with roots were washed down by these floods.

Links between landscapes and water are complex and all downstream water problems cannot be attributed simplistically to upstream logging (van Noordwijk 2006). FAO and CIFOR (2005) report that forests can affect peak river flows and floods on a small-scale, but their effects on major flood and landslide events over a large basin are relatively small. Even in local areas, outcomes are also influenced by the kind of landscape, rainfall, geology and topography in addition to forest cover and management.

The automatic policy response for major flooding and landslide problems in the Philippines has been spending lots of money on reforestation (Walpole 2006), with little consideration of whether it could actually solve the problem, how it should be designed to do so and how to sustain the effort in the long-term. As indicated above, communities and managers tend to believe tree planting in itself can help improve all soil and water parameters. However, Sidle *et al.*'s (2006) review for Southeast Asia suggests that revegetation and management practices could either exacerbate or reduce vulnerability to surface soil erosion and shallow landslides, depending on the type of activities involved. Plantation monocultures with little ground cover and litter could have high surface runoff and soil erosion.

Since December 2005, government and public perceptions of the link between forests and floods/landslides appears to have shifted slightly, coinciding with the widespread dissemination of the report on forests and floods by FAO and CIFOR (2005). Heavy flooding in Mindoro in December 2005 and a massive landslide in Leyte in March 2006 were not immediately blamed on logging and deforestation for the most part, but attributed to unstable geology and very heavy rainfall. A more cautious approach has been adopted with geologists being assigned to check these and other vulnerable areas.

5.2.2 Biodiversity conservation

A sizeable number of the projects (19, or 41%) had objectives related to conserving or enhancing biodiversity, mainly PO, OGA and DENR projects. Table 8 presents information on changes in flora and fauna from pre-project to present time for projects with and without biodiversity objectives. Except for one study with an inventory (OGA Dendro project), the other responses are based on local observations and opinions obtained from the case studies or project evaluation reports of some sites. Respondents also linked changes in the number of hunters in the area to changes in wildlife populations. When opinions differed among managers and communities in the case studies, the opinions of the communities on the ground were applied.

Most projects with information indicated that floristic and wildlife diversity improved from before the project to the present (Table 8). They attributed the change mostly to the establishment of multi-species plantations and the planted trees attracting birds. Respondents attributed declines in floral diversity to a few plantation species replacing more bio-diverse brushlands, and declines in wildlife populations to tree cutting and hunting pressures.

Table 8. Biodiversity outcomes based primarily on observations and opinions

	Change from pre-project to present	Projects with biodiversity objectives *	Projects without biodiversity objectives**	Total
Flora	Increase	6	3	9
	No change	1	2	3
	Decrease	1	1	2
Total		**8**	**6**	**14**
Fauna	Increase	8	8	16
	No change	1	2	3
	Decrease	1	1	2
Total		**10**	**11**	**21**

* includes five case studies
** includes seven case studies

Given that improved floristic diversity was largely attributed to planting multiple species, we examined the number of species planted and their origin (Figure 6, Annex 4a and b). Overall, a number of species were planted per project site. Further, projects with biodiversity objectives planted more species (average 7.2, CI[11] 6.2-8.2) than projects without biodiversity objectives (average 5, CI 4.1-6.0). Also, 30 percent (CI 23-37%) of the species planted on a site tended to be native with little difference between projects with and without biodiversity objectives. Twenty percent of the projects had more than 50 percent native species.

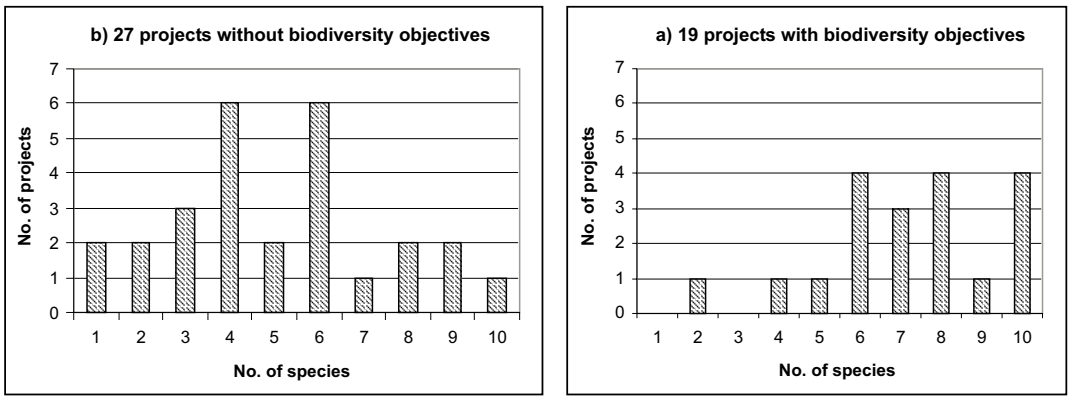

Figure 6. Number of planted tree species in: a) projects with biodiversity objectives, and b) projects without biodiversity objectives

[11] CI- 95 percent confidence interval of estimate.

It was mainly *contract reforestation* sites under FSP I that planted only a few species, namely *Gmelina arborea*, mahogany and *Acacia* species. Other than that, projects of all sectors tended to plant many species. However, at the landscape level, mahogany and *Gmelina arborea* may have become more dominant because they were commonly planted on most sites.

Planting trees was the dominant rehabilitation method, with some planned natural regeneration in 14 projects. Of the case studies with information on natural regeneration status in the plantations, the four with biodiversity objectives had high to very high regeneration while only two of six cases without biodiversity objectives had high regeneration.

A positive finding is that tree planting was done primarily on open grass, shrub or barren land in all project sites (degraded land, Figure 7) and not by converting natural forest which would have resulted in a net loss in biodiversity. Natural forest was retained for the most part with new natural forest being regenerated in four project sites.

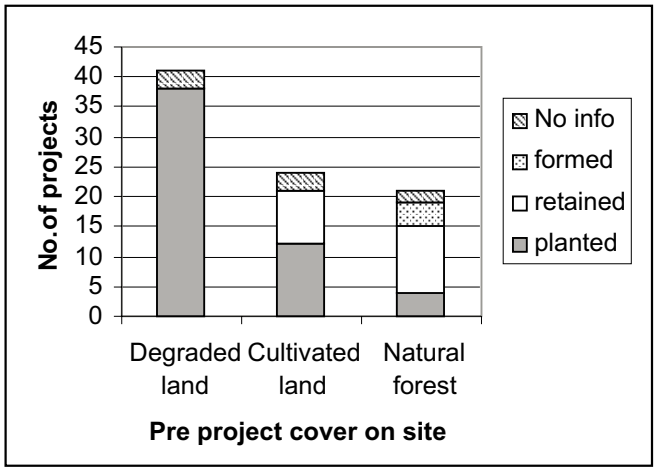

Figure 7. Land cover/use change with project implementation on sample sites: Degraded land, cultivated land or natural forest planted, retained as is, or newly formed

Durand and Monteuuis (1995) also reported that a large number of tree species were being used in reforestation efforts by two private companies and a government project in Mindanao. The literature review in Chapter II suggests that most species planted are exotic and this raises biodiversity concerns. We find that native species do form a significant component of the species planted on the projects assessed in this study, but perhaps projects with primarily conservation objectives such as in protected areas could focus largely on native species. The general literature

provides little information on how rehabilitation efforts affect biodiversity in the Philippines with which our results could be compared. Sayer *et al.* (2004) in their global review indicate that many plantations contribute significantly to biodiversity, though clearly nowhere near the contribution of natural forests. They contribute by allowing natural vegetation in the understorey, catalysing native species regeneration, providing significant wildlife habitat, and retaining small natural forest fragments. However, Cossalter and Pye-Smith (2003) point out that the degree of contribution depends on the specific species and site and the way the plantations are established and managed.

5.3 Production and marketing

Most projects (38) planned to produce one or more economic products from the rehabilitation effort: timber, fuelwood, fruits and other non-timber crops or ecotourism (Table 9). The eight remaining projects focused on increasing forest cover, providing environmental services and/or employment in planting activities. Four of these latter projects were rated as failures and one had no rating, indicating that projects with economic production objectives may provide better incentives for long-term management interest and sustainability.

Table 9. Planned production on sample projects

Project implementer categories	Planned production				No production objectives	Total no. of projects sampled
	Fruits & other non-timber products*	Timber	Fuelwood/ charcoal	Ecotourism		
DENR	3	3			2	6
LGU	6	1	1	1	2	8
NGO	3	2	2	1	2	7
OGA	4	1	3		2	7
PO	10	9	5	1		10
Private	4	7	3	1		8
Total	**30**	**23**	**13**	**4**	**8**	**46**

* Includes cash crops such as rubber and coffee
Note: A single project could aim to produce more than one product

Of the 12 sample projects that were unable to maintain their plantations in the long term, eight had no timber production objectives; one had no production plans, prospects or experience; one faced contradictory harvesting policies; and two private company projects were not financially viable due to high operational costs and low market prices. This suggests that producing timber is important for ensuring the long term sustainability of rehabilitation projects.

5.3.1 Timber and fuelwood

The 46 rehabilitation projects planted around 35 timber species. The dominant species were mahogany, *Gmelina*, *Acacia mangium*, narra, *Acacia auriculiformis*, *Eucalyptus deglupta*, teak, ipil-ipil, falcata (*Paraserianthes falcataria)*, molave (*Vitex parviflora*) and agoho (*Casuarina equisetifolia*) (Annex 4a). Expected rotations were seven-12 years for *Gmelina* and 12-18 years for mahogany and teak. The remaining species were mainly found in only one or two projects and 17 of them were native species.

(Left) *Eucalyptus deglupta* in Davao del Sur, (Right) Coppice regeneration of *Gmelina arborea*. (Photos by Antonio P. Carandang)

So far, there has been little harvesting and marketing of timber on the 25 projects with timber and fuelwood production objectives (Table 10). Fifteen project sites had trees mature enough to be harvested for timber but only six had actually done some harvesting in the rehabilitated area.

We explore the key constraints to timber production and marketing below. Other reviews have noted similar problems with commercial plantation development in the Philippines (Gayo 2000, Acosta 2002, Esteban 2003, FMB-FAO 2003):

1. Most rehabilitation projects, except private sector projects, had no realistic plan for production, although the feasibility studies foresaw marketing. The private sector and NGO projects appeared to be doing better in timber production compared to the DENR and PO projects. DENR projects lacked production plans and implementation even though production was one of their objectives

Table 10. Presence of marketing strategy, mature trees and harvesting experience on the sample projects with timber and/or fuelwood production objectives

Responses	Project implementer categories						Total
	DENR	LGU	NGO	OGA	PO	Private	
Marketing strategy							
Absent	3	2	2		6		13
Present				2	3	7	12
Total	**3**	**2**	**2**	**2**	**9**	**7**	**25**
Mature trees							
Absent		2		1	6	1	10
Present	3		1	1	2	6	13
Present -fuelwood			1		1		2
Total	**3**	**2**	**2**	**2**	**8**	**7**	**25**
Harvesting operations							
Not conducted	3			1	2	3**	9
Conducted: timber and/or fuelwood use & sale			2		1		3
Conducted: timber in 1999-2001						3	3
Total	**3**		**2**	**1**	**3**	**6**	**15**

** Alsons harvested from natural forest only

and they carried out economic feasibility analysis at the start. The problem is that the DENR line officer's role is to regulate utilisation and the private sector has traditionally done most extraction. Once DENR projects end, nobody in the agency is responsible for production. CBFM projects have been very short-term in nature and typically end long before production benefits are supposed to accrue. They assume production and marketing will happen automatically but the DENR and the communities may not be prepared to handle these aspects. One PO (KMYLB) did not harvest due to funding limitations.

2. The OGA WMECP project suffered a harvesting policy conflict, with Presidential Decree (P.D.) 705[12] banning cutting and the Letter of Intent (LOI) 1002[13] allowing cutting. P.D. 705 prohibits timber harvesting in critical watersheds with infrastructure such as hydropower plants and irrigation systems. This may make it difficult for projects to obtain permits to harvest in critical watershed

[12] P.D. 705 dated May 1975 (Revised Forestry Code of the Philippines, as amended by P.D. 1159) defines the basic Government policy on establishing forest tree plantations and the lands to be reforested, and establishes the Forest Management Bureau's jurisdiction over all forest land.

[13] LOI 1002 – NIA was given jurisdiction over Pantabangan and Caranglan watersheds for conservation, rehabilitation and management. LOI 1002 allows timber harvesting.

sites despite timber marketing being approved in their initial rehabilitation and area development plans. This includes many of the PO sites of the recently-completed FSP II which await government decisions in this regard. Confusion regarding harvesting rights exists not just in critical watershed sites but in all watershed areas due to conflicting or unclear policies and varying interpretation and implementation at different levels of government (FMB-FAO 2003). Communities in other LGU (CBTF and Piwardep) and NGO (Banika) watershed project sites hope to be able to harvest in the future. Soriaga (2006) mentions that the very term "watershed" can evoke fear and insecurity among upland dwellers because government has traditionally restricted access to resources and displaced communities when proclaiming watershed areas. Harvesting in protected areas is also restricted and in the DENR Osmeña project, communities have applied for a PACBRAMA[14] to harvest in the permitted sections.

3. Financial viability of rehabilitation efforts has been low due to the high plantation establishment and operational costs (two private companies in Region XI), and poor and unstable timber markets for *Gmelina* and mahogany (on five sites). Market prospects[15] were generally better in Region VII compared with Region XI (Figure 8). Region VII does not have much forest but is a booming market centre for rattan, charcoal and wood, and also imports much raw material from Indonesia and elsewhere in the Philippines. Region XI has a lot of forest. The two private sector projects there believe that it is not possible to recover high plantation establishment costs only by selling timber, so it would be good to combine trees with other high-value crops such as rubber and sugarcane.

Much of the current timber demand in the country is met from imports or illegal logging in natural forests (FMB-FAO 2003). Timber from rehabilitated areas contributes little at the moment. Removal of barriers and reduced tariffs on timber imports makes it hard for domestic producers to compete against cheap imports and that hurts farmers, local communities and companies who have been encouraged to plant trees (Shimamoto *et al.* 2004). High transport costs due to poor roads and long distances to markets are also mentioned by Calderon and Nawir (2004) in their review of the financial feasibility of six IFMA and CBFM projects.

[14] PACBRAMA – 'Protected Area Community Based Resource Management Agreement' is awarded in protected areas occupied by communities with privileges similar to CBFM but with some restrictions under the NIPAS Act (RA 7586). It mainly includes minor forest product utilisation but could also involve timber harvesting in multiple-use and buffer zones. Buffer zones tend to be alienable and disposable lands and multiple-use zones may have agroforestry and other plantations.

[15] Market prospect ratings were based primarily on the presence of buyers (including forest-based manufacturing enterprises) and good prices in the accessible vicinity.

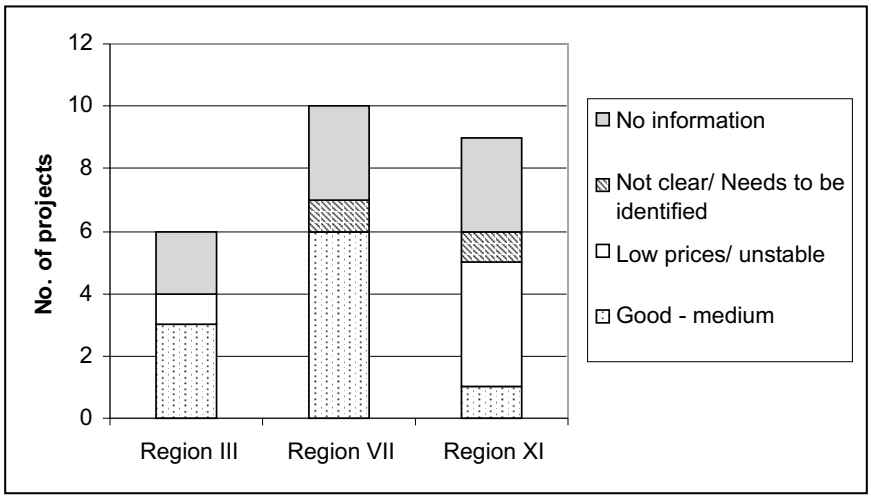

Figure 8. Market prospects for the sample projects across regions

4. Government and other agencies provide inadequate marketing support on five sites, mainly in Region XI. Little effort has been made at the national or local levels to provide marketing support to the producers, other than declaring Regions XI and XIII as timber corridors. The Provincial Environment and Natural Resources Officer of Region XI recently organised a multi-sectoral group to look at commercial timber production in CBFM and private sector lease areas. Austria (1995) reports on an FAO-supported pilot effort to develop local, community-based market information systems on three integrated social forestry project sites in Regions II, III and VI. The trials helped producers to enhance their bargaining power with traders and adapt their management systems to price trends and fluctuations. The government was attempting to institutionalise this information system, but the outcomes are not known.

5. All projects need to obtain approval of their resource use plans and obtain harvesting permits which can be hard to secure due to tedious bureaucratic requirements. Lack of clarity at the field level about policies, which are constantly changing, also makes it difficult to issue permits. DAI (1999) says that the DENR approves only a fraction of the harvesting volume that forest inventories and affirmed management plans show to be sustainable.

An unstable policy environment and poor support for forest production may be increasingly affecting rehabilitation and long-term sustainable management, particularly by communities and the private sector (FMB-FAO 2003). Since 1998, resource utilisation permits have been suspended three times nationwide which negatively affected timber production at rehabilitation project sites. Environmental advocates in the Philippines often consider all timber harvesting destructive and

they have pressured the Government into banning logging nationwide following major floods. Logging has also been suspended due to concerns that CBFM or IFMA contracts are being misused in order to engage in illegal logging. The December 2004 ban was subsequently lifted in Regions XI and XIII and then re-imposed in Region XI following reports of illegal logging. The ban was then lifted for a few IFMAs in other regions. In January 2006, the DENR cancelled all private and community contracts in eight regions, reportedly because of contract violations and non-compliance. In early March 2006, the cancellation of CBFM agreements was put on hold following a plea by the PO federation to avoid displacing 1.4 million people and leaving 1.6 million ha unprotected. Decisions to impose or lift logging bans were poorly justified and the bans have often been used as tools to shift public opinion and deflect the blame for disasters from the parties or authorities in power.

In general there is strong lobbying against production forestry and this is closely linked to the old dictatorship, exploitative practices, corruption and abuse of regulations (Acosta 2002). Such thinking has extended further to opposing forest plantations and increased pressures to impose a total commercial logging ban. The country has been unable to pass legislation on sustainable forest management and utilisation for the last 15 years and policies have been driven by DENR administrative orders, memorandum circulars and orders responding to the pressures of the time. The last forestry legislation is the outdated forestry code of 1975.

The logging bans have not helped conservation in the mostly open-access forest lands nor have they helped to develop stable wood and fibre supplies (Guiang 2001). The ban has directly affected CBFM participants who rely on limited timber harvesting in the absence of alternative livelihood sources. Protection and regeneration of the forests and forest lands (five million ha under different community tenure instruments – DAI 1999) has been handed over to communities with CBFM adopted as the national strategy, yet they have very insecure rights over the trees they grow and little production and marketing support. The marginalisation of economic aspects reduces the incentives for communities and the private sector to grow trees and deprives upland communities of a key livelihood opportunity. Forestry's long gestation periods make it particularly sensitive to policy instability.

However in turn the forestry profession including the Government needs to demonstrate good governance and how sustainable forest management should work on the ground. Abuses continue and fuel public perceptions that hurt well-intentioned private actors and communities. Individual violations of regulations sometimes lead to all forestry actors having their activities suspended or cancelled.

5.3.2 Fruits and other non-timber crops, and ecotourism

Fruit trees and other non-timber crops were important rehabilitation elements in 30 projects (Figure 9). They were especially important in LGU and PO projects, and in Region VII to meet the needs of its highly forest-dependent population. Two private sector projects grew bamboo for poles and furniture in Regions III and XI. There were roughly 18 species planted, the most common being mango, lanzones (*Lansium domesticum*), jackfruit (*Artocarpus heterophyllus*), bamboo (*Bambusa blumeana*), coffee (*Coffea Arabica*), durian (*Durio zibethinus*), rambutan (*Nephelium lappaceum*), rattan (*Calamus merrillii*), kakawate (*Gliricidia sepium*), rubber (*Hevea brasiliensis*) and abaca (*Musa textiles*) (Annex 4b). Rattan was used for furniture, kakawate as driftwood for orchids, abaca for decoration and fibre production, and neem (*Azadirachta indica*) for mosquito repellent, the last two in Region VII. The Fibre Industry Development Authority promoted abaca production through inter-planting in rehabilitation projects, providing income while communities waited for the timber trees to mature for harvesting.

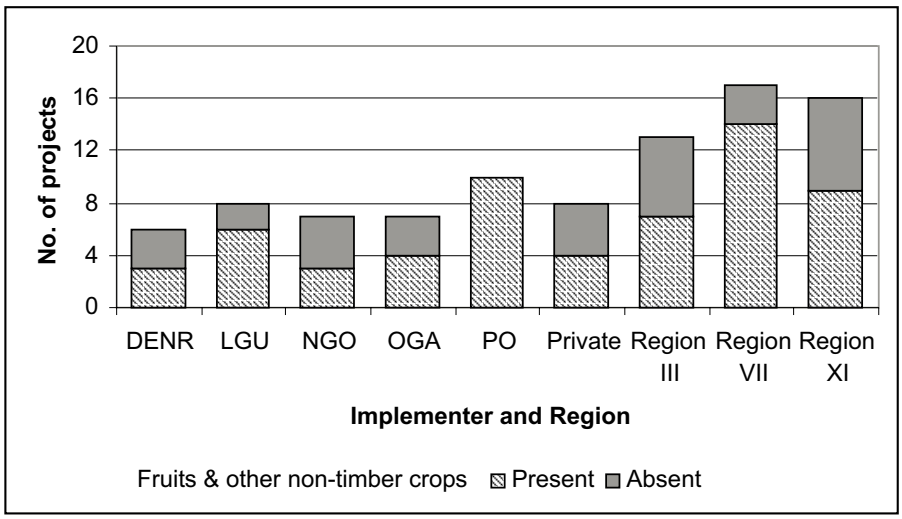

Figure 9. Sample projects with fruit trees and other non-timber crops by implementer group and region

Only the case studies asked specific questions about the production and marketing of fruits and other non-timber crops. In some cases, the plantations were not yet in production. The available information is summarised below:

- Five projects (DENR Osmeña, NGO San Agustin, PO Elcadefe, LGU MTP and OGA PNOC) mentioned good results with fruit production and good markets, particularly for mangoes. Communities benefited and the income helped protect the rehabilitated sites in the LGU and OGA sites.

Durian fruit trees on a reforestation site. (Photo by Takeshi Toma)

- Four PO projects expected to harvest and market the fruits in a few years but faced problems with survival and growth, including lack of species-site matching for species such as mango and coffee. These projects had few maintenance activities.
- Bamboo has been harvested on three-year rotations since 1998 in Osmeña, but IFMA 311 found marketing plantation bamboo difficult because it could not compete with informal natural forest extraction of bamboo and government support was inadequate.
- International demand was good for *Sinamay*[16] fibre production from abaca plantations.

Communities organised into a cooperative in an LGU project had not yet received any income from ecotourism. The cooperative now wished to negotiate with the large resorts nearby for a share of the benefits. An NGO project reported benefits from ecotourism activities. Two sites (SIFMA and PO) planned to benefit from ecotourism in the future.

[16] Fine hand-woven natural fibre made from abaca plant. Very popular for natural gift packaging and wrapping, accents to floral designs, angel wings and skirts among other products.

5.4 Socio-economic outcomes

5.4.1 Livelihoods

Of the 30 projects that sought to increase local income and provide employment or livelihood opportunities, information on longer-term outcomes was available for 23 (Table 11). Seven projects without explicit income objectives also had information on these aspects. The information came from interviews with managers, project documents and case studies.

Table 11. Change in local community cash income from pre-project to present time on sample projects

Change in community cash income from pre-project to present time and reasons why	DENR	LGU	NGO	OGA	PO	Private	Total
Projects with income objectives							
No effect on long-term cash income — short-term employment only (&/or livelihood schemes not viable yet or project terminated)	3	1	1	2	4*	1	12
Improved income due to livelihood schemes &/or employment			3	1	5		9
Improved income due to timber harvests						1	1
Improved income due to contour farming					1		1
Projects without responses but potential long-term benefits		3*		1*			4
No information (1 private project - too early)						3	3
Total	**3**	**4**	**4**	**4**	**10**	**5**	**30**
Projects without income objectives							
No effect on long-term cash income — short-term employment only (&/or livelihood/production schemes not viable yet)	2	2 (1*)	1*			1	6
Income declined because trees replaced agricultural crops		1*					1
No information (1 private project - small area)	1	1	2	3		2	9
Total	**3**	**4**	**3**	**3**		**3**	**16**

* Projects with planned local livelihood/production schemes that could still benefit communities in the longer-term

Twelve of the 30 projects with information (five of them DENR projects) provided only short-term employment and income to local communities. Another seven OGA, DENR and private sector projects planned to provide only short-

term employment but no information was available about the actual outcomes. One NGO made no provision for local communities. Most of these 20 projects were located on government land or leased lands with local claims, but were not participatory, particularly in benefit and cost-sharing decisions. Pressure from local communities was heavily degrading the forests in thirteen of these sites.

The projects with favourable (11 sites) or potentially favourable (11) long-term local income outcomes were mainly PO (all), NGO (4/7) and LGU (5/8) projects, plus two OGA projects.

- These projects had provided for agroforestry, timber production or other livelihood schemes and incentives to communities. Timber and other products had not yet matured to contribute to local income on most of these sites, and outcomes in this regard remained to be seen.
- These projects were more participatory with communities or individual farmers resident in the area directly involved in decision-making and implementation.
- There were no unresolved conflicts on these sites and degradation pressures were low on 20 of the 22 sites.
- Community organising and assistance activities were undertaken on 18 of these sites and community representatives, project staff and evaluation documents indicated positive outcomes such as improved technical, financial and management capacity, and development of links to external agencies on 15 sites. However, continued support and assistance were needed on many sites to ensure successful production and flow of economic benefits. Community organising without paying attention to production and economic aspects runs the risk of creating dissatisfied social groups and rebel movements.
- Most potentially favourable projects were executed on areas where communities had secure tenure through CBFM agreements, or resident communities or farmers had independent contracts that allowed them to benefit directly from the products generated (fruits and other products in most sites and timber in some). However secure land tenure does not guarantee secure tenure over the resources on the land because frequent policy changes have affected the community or farmers' rights to harvest timber, despite their having approved plans and fulfilling their responsibilities.

In 12 mainly government, private sector and NGO project sites, trees were planted not only on barren lands but also on areas cultivated by local people (Figure 7). In nine other sample sites (mainly PO and NGO projects), communities could continue to cultivate sections of the land. Income declined in the short term in three LGU/NGO projects (Piwardep, Small Watershed and Ihan) because trees replaced agricultural crops but in four other areas where such replacement occurred, the projects appear to be viewed positively for their future benefits.

(Top left) PO meeting in Elcadefe CBFM site. (Top right) PO timber production. (Bottom left) PO members at work in Saug watershed. (Bottom right) DENR assisting Dalesan PO in rehabilitation activity. (Source: National Forestation Development Office, DENR)

Non-cash income stayed the same or increased in five (Small Watershed, Elcadefe, PNOC, San Agustin and SRMCI) of 12 case study sites because people had rights to and were using the agroforestry or forestry products regenerated by the projects (Table 12, see Annex 1 for details on case studies). However, non-cash income also increased in four less-participatory cases (WMECP, Family Contract, Davao ESP and Alsons) because people had returned to gathering timber and other forest products. Non-cash income declined in two cases, Piwardep and Ihan, because communities were deprived of agricultural products when their cultivated land was converted to tree plantations.

In three cases (Elcadefe, PNOC and San Agustin) food security improved because of project-related factors: including inter-cropping and agroforestry options. The rehabilitation projects did not directly affect health, utilities, luxury goods or housing. Most cases had improved access to finance, skills and training, and information due to both project-related and external factors. External factors included increased credit availability, and access to schools and road networks. PNOC, San Agustin and Piwardep showed improvements across many livelihood indicators. Improvements in PNOC and San Agustin were directly related to project activities, while external factors were more important in Piwardep.

Table 12. Change in 12 livelihood indicators from pre-project to present in 12 case study sites

No.	Livelihood indicators	Change from pre-project to present)*			Managers' perspective vs. community's if different**
		Increased	No change	Decreased	
1	Cash income	2	9	1	WMECP – increase vs. no change
2	Savings	2	10		San Agustin – decrease vs. no change
3	Non-cash income	6	4	2	San Agustin – no change vs. increase
4	Food security	6	3	3	WMECP – increase vs. decrease; Piwardep – decrease vs. increase
5	Health	2	7	2	WMECP – increase vs. decrease; Piwardep – no change vs. increase; San Agustin – increase vs. no change
6	Housing	6	5		
7	Utilities	6	5		WMECP – increase vs. no change; San Agustin – increase vs. no change
8	Luxury goods	10	1		
9	Access to finance	9	3		Piwardep – no change vs. increase
10	Skills/training	7	3		WMECP – increase vs. no change
11	Access to information	10	1	1	WMECP – increase vs. decrease; Piwardep – no change vs. increase

* Information from the communities on all but two private sector cases – Alsons and Davao ESP
** Different perspectives only available on four cases for livelihood indicators – WMECP, PNOC, Piwardep, San Agustin

Stakeholders had distinct perspectives on livelihood outcomes in three of the four cases where both project staff and communities were surveyed. Only PNOC was rated positively overall by both groups. In the WMECP case, which was terminated due to conflicts over harvesting policy, the OGA project staff were more positive than the community regarding indicators such as cash income, food security, health, utilities, access to education, training and information. In San Agustin, the community viewed the project as more successful than the NGO project staff regarding changes in savings, non-cash income, health and utilities. In Piwardep, the community was more positive than the project staff regarding changes in food security, health, access to finance and information. In this last

case, the LGU project staff only took into account the project area, whereas the communities had migrated to the towns and considered those areas as well.

The findings of this study are in line with those of FMB-FAO (2003) for CBFM in general: They found that income increased at the start due to labour required for planting and additional income is expected when different forest and agroforestry products are harvested or when other livelihood schemes show results. Borlagdan *et al.* (2001) report that harvesting rights and local on-site processing created jobs and generated revenues in many early community forestry sites (1980s to 1990s). In many instances, development and tree planting projects increased productivity on upland farms. But in general, effects on household income varied on their 29 sampled sites. In many instances, labour, opportunity, farm development, protection and transport costs to communities were higher than the benefits.

Borlagdan *et al.* (2001) and Hartanto and Evangelista (2002) insist resource management and other schemes must provide increased income and livelihoods to sustain CBFM. They note that rigid regulatory requirements prevent viable and effective management and income generation. For example, the DENR determines annual allowable cuts and cutting area, requires 100 percent inventory, and approves resource use applications and transport permits. According to DAI (1999), only 98 out of more than 4000 CBFM communities have approved resource management plans.

5.4.2 Technical assistance and community empowerment

Most (17) of the 21 projects with community support and empowerment objectives and activities were foreign assisted, except for one PO (KMYLB), one LGU and two private sector projects. Recent foreign-assisted programs usually required community involvement and participatory approaches. Activities ranged from formal community organising to registration as legal entities; assistance and training in technical, marketing, livelihood, management, book keeping and financial matters; preparing proposals and financial work plans; networking with donors and external agencies; and monitoring and evaluation.

Farmers and communities achieved some empowerment on most project sites, according to project managers, evaluation documents and the communities in four case studies (Figure 10). PO staff provided their views on empowerment in eight PO sites. Community and project staff perceptions were similar in the four sites where both groups were surveyed. All the sites with community empowerment objectives and support activities by the DENR, NGOs and LGUs have managed to maintain their plantations. However, they encountered some problems including limited technical assistance, termination of funds and support, poor PO leadership, poor capacity of assisting organisations, and organising being conducted too fast and failing to bring about cohesion.

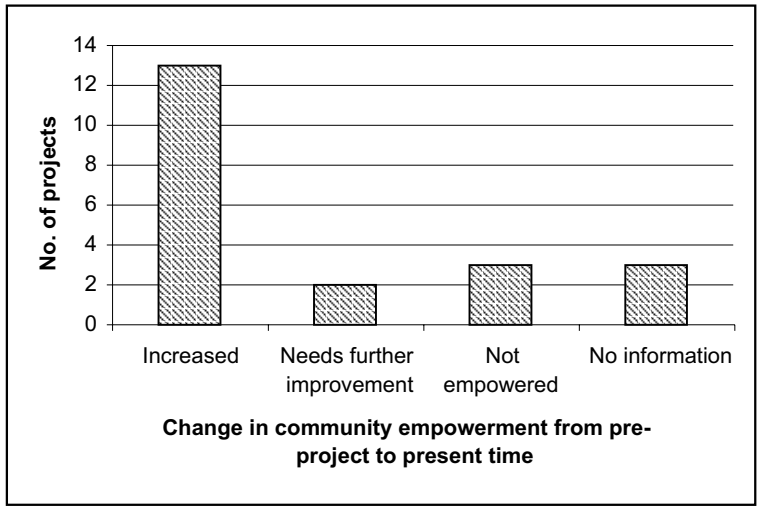

Figure 10. Change in community empowerment from pre-project to present time on sample projects

Borlagdan *et al.* (2001) point out that technical assistance and training are a key incentive for adopting CBFM. As in our study, they found that community organisations, morale, participation and links to outside agencies and ideas were strengthened in many cases. They also noted that assisting organisations' capacity is often very low and community empowerment will take long-term sustained effort by the LGU and the DENR (Borlagdan *et al.* 2001, Hartanto and Evangelista 2002). One problem is that when the project ends so does support. The DENR lacks funds to provide continued support.

5.4.3 Tenure security

Of the nine project sites that sought to improve tenure clarity and security on public forest lands, eight obtained secure and clear CBFM, IFMA and SIFMA contracts (See Annex 3 for details on the different agreements). Secure tenure was pending on the OGA UDP site inhabited by indigenous people, where "Free Prior Informed Consent"[17] from the National Commission for Indigenous People was needed before a CBFM agreement could be issued.

At present:

- Nine PO sites have clear CBFM agreements securing communities' tenure over the forest land for specified purposes.

[17] The Philippine Indigenous Peoples Rights Act recognises the right of free prior informed consent of indigenous people for all activities affecting their lands and territories.

- Two *contract reforestation* areas (DENR and PO), one LGU and one NGO project still have secure Certificates of Stewardship Contract from the former Integrated Social Forestry project.
- The private sector sites had clear and secure IFMA (five sites) or SIFMA (two sites) agreements for using public forest lands.
- The remaining 24 sites were direct government-owned timberland, reservations or protected areas, many with local land claims. Tax declarations[18] and land claimants were recognised in 19 projects along with former FLMA and CSC on three OGA, four LGU, two NGO, three PO, four private and two DENR projects. People were allowed to continue farming, or were involved in decision making in one LGU project, prioritised for hire in one private sector project, or their land bought out in one OGA project (Mananga). Tenure security for local communities was low on these sites.
- A Protected Area Community Based Resources Management Agreement (PACBRAMA) had been issued on part of the Osmeña project site.

Seventeen instances of land tenure conflict were encountered across project types. Most were resolved through amicable settlement, meetings, dialogues and facilitation. Labour payments were made on two sites and people were paid to leave another site. Disputes on six sites remained unresolved. There were conflicts between people and government, people and people, people and PO or Cooperative, PO or people and absentee claimants, DENR and Department of Agrarian Reform, and DENR and Metro Cebu Water District. In the last case, the DENR disputes the district's sale of land, which is not permitted under the NIPAS law[19]. Tenure was the main conflict source on the project sites, followed by encroachment and illegal resource use.

5.4.4. Gender

Four of the nine projects that sought to enhance gender equity (mainly PO and NGO projects) had information on outcomes. The projects made attempts to equitably include women and provide them with opportunities. This resulted in increased participation and benefits for women in Banika project, and high representation at meetings and thus influence over decision-making in the San Agustin and Samabaco projects. In Dalesan project, only a few women were involved despite overtures.

[18] LGUs may accept tax declarations from claimants, thus recognising that claimants have developed the forestry land to some extent. This is one way that farmers gain some security over the land they till and occupy. The LGUs collect taxes on lands irrespective of whether they are private or public. Technically, such tax declarations are not allowed on public forest lands, but the DENR is unable to control this phenomenon.

[19] National Integrated Protected Areas System (NIPAS) Act of 1992.

5.5 Long-term management plans and status

All PO and private sector initiatives, except for the community *contract reforestation* project PISFFAI, had long-term management, monitoring and evaluation plans. The Government demands long-term (25-year) comprehensive resource management plans for IFMA, SIFMA and CBFM agreement areas (Guiang 2001), with regular monitoring and evaluation by the DENR. The official project period has drawn to an end for the JBIC-funded PO projects and it remains uncertain if the area will continue to be managed over the long-term.

Only three of the seven OGA projects had long-term management plans. Two of these involved POs with CBFM agreements. Two of the seven NGO projects had some sort of plan for 10 or 25 years, with one other project, Kalinan, planning a Memorandum of Agreement with the DENR for long-term management. Of the eight LGU projects, three had long-term plans and farmers were supposed to be protect and maintain two project sites with some LGU assistance. But farmers in the Small Watershed project felt there were no individual plans for their respective areas, and they had lost their farming income with conversion to plantations. Most DENR projects covered in this study had no long-term management and monitoring plans to show because they were implemented a long time ago (Osmeña in 1916) or were regular reforestation projects from the 1970s and 1980s with funding terminated in 1990. Guiang (2001) confirms our findings that most forest lands under government administration without long-term community or private sector tenure arrangements have no effective and operational long-term management plans and maintenance, and depend on ad-hoc funding.

Long-term management seems closely linked to having a plan in the first place. A simple statistical test of the relation between having a plan and long-term maintenance of the trees showed that it was positive and significant ($\chi^2_{1,<0.001}$= 13.74). Of the 25 projects with plans, 22 had continued high maintenance and protection activities. Of the 21 without plans, only nine had continued high maintenance.

5.6 Financial viability

ADB loan I, DENR and many OGA-funded projects proved not to be financially viable in the long-term. They had little or no long-term support and funds were stopped after the establishment phase.

More recent foreign-assisted and private sector projects planned for reinvestment through income generation from timber and non-timber products and/or livelihood schemes, but these plans often ran into trouble due to production and marketing problems and/or livelihood schemes not being viable. Thirteen

projects were doing poorly, either because their funding stopped (nine DENR, OGA and ADB loan I) or their reinvestment plans failed (three private, one OGA). Of these, 10 had already lost a substantial proportion of their plantations to human pressures and fire, and two *contract reforestation* projects were just surviving. Eleven projects (mainly DENR and PO) were struggling along with limited government funding, reinvestment plans that were yet to prove viable or submitting proposals for funding.

Seven mainly non-government projects (three PO, two NGO, one private, one LGU) were doing well financially, with ongoing reinvestment from income earned, funds attracted from other sources, or further investments not needed. Another 12 projects were potentially viable in the long term, having reinvestment plans (two LGU and three private, one PO) or where farmers could harvest the products and maintain the areas (six LGU, NGO and OGA). Outcomes from the planned production, livelihood and reinvestment schemes remain to be seen. Projects with better financial status also tended to be better maintained and protected.

Even though many externally-funded projects failed to sustain their efforts over the long term and future viability of projects just completed is not really assured, the Philippine Government and JBIC are negotiating for another large loan of P6.027 billion to rehabilitate 86,000 ha of denuded forest land (*http://www.denr.gov.ph/article/view/3477*). If the projects prove unproductive and unviable in the long run and continue to depend on large external loans, the Philippines risks further indebtedness with little to show for it. Past loans still have to be paid back and funds for rehabilitation loan repayments will have to come from outside the forestry sector. Esteban (2003) also expresses concern about lack of funds and overdependence on donors, along with ensuring that commercial reforestation efforts are viable.

5.7 Outcomes and sustainability across multiple criteria

Projects were rated based on two primary considerations: "percent target area planted and area remaining intact at present", and "community organising, livelihood schemes and long-term viability" in more community-oriented projects. Based on these criteria, the project managers rated roughly 12 projects as unsuccessful ($\leq$ 6 on a scale of 1-10, 10 being the most successful) (Table 13). Of the 12 projects, five were rated 8-10 soon after the project but the respondents rated them less successful over the long term. Community ratings were additionally available on six non-PO case studies and were similar to the project managers' ratings, except that managers rated PNOC, San Agustin and Family contract slightly lower than the communities did.

Table 13. Success ratings of sample projects over the longer term or at present time by project managers on a scale of 1-10 (≤ 6 failure, 7 satisfactory, 8-10 good)

Project implementer categories	Success ratings					Total no. of projects sampled
	<3	4-6	7	8-10	No response	
DENR	2		1	3		6
LGU	1	1	1	4	1	8
NGO		1		5	1	7
OGA	1	2	2	2		7
PO		2	2	5	1	10
Private		2	1	4	1	8
Total	**4**	**8**	**7**	**23**	**4**	**46**

We also looked at production and marketing and long-term financial and management aspects to assess overall sustainability. These aspects and socio-economic considerations such as pressures on the forest resources, unresolved conflicts, institutional arrangements, local participation, benefits provided to communities and livelihood outcomes tend to influence the long term maintenance of the rehabilitated areas. Tenure security and funding source were less important.

Four dominant clusters of sample projects from the 40 included were evident from the nonlinear principal components analysis taking into account 13 variables related to physical accomplishments, socio-economic, production and marketing, institutional, financial and management aspects (See Table 7 for variables and categories in each). Category coordinates for all variables and the sample project scores are plotted on two-dimensional ordination diagrams (Figures 11 and 12). The analysis explained a large amount of the variation in the data, as is evident from the large decline in the eigenvalues (0.47 to 0.16) from the first to second dimension. Dimension I explained a substantial amount of the variance and was related to the ordinal variables: financial viability, long-term management plans, plantations maintained in the long term, degrading pressures, timber production prospects and outcomes, and local participation. Categories of the nominal variables of funding sources, planned socio-economic incentives and institutional arrangements were scattered over Dimensions I and II with different categories strongly related to Dimensions I or II.

Looking across the multiple criteria:

- Ten community-based projects in Cluster II (Figure 12) fared the best, doing well on the socio-economic side and having promising long-term management and sustainability prospects. Plantations tended to be maintained in the long-term, degrading pressures were low, local participation in decision-making was high, and livelihood outcomes were positive. Communities had contracts

with the DENR ensuring secure tenure over the land and setting out rights and responsibilities. Planned socio-economic incentives included timber, non-timber products and livelihood schemes. However, these projects are relatively recent, most are foreign funded and it remains to be seen whether they will be sustainable in the long-term once their funding ends. Much depends on whether their income generation, production and reinvestment strategies bear fruit. They probably need continued support in these aspects.

- Farmer-assisted projects[20] (Cluster I) were also doing relatively well and differed from the PO projects mainly in the lack of secure land tenure, having less well-established long-term financial and management plans, and often only having access to non-timber products and livelihood schemes. Local participation in decision-making was high and livelihood outcomes were positive. Projects were mostly funded by foreign grants since the 1990s and have so far been maintained with little pressure on forests and no unresolved conflicts.
- Private sector (Cluster III) and pure government projects including FSP I (Cluster IV) where communities had little role performed poorly on socio-economic aspects. They only provided employment or non-timber benefits to local communities. Many of these types of government projects and a few private sector projects faced high degrading pressures, unresolved conflicts and found it difficult to maintain their plantations in the long term. Projects that fared badly did badly across the board, in physical accomplishments, socio-economic outcomes, production and marketing, long-term management and financial viability.

  The private sector was better off than the pure government projects in terms of timber production plans, prospects for long-term financial viability and ability to maintain and protect their plantations. However, the private sector operates on lands claimed by farmers and how they manage their social relations will influence long-term outcomes. How their timber production plans and reinvestment strategies work out also remain to be seen.

At the current time, market prospects seem generally poor and support for production and marketing on projects of all sectors is limited. Any change in the external environment in terms of policy and marketing support may substantially influence long-term outcomes.

[20] Projects where farmers were assisted to rehabilitate the lands they occupied and benefit from timber or non-timber products and livelihood schemes.

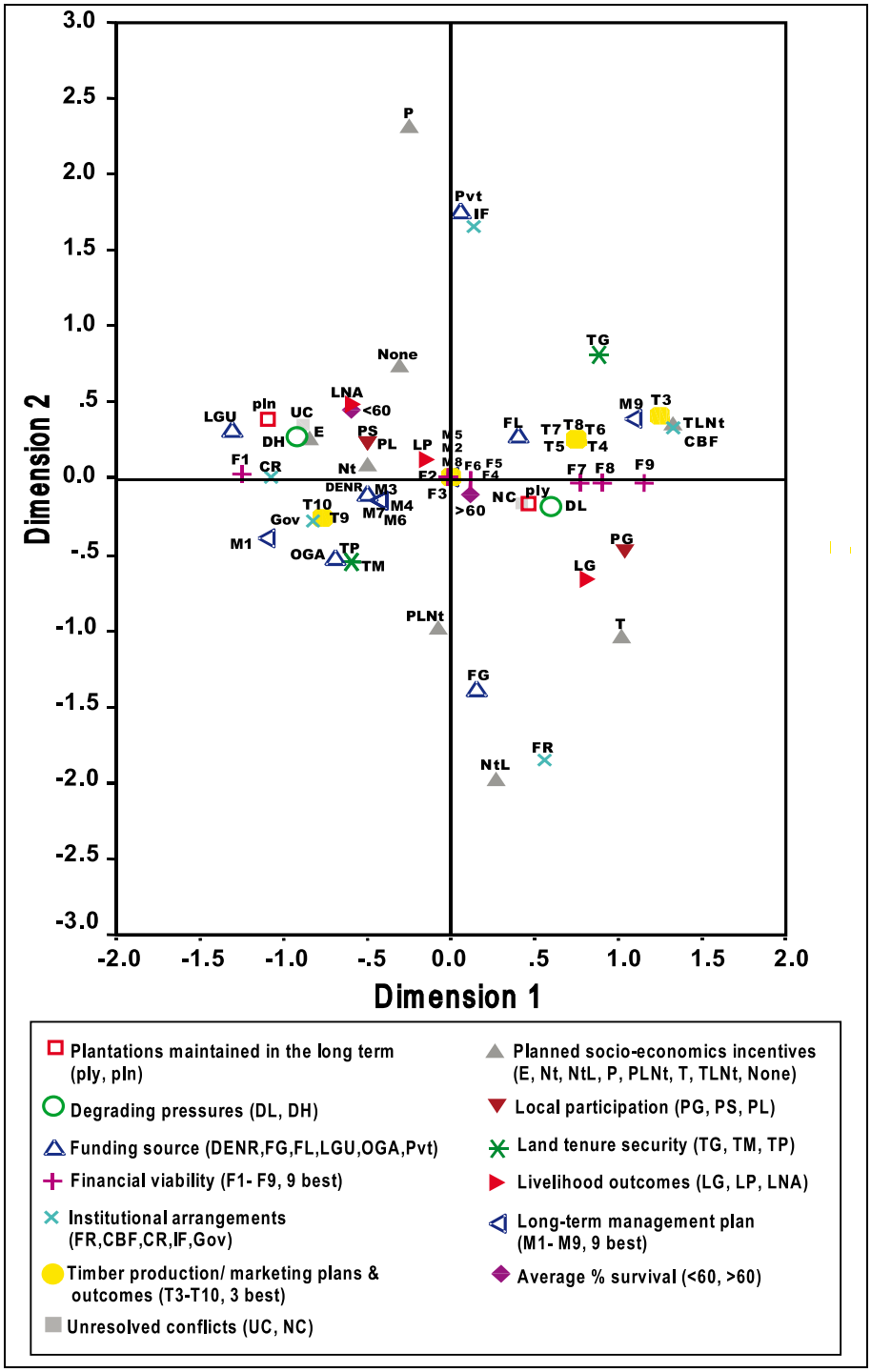

Figure 11. Plot of category coordinates for the different variables as generated by the Nonlinear Principal Components Analysis. Codes for each variable are described in Table 7

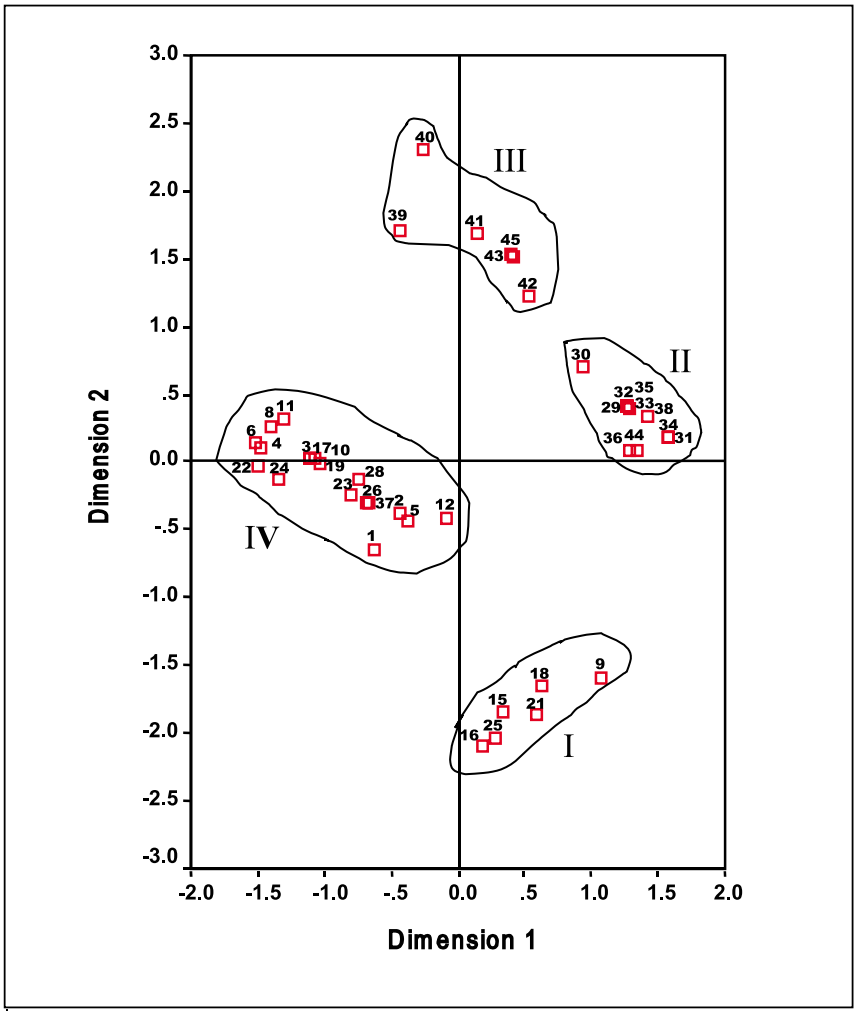

Figure 12. Plot of sample project scores as generated by the Nonlinear Principal Components Analysis, and delineation of project clusters I, II, III and IV. Projects are labelled by Project ID as in Annex 1

5.8 Region

The three regions differed little except that fuelwood, fruits and NTFPs were more important in Regions III and VII than in Region XI. The latter had more forest (see Chapter IV). Region VII had better market prospects for timber and other forest products. This is probably because of its strategic location, low forest cover and large forest-dependent population (see Chapter IV). Region XI projects in particular felt a lack of support from government and other agencies for marketing rehabilitation-related products. Kummer *et al.* (1994) and Walters *et al.* (2005) also indicate that a shortage of wood and good markets can lead to successful tree planting as in Cebu island, Bais Bay, and Manacan island.

6. Summary and lessons learnt

Many actors were involved in implementing rehabilitation initiatives under various institutional arrangements ranging from pure government, NGO and private sector projects to more participatory community or farmer-assisted models. Communities or resident farmers actively participated in only a third to half the initiatives assessed despite being the targeted beneficiaries on 89 percent. Most DENR, OGA and private sector initiatives aimed to provide mainly employment benefits to communities while LGU, NGO and PO initiatives (particularly the last) sought to offer a mix of benefits including livelihood schemes, agroforestry, fuelwood, timber and NTFP production. PO and NGO projects were mostly foreign-funded, while DENR, OGA and private sector projects were self-funded. Foreign-assisted and private sector initiatives tended to have high costs per ha, while pure government projects had more limited funding.

A high percentage of the initiatives did reasonably well in getting the plantations established and maintaining them in the immediate post-project period. However, their long-term sustainability is uncertain and depends on the enabling factors listed in the "*lessons*" below. Ultimately, whether established plantations will remain will largely depend on whether the rehabilitation efforts and/or any other allied initiatives address the livelihood needs of forest-dependent communities. This remains to be seen on roughly 25 percent of the initiatives sampled pending outcomes from forest production and rehabilitation activities, while a large number (roughly half) appear to be doing poorly on socio-economic aspects. Forest production, income generation and financial viability therefore appear to be key to sustaining rehabilitation efforts, but all sectors (and government projects in particular) did poorly on production and marketing despite stated production goals. Only 16 percent of the projects are financially viable at present, with a further 28 percent depending on future income generation and forest production outcomes. The remaining projects have either terminated with no funding and long-term management, or are struggling along with minimal, ad hoc funding. Across multiple criteria (technical, socio-economic, financial, management, production and marketing), farmer and community-participatory models appeared to be doing best compared to pure government, NGO or private sector initiatives but future sustainability remains to be seen.

The initiatives, particularly the ones with biodiversity objectives, appear to be contributing modestly to enhancing biodiversity through planting numerous species per site including some native species, and allowing natural regeneration in the understorey. Contribution to watershed functions is unclear in the absence of technical monitoring. Lessons learnt on the factors (approaches and incentives) contributing to positive outcomes and sustainability are presented below:

6.1 Physical accomplishments and long-term maintenance

1. Accomplishing planting targets is generally not a problem given adequately funded projects and availability of local labour for hire. The challenge lies in ensuring short and long-term survival of the planted areas which involves paying attention to technical and socio-economic issues. Government-led projects in particular need to improve on ensuring survival of the rehabilitated areas in the short and long term.
2. Species-site matching is vital to ensure good survival and growth. The government, academe and even private agencies could provide technical guidance through extension services and materials to project managers, and make more available quality planting material of appropriate species.
3. Planting many species in mixed stands or in mosaics could reduce pest and disease problems. Nair (2001) indicates that large monoculture plantations are most susceptible to pest outbreaks, and susceptibility is not exclusively determined by the exotic or indigenous nature of the tree species.
4. Almost all forest lands in the Philippines suffer degradation due to high demand for wood, fuelwood, grazing and *kaingin* cultivation. Continued management and protection and reduced degrading human pressures are the most important factors for maintaining rehabilitated areas in the long term. These factors are closely linked to having a) long-term management plans and protection measures in place, b) stable long-term funding or financial viability, and c) local community participation and stake in the projects.

6.2 Environmental aspects

1. Technical evaluations of project impacts on soil and water properties are needed, particularly given that a) this objective drives many projects, b) observations of impacts vary widely and c) perceived links between forests and large-scale flooding and landslides drive forestry policies in the Philippines.
2. Rehabilitation activities should be designed, techniques and species chosen, and the area managed according to the specific watershed and soil conservation objectives. Plans must be site-specific.
3. Philippines' forest rehabilitation efforts have a high potential to contribute to biodiversity enhancement while meeting production and livelihood needs through a) continuing to plant many species, including native species, and retaining and allowing natural regeneration; and b) protecting the rehabilitated areas from over-logging, over-hunting and other unplanned human activities. Lamb *et al.* (2005) advocate establishing mixed species and native species plantations rather than traditional large-scale monocultures to provide both goods and ecological services. Mixed plantations could contribute to biodiversity, while also providing production gains, reducing pest damage and protecting against uncertain markets. However, marketing support for the species planted is crucial.

6.3 Production and marketing

1. Long-term social and political support for the production functions of forests needs to be generated and secured to ensure successful rehabilitation and sustainable management of forest lands. This is important to meet industrial and household demand, generate income for impoverished upland communities, and provide environmental services in the process. Pure conservation projects have little chance of success. The private and government sectors will have to demonstrate good practices and governance to gain civil society's trust and support.
2. Clear and consistent policies, dissemination and implementation are required for management and harvesting in forest lands with different types of legal status, tenure and institutional arrangements, such as watersheds, protected areas, CBFM agreement areas, and IFMA and SIFMA areas. Such policies should be framed following a well-facilitated information exchange and negotiation process with stakeholders, and legislated to reduce vulnerability to political changes. Individual violators of regulations should be subject to suspensions and not all forestry actors en masse.
3. The Government and other agencies need to provide marketing support for timber and other products generated by farmers, communities and the private sector to make viable and sustain the efforts and investment in rehabilitation and forestry. This is particularly so for Region XI and perhaps some lessons can be learned from Region VII which is doing better in market prospects and marketing support. FMB-FAO (2003) note that markets for products such as furniture have barely been tapped. Community-based market information systems, selecting species based on markets too, incentives to processing firms to obtain wood from rehabilitated areas, forming marketing associations, adding value, improving roads and transport, and certification have been suggested as means to improve marketing (Austria 1995, Hartanto *et al.* 2002, Calderon and Nawir 2004).
4. Viable production and marketing strategies are needed, along with plans and follow-through to implementation for all rehabilitation projects with timber production objectives. If the DENR and OGAs cannot be sure of sustained follow-through due to unstable funding or political support, production forestry may be better left to other sectors of society. Communities need support to develop good strategies and plans and see it all the way through to marketing, but the DENR does not have sufficient resources to support the projects in the long term. Private sector-community partnerships may be one mechanism, however FMB-FAO (2003) mention that the CBFM policy tends to discriminate against (rather than enable meaningful) collaboration of communities with private enterprises.
5. Production costs need to be assessed and adequate incentives provided to promote viable commercial forestry and interest from different sectors. Overall,

a well-defined comprehensive effort is required along with an agency to take the lead to make commercial forestry and rehabilitation efforts viable for the different sectors.

6. Bureaucratic requirements for approval of resource use plans and provision of harvesting permits need to be simplified to ensure that project managers can respond effectively to the market opportunities.
7. Fruits and other non-timber crops are less subject to the policy instability and disincentives faced by timber plantation establishment and production. Their incorporation into rehabilitation projects by POs, government agencies or NGOs in timberland and protection forest areas could provide an important long-term source of income for upland communities while maintaining tree cover. Communities would need assistance with technical and marketing aspects.

6.4 Socio-economic aspects

1. Before the project, almost all sites had degradation problems due to logging, fuelwood collection, grazing and *kaingin* cultivation, and this is the case in most upland areas in the Philippines. It is therefore important to address these causes of degradation and ensure positive socio-economic outcomes on all projects to ensure their long-term sustainability, or else the degrading pressures will continue as was found in many sample projects. The new forestry sector project seeking to sustain rehabilitation by moving communities out is unlikely to meet its objectives given that land is limited and communities have few options.
2. Both short and long-term income-generating options are needed for the communities to have a stake in rehabilitating and managing the areas. Providing only short-term benefits results in wasted effort because people return to their former livelihood activities afterwards. A combination of employment opportunities, livelihood schemes and long-term benefits from sale of agroforestry and timber products looks promising.
3. Community empowerment and capacity building is a must to help communities manage their areas and funds, harvest and market the products, and ensure that livelihood and reinvestment schemes are viable. It may take a long time before communities can manage by themselves and therefore continued long-term assistance is essential with an appropriate financing mechanism. The process cannot be rushed and it needs to be highly participatory right from the start to build true cohesion. Experienced community organisers tend to be more effective. Hartanto *et al.* (2002) recommend collective action, learning and information exchange to manage community forests and monitor markets based on successful trials in Palawan.
4. Tenure security both over the land and its resources will go a long way towards ensuring long-term management interest and investment of effort by

the farmers and communities. Harvesting rights on different lands need to be clarified and made consistent and legislated to buffer communities from frequent political changes.

5. It is not possible or equitable to lock out the impoverished communities inhabiting and using these uplands. DENR, OGA and private sector projects in particular need to recognise community claims and use negotiation and partnership agreements to ensure communities have a stake in the project's long-term sustainability. Clear long-term institutional arrangements and having local people participate in decision-making (including in benefit and cost-sharing) are critical. On projects mainly for environmental purposes, allowing for fruit and other non-timber products as well as livelihood schemes could encourage community support. Garforth and Mayers (2005) emphasise similar aspects in their review of how plantations could help poor people.
6. Ground evaluations are needed of the impacts of planned and completed rehabilitation projects on communities given that a) many projects have livelihood improvement as an objective; b) sustaining livelihoods is key to sustaining the rehabilitated areas; and c) approaches need to be tailored to derive positive impacts.

6.5 Management plans and financial viability

1. Long-term management plans and institutional arrangements need to be developed to effectively maintain and protect the rehabilitated areas, particularly for open-access, government-administered areas.
2. Stable long-term funding is required for continued maintenance, protection and sustainability of rehabilitation efforts. It is better not to rely entirely on short-term and/or unstable government and foreign funding, though it is good as start-up money for site development and social organising. The projects should have long-term income generation and reinvestment plans from the forest products generated or from the livelihood schemes. This is true for both protection and production areas, though the kind of production may be more restricted in the former.
3. Income generation and reinvestment plans must be made to work for government, community and private sector projects through sustained long-term support for production and marketing and livelihood schemes. Lack of financial viability will cause investors to move to other, more profitable sectors, leading to less investment in forests both for production and environmental services.

6.6 Outcomes and sustainability across multiple criteria

1. Long-term sustainability requires attention to all aspects of rehabilitation: technical, socio-economic, financial, management, production and marketing aspects.

2. The community or farmer-based participatory rehabilitation models appear promising in terms of plantation maintenance and socio-economic outcomes to date. But long-term sustainability will depend on how well the income generation, production and reinvestment strategies work out. These projects need strong production and marketing support in a stable and enabling policy environment.
3. The private sector model with minimal local participation is doing moderately well and depends substantially on continued maintenance and protection to sustain the efforts. Poor market prospects, potential lack of financial viability and social problems threaten many of these projects. The private sector needs to work on the socio-economic aspects while also obtaining strong production and marketing support to ensure long-term financial viability. A stable enabling policy environment is vital in this model too.
4. The pure government sector model with limited attention to local people and production functions of forests is the weakest and prone to failure. It depends purely on limited unstable government or external funding and faces high risks of termination followed by forest degradation. Such government-initiated projects need to work on all aspects (socio-economic, production, financial and management) to ensure long-term sustainability of their rehabilitation efforts and positive outcomes. It is best if government-initiated projects are restricted to strict conservation and protection areas where other sectors cannot play a larger role. Even in such situations, attention needs to be paid to local community needs with appropriate incentives provided, as well as tapping into stable funding sources for long-term management and protection. Perhaps communities could play an effective role in protection functions, too, given appropriate incentives.

6.7 Regions

1. The enabling environment for successful rehabilitation may be better in Regions VII and III compared with Region XI, given a greater demand for the products and possibly better support from the government and other agencies. Available wood products from natural forests in Region XI reduce incentives for plantation establishment. The needs and prospects could be built on for favourable outcomes, and more effort will have to be put into Region XI to support rehabilitation projects and their outputs.

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Annex 1. List of sample projects

ID	Region	Key Implementer	Project name	Abbreviation	Location	Funding source	Period
1	3	**DENR**	ASEAN New Zealand Afforestation Project	ANZAP	Brgys.1 Bigbiga, Sula, Burgos and Maamot; San Jose and Mayantok municipalities; Tarlac	Foreign grant	1980-87
2	3	**DENR**	Calao Quick Forest	Calao	Sitio Calao, Brgy. San Jose, Mayantok, Tarlac	DENR	1979-03
3	3	**DENR**	* Contract Reforestation Project by Family	Family Contract	Brgy. Villarica, Pantabangan municipality, Nueva Ecija	Foreign loan	1989-91
4	11	**DENR**	Davao Seed Orchard Reforestation Project	DVSO	Brgys. Balagunan, Bobongan, Magwawa, San Jose and Mamacao; Sto. Thomas and Kapalong municipalities; Davao del Norte	DENR	1976-90
5	7	**DENR**	* Osmeña Reforestation Project	Osmeña	Camp 7, Minglanilla, Cebu	DENR	1916-present
6	11	**DENR**	Pasian Reforestation Project	Pasian	Pasian, Monkayo, Compostela Valley	DENR	1975-89
7	7	**LGU**	Community Based Resource Management Project	CBRMP	14 brgys. Bagtik, Cananghan, Libaong, Sab-a, San Remegio, Cebu	Foreign grant	2001-04
8	7	**LGU**	Community-Based Contract Reforestation Project	CBCR	Maglinao and Cabatuanan, Basay, Negros Oriental	Foreign loan	1988-92

[1] Brgy. - barangay. The smallest political unit in the Philippines and often corresponds to a village or town district.

ID	Region	Key Implementer	Project name	Abbreviation	Location	Funding source	Period
9	3	**LGU**	Community-Based Tree Farming Project	CBTF	Bazal and Diat, Ma. Aurora, Aurora	Foreign grant	1996-99
10	3	**LGU**	Contract Reforestation Project by LGU	LGU Contract	Bagac, Bataan	Foreign loan	1989-94
11	3	**LGU**	Municipal Tree Park	MTP	Brgy. General Luna, Carrranglan, Nueva Ecija	LGU	1982-98
12	7	**LGU** (Forestry-based Multipurpose Cooperative in Pilar)	*Pilar Watershed Rehabilitation and Development Project	Piwardep	Brgy. Ilaud, Pilar, Bohol	OGA	1997-01
13	11	**LGU**	Plant Now/ Pay Later and High Value Crops Disappear Program	PNPL	Laak, Compostela Valley	LGU	2000-present
14	11	**LGU**	*Small Watershed Rehabilitation Project	Small Watershed	Panas, Carion, New Corella, Davao del Norte	LGU	2000-present
15	7	**NGO** (Ting Matiao Foundation TMF)	Banika River Watershed Development Project II	Banika	Apolong, Sagbang, Valencia, Negros Oriental	Foreign grant	1994-97
16	7	**NGO** (Mag-Uugmad Foundation Inc.)	Cebu Soil and Water Conservation Project	Cebu soil	Brgy. Tabayag, Argao, Cebu	Foreign grant	1981-94
17	3	**NGO** (Green Makers Development Foundation, Inc.)	Contract Reforestation Project – by NGO	NGO Contract	Brgy. Pag-asa, Bamban, Tarlac	Foreign loan	1988-93
18	11	**NGO** (Kiblawan Rural Development Foundation Inc. KRDFI)	* Ihan Reforestation Project	Ihan	Ihan, Kiblawan, Davao del Sur	Foreign grant	1996-98
19	11	**NGO** (Kalinan Socio-Ecological Development Organisation KASEDO)	Japanese – Philippines Volunteer Foundation Project	Kalinan	West Marahan, Marilog, Davao City	Foreign grant	1991-96

ID	Region	Key Implementer	Project name	Abbreviation	Location	Funding source	Period
20	11	**NGO** (Movement for a clean and green mountain forest Inc.)	Rehabilitation of 46 km Buda Road	MAMI	Bukidnon and Davao Provinces	OGA	2003-03
21	7	**NGO** (Soil & Watershed Conservation Foundation Inc. SWCFI)	* San Agustin Integrated Agroforestry and Livestock Project	San Agustin	San Agustin and Bugsoc, Sierra Bullones, Bohol	Foreign grant	1995-98
22	3	**OGA** (Tarlac College of Agriculture)	Dendrothermal Project	Dendro	Sitio Calao, San Jose, Mayantoc, Tarlac	OGA	1982-89
23	7	**OGA** (Metro Cebu Water District)	Mananga Watershed Rehabilitation Program	Mananga	Brgys. Sudlon, Sinsin and Butao; Cebu City	OGA	1999-present
24	3	**OGA** (National Power Corporation)	Pantabangan Watershed Area Team Reforestation Project	Pantabangan	Burgos, Caranglan, Nueva Ecija	OGA	2002-04
25	7	**OGA** (Philippine National Oil Company)	* PNOC-EDC Southern Negros Geothermal Project	PNOC	Lunga, Valencia, Negros Orientel	OGA	1992-present
26	11	**OGA** (National Power Corporation)	Talomo Watershed Riverbank Stabilisation	Talomo	Talomo, Davao city	OGA	1994-present
27	11	**OGA** (Department of Agriculture)	Upland Development Program	UDP	Pitu, Malalag, Davao del Sur	Foreign grant	2000-05
28	3	**OGA** (National Irrigation Administration)	* Watershed Management and Erosion Control Project	WMECP	Pantabangan and Magat, Nueva Ecija	Foreign loan	1980-89
29	7	**PO** (El Nansa Agroforestry Developers Association, Inc.)	Boljoon Reforestation Project	Boljoon	Boljoon, Cebu	Foreign loan	1995-98
30	3	**PO** (San Roque Community Management Centre Inc. SRMCI)	* Cadmang Watershed Rehabilitation Project	SRMCI	Brgy. Cadmang, Cabangan, Zambales	Foreign loan	1997-99

ID	Region	Key Implementer	Project name	Abbreviation	Location	Funding source	Period
31	11	**PO** (San Isidro-Mambing-Bayabas Multi-Purpose Coop.)	CBFM - SAMABACO	Samabaco	Nabunturan, New Corella, Montevista, Davao del Norte	Foreign loan	1997-03
32	11	**PO** (Dalaguete Lebanon San Vicente Montevista Watershed Multi-purpose Coop.)	Dalesan Montevista Watershed Multipurpose Coop	Dalesan	Vicente Montevista, Compostela Valley	Foreign loan	1997-03
33	11	**PO** (El Salvador, Cabidianan, Del Monte and Santa Fe CBFM Planters Association Inc.[ELCADEFE])	* ELCADEFE CBFM Planters Association, Inc.	Elcadefe	Brgys. El Salvador, Cabidianan, Del Monte and Santa Fe; New Corella municipality, Davao del Norte	Foreign loan	1997-03
34	3	**PO** (People's Organisation for Environment Development Incorporation [POEDAI])	JBIC Balog-Balog Watershed Project	Balog	Brgy. Maamot, San Jose, Tarlac	Foreign loan	1998-03
35	7	**PO** (Sicopong United Ecological Rehabilitators for Sustainable Development Association Inc. [SUERSDAI])	JBIC Sicopong Watershed Sub Project	Sicopong	Sab-ahan, Bais City, Negros Oriental	Foreign loan	1997-03
36	7	**PO** (KMYLB) Kapunungan sa mga Maguuma sa Yutang Lasangnon sa Bulalacao	KMYLB Agroforestry Development Corp.	KMYLB	Bulalacao, Nug-as, Alcoz, Cebu	DENR	1985-present
37	7	**PO** (PISFFAI) Palaypay Integrated Social Forestry Farmers' Association, Inc	PISFFAI Contract Reforestation Project	PISFFAI	Sab-ahan, Palaypay, Bais City, Negros Oriental	Foreign loan	1989-98

ID	Region	Key Implementer	Project name	Abbreviation	Location	Funding source	Period
38	7	**PO** (Tabogon Ecological Resource Management Association Inc. Termai)	Maintenance and Protection Enhancement Program - DENR Loan II	Termai	Kal-anan, Tabogon, Cebu	Foreign loan	1997-99
39	11	**Private** company (Alcantara & Sons)	* Alcantara and Sons IFMA	Alsons	Brgys. Misolong and Sto. Nino, Talaingod municipality, Davao del Norte	Private	1993-2018
40	11	**Private** Company (Davao ESP)	* Davao ESP Resource, Inc. IFMA	Davao ESP	Magsaysay, Marilog, Davao City	Private	1992-2017
41	7	**Private** Company (Manguerra Mining and Development Corporation)	Manguerra Mining and Development Corporation IFMA	Manguerra	Brgys. Atabay, Ginang and Danang Lungsod; Alcoy; Cebu	Private	1984-94
42	7	**Private** individual	* IFMA No.205	IFMA 205	Sitio Pamari, Brgy. Tayawan, Bayawan, Negros Oriental	Foreign loan	1991-2016
43	3	**Private** individual	IFMA No. 311	IFMA 311	Sitio Ganlang, Brgy. Talbak, Doña Remedios Trinidad, Bulacan	Private	1992-2017
44	11	**Private** originally, now PO (San Roque Multi-Purpose Cooperative)	San Roque MPC	SRMPC	San Roque, Nabunturan, Compostela Valley	Foreign loan	1990-present
45	11	**Private** individual	SIFMA	SIFMA	Bagong Silang, Bayanihan, Marilog, Davao City	Private	1990-2015
46	7	**Private** company (FARLIS)	SIFMA of FARLIS	Farlis	Brgys. Gaas and Duangan, Balamban municipality, Cebu	Private	2000-05

* case studies

Annex 2. Participants of focus group discussions and interviews for database II in 13 case studies

Case	Focus Group Discussion	Additional interviews	Perspectives
	Region 3		
1. San Roque Community Management Centre Inc. (SRMCI)	• 14 representatives from PO SRMCI - 1 Chairman - 1 Board of Trustee member - 12 SRMCI members • 4 SRMCI non-members • 1 DENR staff	Two PO members and a PO non-member	The PO was the project manager, so only community perspectives
2. Watershed Management and Erosion Control Project (WMECP)	• 5 project beneficiaries (served as labourers during project implementation) • 8 project staff (from OGA National Irrigation Administration)	One OGA project staff	OGA staff and community perspectives separated out in group discussion
3. Contract Reforestation Project – Family Approach (Family Contract)	• 5 project contractors • 7 DENR personnel/staff	Two contractors	DENR staff and community perspectives separated out in group discussion
	Region 7		
4. San Agustin Integrated Agroforestry and Livestock Project (San Agustin)	• 5 community representatives • 1 NGO staff (from Soil & Watershed Conservation Foundation Inc. SWCFI)	NGO project manager	NGO manager and community perspectives
5. PNOC-EDC Southern Negros Geothermal Project (PNOC)	• 14 representatives from the Lunga Farmer's Association (LUFA) - Vice-President - 13 members • 2 representatives from OGA Philippine National Oil Company (PNOC)	OGA project manager	Project manager's and community perspectives

Case	Focus Group Discussion	Additional interviews	Perspectives
6. Pilar Watershed Rehabilitation and Development Project (Piwardep)	• 15 representatives from the Piwardep LGU cooperative- Vice Mayor - Municipal Councillor - 2 Board of Directors - Coop Chairman - 10 coop members (LGU staff) • 3 local co-operators/contractors	One LGU project staff, one contractor, and the *barangay* chairman at time project establishment	LGU project staff and contractor perspectives
7. Osmeña Reforestation Project (Osmeña)	• 10 representatives from 3 POs – MALTAJ, CAMMITA, and Camp 7 NTPMPC - 2 Board of Directors - 1 Chairperson - 1 Vice-Chairperson - 6 members • 2 representatives from DENR	Three community members	DENR staff not interviewed separately, so only community perspectives
8. IFMA No.205		IFMA holder	Only project manager's perspective
Region 11			
9. Small Watershed Rehabilitation Project (Small Watershed)	• 4 farmers' cooperative members • 1 DENR staff	LGU staff	LGU staff and community perspectives
10. Ihan Reforestation Project (Ihan)	• 5 from farmers' group • 1 NGO staff (from Kiblawan Rural Development Foundation Inc. KRDFI)		Only community perspective
11. Alcantara and Sons IFMA (Alsons)		Company staff	Only project manager's perspective
12. Davao ESP Resource, Inc. IFMA (Davao ESP)		Company owner and staff	Only project manager's perspective
13. ELCADEFE CBFM Planters Association, Inc. (Elcadefe)		Two PO members	The PO was the project manager, so only community perspective available

Annex 3. Tenure agreements issued on public forest lands

Tenure Instrument	Duration of Lease/ Agreement/ Contract	Description	Basic Issuances	Beneficiaries
CBFMA Community-Based Forest Management Agreement	25 yrs, renewable for another 25 yrs	A production sharing agreement entered into between a community and the government, to develop, utilise, manage and conserve a specific portion of forest land, consistent with the principles of sustainable development and pursuant to a community resource management framework.	EO 263-1995: Adopting CBFM strategy to ensure the sustainable development of the country's forestland resources and providing mechanisms for its implementation DAO 96-29: R & R for the implementation of EO 263 otherwise known as CBFMS	Peoples organisations, community associations
CSC Certificate of Stewardship Contract in conjunction with Integrated Social Forestry Program (ISF)	25 yrs, renewable for another 25 yrs	Refers to a contract entered into by and between an individual forest occupant or forest community association or cooperative and the Government allowing the former the right to peacefully occupy, cultivate and enjoy all income/proceeds derived from a designated area. The size of farms approved for the CSC is 3-7 ha. Grantees are to develop their allocated land into productive farms consistent with sound ecological practices, and devote at least 20% of the land to tree farming for ecological stability.	LOI 1260, MNR Order 82-48: Integrated Social Forestry Program and regulations and guidelines for implementation.	Individuals or families actually occupying or tilling portions of forest lands prior to 1 January 1982. Includes upland community associations

Tenure Instrument	Duration of Lease/ Agreement/ Contract	Description	Basic Issuances	Beneficiaries
IFMA I Industrial Forest Management Agreement	25 yrs, renewable for another 25 yrs	IFMA is an agreement entered into by DENR and a qualified person, to occupy and possess, in consideration of a specified rental, any forest land of the public domain in order to establish an industrial forest plantation. The minimum area for IFP is 100 hectares and the maximum area shall be the area that can be developed within five (5) years by the lessee but not to exceed 20,000 hectares, with some exceptions. Only open and denuded areas shall be granted.	DAO 91-42: Revised regulations and guidelines governing the development of Industrial Forest Plantations (IFPs)	Filipino citizen; corporations, partnerships or associations or cooperatives registered under Philippine laws; TLA holders in good standing who are willing to convert their TLA to IFMA; and community organisations whose members reside near or adjacent to the lands applied for.
IFMA II Industrial Forest Management Agreement II	25 yrs, renewable for another 25 yrs	A production sharing agreement entered into between the DENR and a qualified applicant which grants to the latter the right to develop, utilise and manage a specified area (including natural forest) consistent with the principles of sustainable development and in accordance with a Comprehensive Development and Management Plan, under which both parties share in its produce.	DAO 97-04: Rules and regulations governing the Industrial Forest Management Program	
SIFMA Socialised Industrial Forest Management Agreement	25 yrs, renewable for another 25 yrs	SIFMA refers to an agreement entered into by and between a natural or judicial person and the DENR wherein the latter grants to the former the right to develop, utilise and manage a small tract of forest land, consistent with the principle of sustainable development. Only open and denuded areas shall be granted. As an incentive for the participation of qualified tree planters, they shall be granted the privilege to benefit from their crops which shall consist primarily of trees for wood production, non-timber species and other cash crops that may be inter-planted.	DAO 96-24: Rules and regulations governing the Socialised Industrial Forest Management Program	Private individuals/ single family 1-10 ha; associations or corporations 11-500 ha.

Tenure Instrument	Duration of Lease/ Agreement/ Contract	Description	Basic Issuances	Beneficiaries
FLMA Forestland Management Agreement	25 yrs, renewable for another 25 yrs	A contract between the DENR and a forest land manager granting the sole and exclusive right to occupy, develop, manage, harvest, sell and utilise products grown from the land with corresponding obligation to repay the financial assistance provided by the DENR to help develop the land. Grants of 100 ha or more.	DENR MC 20, 1992: Implementing guidelines for the awarding, monitoring and evaluation of community organising contracts for Forest Land Management Agreement DAO 23-1993: Forest Land Management Program	Individuals, organisations and former reforestation contractors who were involved in the reforestation efforts of the government
PACBRAMA Protected Area Community Based Resource Management Agreement	25 yrs, renewable for another 25 yrs	An agreement entered into by and between the DENR and the organised tenured migrant communities or interested indigenous people in protected areas and buffer zones. PACBRMA shall be the tenure instrument issued to POs in all NIPAS sites, additional and initial components. It shall provide tenure security and incentives to develop, utilise, manage, conserve and protect these areas pursuant to the approved Community Resource Management Plan (DAO 2004-32).	RA No. 7586, NIPAS Act of 1992 DENR Admin. Order No. 25, Series of 1992 (Implementing rules & regulations of NIPAS Act) EO 263 adopting CBFM as the national strategy for the sustainable development of the country's forestland resources and providing mechanisms for its implementation DAO 2002-02: Guidelines on the establishing and managing community-based programs in protected areas	Organised tenured migrant communities and indigenous people

Annex 4a. Timber species planted on sample project sites

Latin name	Common/ local name	N/E*	Purpose	Implementer group						Total	Region		
				DENR	LGU	NGO	OGA	PO	Private		III	VII	XI
Swietenia macrophylla	mahogany	E	Timber, posts & poles	4	5	7	6	10	5	**37**	10	15	12
Gmelina arborea	*Gmelina*, yemane	E	Timber, fuelwood	6	6	6	3	8	4	**33**	10	12	11
Acacia mangium	mangium	E	Timber, fuelwood	2	2	3	2	4	6	**19**	6	8	5
Pterocarpus indicus	narra	N	Quality timber – furniture	4	1	4	4	4	0	**17**	7	6	4
Acacia auriculiformis	*Acacia*	E	Timber, fuelwood	1	1	1	3	2	1	**9**	3	5	1
Eucalyptus spp.	*Eucalyptus*	E	Timber	3	0	0	1	2	3	**9**	6	3	0
Eucalyptus deglupta	bagras	E	Timber/Poles	0	1	1	0	3	3	**8**	0	2	6
Leucaena leucocephala	ipil-ipil	E	Charcoal, fuelwood, leaf meal, posts & poles	2	1	1	2	0	2	**8**	4	1	3
Tectona grandis	teak	E	Quality timber – furniture	5	0	1	0	0	2	**8**	3	2	3
Paraserianthes falcataria	falcata, moluccansau	E	Timber, charcoal	1	0	0	0	3	3	**7**	0	0	7
Casuarina equisetifolia	agoho	N	Timber	2	1	0	0	2	1	**6**	3	3	0
Vitex parviflora	molave	N	Quality timber	1	1	2	1	1	0	**6**	1	3	2
Samanea saman	rain tree	N	Timber	0	1	0	1	1	0	**3**	1	2	0
Araucaria columnaris	*Araucaria*	N	Timber	0	0	1	0	0	1	**2**	0	0	2
Acacia confusa	ayangile	N	Timber	0	0	0	1	0	1	**2**	0	2	0
Pinus insularis	benguet pine	N	Timber/latex	1	0	0	0	0	1	**2**	0	1	1
Delonix regia	fire tree	N	Boundary marker/Timber	1	0	0	1	0	0	**2**	0	1	1
Intsia bijuga	ipil	N	Timber	1	0	0	1	0	0	**2**	1	1	0
	robles	E	Woodcraft	0	1	0	0	0	1	**2**	0	2	0

Latin name	Common/ local name	N/E*	Purpose	Implementer group						Total	Region		
				DENR	LGU	NGO	OGA	PO	Private		III	VII	XI
Melanolepis multiglandulosa	alim	N	Woodcraft	0	0	0	0	0	1	**1**	0	1	0
Reutealis trisperma	baguilumbang	N	Timber	1	0	0	0	0	0	**1**	0	1	0
Lagerstroemia speciosa	banaba	N	Medicine/ timber	0	0	1	0	0	0	**1**	0	0	1
Antidesma ghaesembilla	binayoyo	N	Timber	0	0	0	0	0	1	**1**	0	0	1
Macaranga tanarius	binunga	N	Timber	0	0	1	0	0	0	**1**	0	0	1
Dracontomelon dao	dao	N	Timber	0	0	1	0	0	0	**1**	0	0	1
Toona calantas	kalantas	N	Timber	0	0	0	1	0	0	**1**	0	1	0
Shorea spp.	lauan (red or white)	N	Quality timber	0	0	1	0	0	0	**1**	0	0	1
Aleurites moluccana	lumbang	N	Timber	1	0	0	0	0	0	**1**	0	1	0
	native species	N		0	0	0	1	0	0	**1**	0	0	1
	others	N		0	0	1	0	0	0	**1**	0	0	1
	pines	E	Timber/ latex	1	0	0	0	0	0	**1**	1	0	0
	red cedar	E	Timber	0	0	0	0	0	1	**1**	0	0	1
Cedrela odorata	Spanish cedar	E	Timber	0	0	1	0	0	0	**1**	0	0	1
Shorea contorta	white lauan	N	Quality timber	1	0	0	0	0	0	**1**	0	1	0
	yanti	N		0	0	1	0	0	0	**1**	0	0	1
Acacia spp.		E	Timber	0	0	1	0	0	0	**1**	1	0	0
Acacia siamea & Acacia diversifolia		E	Timber/ charcoal	0	0	1	0	0	0	**1**	0	1	0

* N/E: Native/ Exotic species

Annex 4b. Fruit and other non-timber species planted on sample project sites

Latin name	Common/ local name	N/E	Purpose	Implementer groups						Total	Region		
				DENR	LGU	NGO	OGA	PO	Private		III	VII	XI
Mangifera indica	mango	E	Fruits	1	2	1	2	6	1	**13**	6	4	3
Lansium domesticum	lanzones	N	Fruits	0	2	1	2	4	0	**9**	0	4	5
Artocarpus heterophyllus	jackfruit, nangka	N	Fruits	0	0	2	2	3	0	**7**	0	7	0
Coffea arabica	coffee	E	Coffee beans	0	0	0	1	5	0	**6**	0	3	3
Durio zibethinus	durian	N	Fruits	0	2	0	1	3	0	**6**	0	0	6
Nephelium lappaceum	rambutan	E	Fruits	0	1	1	1	3	0	**6**	0	1	5
Gliricidia sepium	madre de cacao, kakawate	E	Fruits, driftwood for orchids	1	0	1	0	1	1	**4**	2	2	0
Hevea brasiliensis	rubber	E	Latex	0	0	0	0	3	0	**3**	0	0	3
	fruit trees	E		1	0	0	0	0	2	**3**	0	0	3
Persea gratissima	avocado	E	Fruits	0	0	1	0	0	0	**1**	0	1	0
Citrofortunella microcarpa	calamansi	N	Fruits	0	0	0	1	0	0	**1**	1	0	0
Anacardium occidentale	cashew	E	Fruits	0	0	0	1	0	0	**1**	1	0	0
Manilkara sapota	chico	E	Fruits	0	0	1	0	0	0	**1**	0	1	0
Sandoricum koetjape	santol	N	Fruits	0	0	1	0	0	0	**1**	0	1	0
Cocos nucifera	coconut	N	Fruits, timber	0	0	0	0	1	0	**1**	0	1	0
Calamus merrillii	rattan "palasan"	N	Furniture	0	0	1	1	3	0	**5**	1	4	0
Bambusa blumeana	bamboo	N	Furniture, posts & poles	1	0	1	1	2	2	**7**	3	2	2
Azadirachta indica	neem	E	Mosquito repellent	1	1	0	0	0	0	**2**	0	2	0
Musa textiles	abaca	N	Sinamay for decoration, fibres	0	0	1	1	1	0	**3**	0	3	0

Chapter IV
Bottlenecks and recommended actions: Stakeholder perspectives from Regions III, VII and XI

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As part of CIFOR's regional research project "Review of forest rehabilitation: Lessons from the past", workshops were held in the three study regions, Region III (Central Luzon), Region VII (Central Visayas) and Region XI (Davao) in October 2003. These workshops provided a platform for stakeholders to share their experiences and perspectives on key forest rehabilitation[1] problems and issues. The workshop in Region III also served as a national workshop.

Each workshop had 16-27 participants. Participants came from the Department of Environment and Natural Resources (DENR), local government units (LGU), the private sector, non-government organisations (NGO), 'people's organisations' (PO) or the community, and other government agencies (OGA) such as the Philippine National Oil Company and the National Power Corporation (Table 1). In Regions VII and XI, participants divided into working groups to discuss issues of concern and make recommendations to improve and sustain the rehabilitation efforts of different sectors. In the national workshop, only government representatives from Region III discussed issues pertinent to that region.

[1] See Chapter I for details on rehabilitation terminology.

Table 1. Summary of workshop participants, October 2003

Initiatives	Region III	Region VII	Region XI
Government [DENR]	9	11	9
Local Government Units [LGU]		1	1
Private Sector	5	5	4
Non-Government Organisations [NGO]	2	4	1
People's Organisation /Community [PO]		1	1
Other Government Agencies [OGA]	11		
TOTAL	**27**	**22**	**16**

Group discussions in Region III (Left) and Region XI (Right) workshops, October 2003. (Photos by Philippines rehabilitation study team)

Plenary discussion in National workshop, October 2003. (Photo by Philippines rehabilitation study team)

We first provide a brief overview of the background of the three study regions. We then present and discuss the key problems and concerns raised by different stakeholders, followed by their recommendations.

1. Background

Region III or Central Luzon which lies just north of Metro Manila is rapidly industrialising, while also producing most of the country's rice on the largest plain in the Philippines (Figure 1). Region VII or Central Visayas has a strategic location and has been the predominant destination for direct foreign investment, export industries, trade and urban support services Its capital, Cebu City, is the second largest urban economic center in the country and the economic center

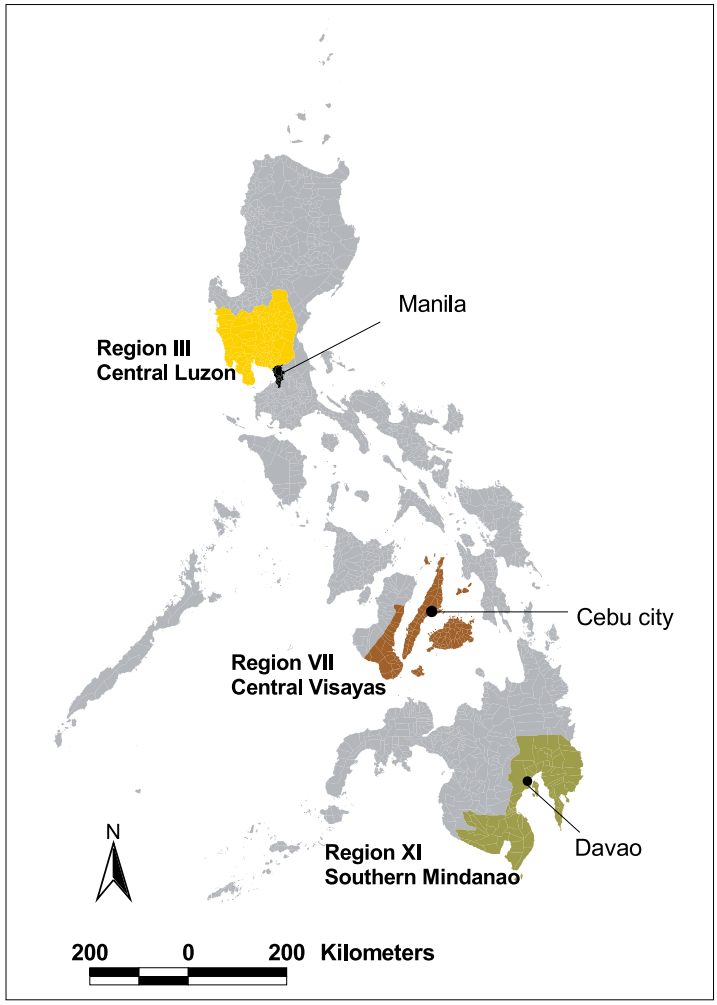

Figure 1. The three study regions (Regions III, VII and XI). Data source: Center for International Earth Science Information Network

for the Visayas and Mindanao areas. Region XI or Davao, with its administrative centre at Davao City, is largely rural and agricultural.

Regions III, VII and XI cover the most urbanized parts of the Philippines' three major island groups (while Region 3 does not cover Metro Manila, it is adjacent). However, significant portions are still classified as official forest lands[2] (36, 42 and 60% respectively). Regions III and VII contain more Alienable and Disposable lands[3] compared with forest lands, and have little remaining forest (Table 2, FMB 2001). In contrast, Region XI has more forest land and relatively high forest cover, reflecting its less urbanized state.

Table 2. Forest, rehabilitation and socio-economic data

Rehabilitation rate and socio-economic variables	Region III	Region VII	Region XI
Absolute forest rehabilitation rate ha (1993-2001)	30522	23619	45446
Relative rehabilitation rate as % of forest land (1993-2001)	3.9	4.4	2.8
Forest land (FMB 2001)	771,174	535,919	1,634,235
Forest cover ha (FMB 2001)	194,500	19,000	704,790
Population (million) (2000)	8.0	5.7	5.2
Population density per km^2 (2000)	437	359	183
Population growth rate (1995-2000)	3.17	2.76	2.54
Population in forest land	90,799	355,167	412,865
Population density in forest land per ha	0.12	0.66	.021
Human Development Index	High	Low	Low
Percent poverty incidence 2000	17	32	32
2002 Gross Regional Product	316,000	286,000	220,000
Percent of families dependent on forestry and hunting	0.17	0.24	0.19
Percent of households using fuelwood	14	60	56

Source: Forest and rehabilitation data (FMB 1993-2001), Socio-economic data (National Statistical Coordination Board 2002)

About a quarter of the families in Region VII depended on forestry and hunting, slightly higher than in the other two regions (Table 2). More than half the families in Regions VII and XI used wood as fuel compared with less than 15% in Region III. This suggests that families in Region VII depend the most on forest resources. Regions VII and XI were poorer and ranked lower on the Human Development Index[4] compared with Region III (National Statistical Coordination Board 2002).

[2] The term "forest land" refers to all property owned by the national government that is still in the public domain. It is a legal, not a botanical description. In reality, much "forest land" does not contain forests.

[3] Alienable and disposable lands refer to lands that have been officially classified as not needed for forest purposes. They are open for conversion to alternative use.

[4] Human Development Index is a measure of human well-being that aggregates several development indicators.

The relative reforestation rate (area reforested over total forest land) from 1993-2001 correlates inversely with the regions' remaining 2001 forest cover and with the population density (Table 2). Region XI with the highest forest cover and low population density had the lowest rehabilitation rate as a proportion of forest land. Region VII with the lowest forest cover and high population density overall and on forest land, had the highest rehabilitation rate. This implies that the incentive to rehabilitate may be stronger in regions with less forest cover and higher population density. Other regional socio-economic variables are not well correlated with the relative rehabilitation rate.

Cumulatively from 1993-2001, the non-governmental sector (particularly the private commercial sector) has been the dominant player in rehabilitation efforts in Region XI (Figure 2), given the favourable agro-climatic conditions and low population density on forest land. But in Region VII, with its very low forest cover and high population density living on forest land and depending on forest products, the DENR has been the main player.

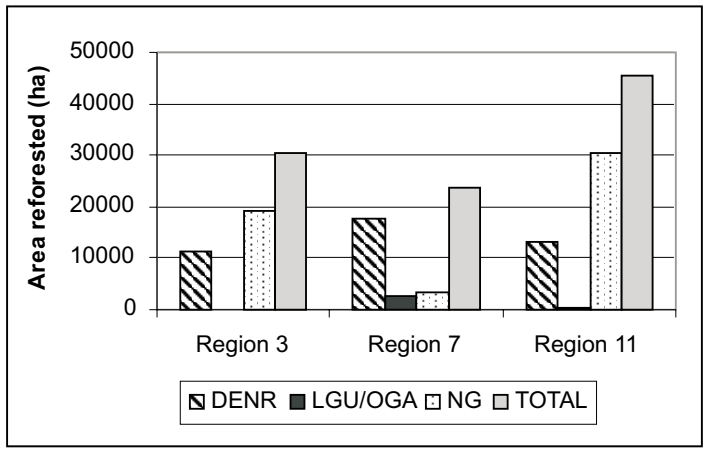

Figure 2. Total area reforested 1993-2001
Source: Forestry Statistics (FMB 1993-2001)
NG: The non-government sector includes timber license holders, industrial and socialised industrial forest management agreement holders (IFMA and SIFMA), NGOs and POs

2. Rehabilitation issues raised by regional stakeholders

2.1 Technical problems and concerns

Workshop participants from each region raised about five technical issues needing to be addressed (Table 3). Government project representatives in Region III cited

Table 3. Technical problems and concerns

Issues	Region III	Region VII					Region XI			
	Gov[5]	Gov	PO	LGU	NGO	Priv[6]	Gov	PO	LGU/ NGO	Priv
1. Implementer lacks technical capability				X	X	X		X	X	X
2. Site/tree growth problems. Improper species-site matching	X					X	X	X		X
3. Pest infestation	X		X							
4. Fires	X		X							
5. Monocultures, exotic species					X		X			
6. Silvicultural treatments not applied, low quality products	X						X			
7. Improper handling of seedlings								X		
8. No source of quality seeds & planting materials	X									
9. Areas allocated not suitable for growing timber trees										X
Total	**5**		**2**	**1**	**2**	**2**	**3**	**3**	**1**	**3**

the most number of issues. Despite facing many technical problems, government agencies felt technically competent while the other actors felt they had inadequate technical capability and needed support.

Species-site matching was another commonly cited problem, perhaps related to the fact that a few dominant species such as *Gmelina arborea,* mahogany (*Swietenia macrophylla*) and narra (*Pterocarpus indicus*) are planted irrespective of the site conditions. This has led to a high mortality rate and poor performance of seedlings, particularly in Region XI.

2.2 Policy problems and concerns

Inconsistent or contradictory policies were the most common problem affecting rehabilitation across sectors and regions (Table 4). For example, tree planting is promoted in the uplands and yet harvesting and transport regulations are

[5] Gov – Government agencies
[6] Priv – Private sector

Table 4. Policy problems and concerns

Issues	Region III	Region VII					Region XI			
	Gov	Gov	PO	LGU	NGO	Priv	Gov	PO	LGU/ NGO	Priv
1. Inconsistent or contradictory policies	X	X		X				X		X
2. Non-continuity of policies				X				X		
3. No clear policies on utilising products from the rehabilitated areas & harvesting mature plantations		X					X			
4. DENR project goals oriented to physical planting targets	X						X			
5. Poorly-defined objectives							X			
6. No investment incentives										X
7. Good policies but poor implementation									X	
8. Government share of harvest returns too big						X				
9. Higher taxes/ha for large land holders – no incentive to rehabilitate						X				
10. IPRA law very powerful & may pose constraints to efforts								X		
11. Non-issuance of NCIP* clearance for rehabilitation activities								X		
Total	**2**	**2**		**2**		**1**	**3**	**4**	**1**	**2**

*NCIP – National Commission for Indigenous People

prohibitive. Government representatives in two regions raised concerns about project goals being oriented towards physical planting targets without clear harvesting guidelines. Poor policy continuity was pointed out by LGUs in Region VII and POs in Region XI.

The private sector in Region VII found that the large government share of harvest returns and higher taxes per hectare for large landholders provided little incentive to rehabilitate. Region XI had a wide range of policy issues negatively affecting rehabilitation: poor policy implementation, limited incentives for the private sector and constraints posed by the Indigenous Peoples Rights Act (IPRA).

2.3 Management problems and concerns

Government representatives in Regions III and XI cited the most management problems, such as poor knowledge of project implementation, low capability of organizations assisting the POs, inadequate information and education campaigns (IEC), nepotism in hiring laborers and staff, high DENR project staff turnover and poor maintenance and protection (Table 5). POs also mentioned high DENR staff turnover, besides inadequate social preparation to ensure viability and problems with distributing benefits among members.

Table 5. Management problems and concerns

Issues	Region III	Region VII					Region XI			
	Gov	Gov	PO	LGU	NGO	Priv	Gov	PO	LGU/ NGO	Priv
1. Poor maintenance; Limited funds and staff; Monitoring not sustained after project ended	X	X			X		X	X	X	
2. High turn-over of DENR project staff	X							X		
3. Poor knowledge of project implementation							X		X	
4. Poor social preparation								X		
5. Inequitable sharing of benefits among PO officers and members								X		
6. Inadequate IEC* leading to negative attitudes	X									
7. Nepotism in hiring laborers, staff							X			
8. Low capability of assisting organizations & failure to meet their commitments	X									
Total	**4**	**1**			**1**		**3**	**4**	**2**	

* IEC - Information and education campaign

An issue cited across all groups except the private sector was poor maintenance and protection. This is because rehabilitation is equated with tree planting. After planting, there is little emphasis on maintenance. Also many government and foreign-assisted projects including the Forestry Sector Project Loan I *contract reforestation* sites were allocated funding for only a few years. Monitoring was not sustained after the project ended and many areas became open access again.

Within a short time, they were cleared for agriculture or left to burn.

2.4 Financial problems and concerns

The most common financial problems were limited funding or poor access to funding for rehabilitation and continued maintenance, as well as delayed funding releases from the government (Table 6). Timely funding releases are crucial because planting has to be done during the few wet months. The absence of a mechanism to make projects financially viable was recognised in Region VII.

Table 6. Financial problems and concerns

Issues	Region III	Region VII					Region XI			
	Gov	Gov	PO	LGU	NGO	Priv	Gov	PO	LGU/ NGO	Priv
1. Limited funds for rehabilitation	X			X	X		X	X		
2. Delayed release of funds	X			X	X			X		
3. Improper utilisation, allocation of funds	X						X			
4. Poor access to credit, high interest rates						X				
5. No mechanism to make projects financially sustainable, to generate income & reinvest		X								
Total	**3**	**1**		**2**	**2**	**1**	**2**	**2**		

2.5 Socio-economic problems and concerns

Region VII cited many socio-economic issues, followed by Region III (Table 7). This matches with Region VII's high population density on forest land, coupled with high poverty levels and dependence on forest products. The most notable social issue stated by POs and other sectors was the lack of livelihood opportunities for upland farmers. The farmers are more concerned with earning a living from the land now rather than waiting for trees to mature. Interestingly, non-PO sectors were concerned about the apathy of villagers to rehabilitation projects, encroachment, peace and order problems and population pressure. The perception that upland communities do not support rehabilitation could be due to the fact that their interests are not taken into account when planning projects. NGO/LGU representatives in Region XI specifically mentioned that indigenous communities living in the forest areas were not officially recognized.

Table 7. Socio-economic problems and concerns

Issues	Region III	Region VII					Region XI			
	Gov	Gov	PO	LGU	NGO	Priv	Gov	PO	LGU/ NGO	Priv
1. Lack of livelihood opportunities; poverty	X		X		X				X	
2. Indifference & apathy among some villagers towards rehabilitation projects	X			X	X					
3. Peace & order	X			X		X				
4. Absentee claimants; encroachment				X		X				
5. Population pressure for grazing & farming	X	X								
6. Indigenous forest communities not recognized									X	
7. No marketing support for forest & farm products, low prices	X		X		X		X			X
8. Lack of infrastructure, roads & transport to market			X		X	X				
9. Need to study product development						X				
Total	**5**	**1**	**3**	**3**	**4**	**4**	**1**		**2**	**1**

Almost all sectors were concerned about marketing. The government did not provide much marketing support for tree plantations and the lack of farm-to-market roads makes transporting logs difficult.

2.6 Governance problems and concerns

Different sectors in each region raised governance problems in the workshops (Table 8). NGO participants in Region VII strongly cited lack of LGU support, local political unwillingness to enforce forestry laws, political interference and corruption as factors undermining rehabilitation success.

Region III government participants mentioned insufficient support for LGUs, political interference and corruption. The private sector in Region XI raised issues such as insufficient support for LGUs, lack of legal support during litigation against violators, and bureaucratic delays and expense in processing documents.

Table 8. Governance problems and concerns

Issues	Region III	Region VII					Region XI				
	Gov	Gov	PO	LGU	NGO	Priv	Gov	PO	LGU	NGO	Priv
1. Political interference	X				X						X
2. Corruption	X				X						
3. Some local chief executives lack political will to enforce forestry laws & regulations				X	X						
4. Lack of awareness and support from some LGU officials					X			X			
5. Insufficient support for LGUs	X										X
6. Support for project uncertain with changes in political leadership				X							
7. Lack of legal support during litigation against violators											X
8. Non-payment by POs of government share of harvest benefits								X			
9. Some POs misuse CBFM projects	X										
10. Bureaucratic delays & expense to process documents											X
11. Weak enforcement of contracts	X										
Total	**5**			**2**	**4**			**2**			**4**

All regions cited political interference, which, coupled with corruption among local leaders, can stifle civil society initiatives. Changes in political leadership also lead to changes in priorities, negating the efforts of the previous administration, as stated by the LGU sector in Region VII.

3. Recommendations

Workshop participants provided many recommendations to address the key rehabilitation bottlenecks they identified (Tables 9-14). Common recommendations across sectors and regions were to:

- Build implementers' capacity.
- Provide alternative livelihoods or livelihood assistance.
- Allocate more funds for plantation development and long-term protection.
- Strengthen POs; provide social preparation to manage the resources.
- Provide technical assistance.
- Strengthen policies.
- Strengthen community awareness.
- Improve roads, transport, infrastructure.
- Undertake proper species-site selection.
- Release funds in a timely manner.
- Develop marketing systems and links to domestic and foreign markets.

Table 9. Technical recommendations

Recommendations	Gov	PO	LGU	NGO	Priv
1. Provide technical assistance		2X*			2X
2. Undertake proper site selection	X**				2X
3. Promote indigenous species use and allow land to regenerate for non-commercial forest rehabilitation					X
4. Establish regional seed centre and clonal nursery	X				
5. Use tried and tested species	X				
6. Strengthen silvicultural research and transfer the technologies to end users	X				
7. Provide funds for silvicultural treatment and management	X				
8. Provide fire-fighting tools and equipment	X				
9. Build biodiversity conservation into all rehabilitation projects				X	
10. Use chemical and other methods to control pests		X			
11. Plant some species as fire breaks		X			

* PO groups in two regions made the recommendation
** A Government group in one region made the recommendation

Table 10. Policy recommendations

Recommendations	Gov	PO	LGU	NGO	Priv
1. Review and modify existing policies to make them acceptable and effective	2X	X			X
2. Establish a policy to facilitate marketing			X	X	
3. Ensure tenure security	X				X
4. Private investors must be given incentives to sustain development					2X
5. Make rules and regulations easy to follow					X
6. Reduce government share in harvest profits					X
7. Enact local ordinance to sustain project despite leadership changes			X		
8. Formulate policies that would address erring contractors	X				

Table 11. Management recommendations

Recommendations	Gov	PO	LGU	NGO	Priv
1. Build implementer's capacity	2X	2X	X	X	2X
2. Strengthen POs; provide social preparation to manage the resources	2X	2X			
3. Choose assisting organisations from the local area	X	X			
4. Select NGOs rigorously based on technical capability and commitment	X				
5. Retain government staff and personnel handling the project	X				
6. Conduct resource surveys, mapping and planning	X				
7. Ensure transparency among PO members		X			

Table 12. Financial recommendations

Recommendations	Gov	PO	LGU	NGO	Priv
1. Allocate more funds for plantation development and long-term protection	2X	2X		X	
2. Release funds in a timely manner	X	X	X		
3. Provide financial assistance					X
4. Use funds for allocated purposes	X				
5. Improve financial management			X		
6. Reduce paperwork for fund release				X	
7. Treat reforestation as a business so that marketing, employment, benefits and sustainability will be addressed	X				

Table 13. Socio-economic recommendations

Recommendations	Gov	PO	LGU	NGO	Priv
1. Provide alternative livelihoods or livelihood assistance	2X	2X		X	
2. Create vested interest for communities to protect area				X	
3. Encourage local community participation	X				
4. Issue land titles to long-term residents for forestry purposes	X				
5. Strengthen community awareness	X	X	X	X	
6. Solve the insurgency problem					X
7. Improve roads, transport, infrastructure	X	X		X	X
8. Develop marketing systems and links to domestic and foreign markets	X	X		X	
9. Help with product development					X

Table 14. Governance recommendations

Recommendations	Gov	PO	LGU	NGO	Priv
1. Establish strong partnership with LGU		X		X	
2. Provide incentives for local leaders to support and protect rehabilitation area				X	
3. Strengthen forestry law enforcement				X	
4. Minimize corruption				X	
5. Make LGU aware of DENR programs and guidelines					X
6. Create ENROs[7] in LGUs as a continuing body to support projects despite political changes			X		
7. Regularize CBFM division of DENR to avoid turnover		X			

4. Summary

Participants in the consultative workshops in Regions III, VII and XI came from the Government (DENR and OGA), LGU, NGO, PO, and private sectors. They identified many technical, policy, financial, management, governance and socio-economic constraints to rehabilitating forests in their regions. The main rehabilitation issues raised and the actors raising the issues were different across regions. Region XI raised many policy-related issues. Region VII raised many socio-economic issues, reflecting the high density of people living on its forest land and depending on forest products. Region XI has a very low population

[7] ENRO – Environment and Natural Resources Officer

density on forest land and raised very few socio-economic issues. In the technical, governance and financial aspects, there was not much difference between regions in terms of number of issues raised. The PO and DENR raised the most issues in Region XI, where the private and other non-government sectors have been the dominant forest rehabilitation actors from 1993-2001. Likewise in Region VII, a DENR-dominated rehabilitation area, non-DENR actors appeared to be raising the issues of concern.

The most commonly cited problems across sectors and regions were:

- Poor long-term maintenance due to limited funds and staff after project ends.
- Lack of species-site matching.
- Lack of technical capability to rehabilitate.
- Inconsistent or contradictory policies.
- Limited funding or poor access to funding.
- Delayed release of funds.
- Lack of livelihood opportunities for upland farmers.
- Lack of marketing support and farm-to-market roads.
- Political interference.
- Apathy of villagers to rehabilitation projects.
- Peace and order problems.

The last two concerns were raised mainly by the non-PO sectors. Perceptions that upland communities do not support rehabilitation efforts could be due to the fact that their interests are not taken into account when planning projects. The workshop participants finally provided specific recommendations to address the key rehabilitation bottlenecks that they identified.

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Chapter V
Conclusions and recommendations

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The Philippines has invested a lot of money and effort to rehabilitate[1] its degraded forest lands over the last century. Coming back to our questions in Chapter I, have these efforts actually increased forest cover, helped impoverished upland communities, enhanced biodiversity and environmental services, or contributed to meeting timber needs? Did they address the underlying degradation causes and were the rehabilitated areas maintained in the long term? What are the most promising approaches? Which ones can be replicated at low cost by local institutions and actors? Which ones are self-sustaining at the local level? What enabling factors are required to sustain the efforts?

Forest cover continued to decline at least until 1988 although 849,304 ha were planted (188,374 ha from 1910-74 and 660,930 ha from 1975-87). A high deforestation rate was ongoing simultaneously and little is known about long-term survival of the plantations. From 1988-2003, forest cover registered a significant 0.7 million ha increase, which government and other actors attribute to regrowth vegetation, plantations established through reforestation projects (936,542 ha planted from 1988-2002), and spontaneous tree growing by farmers and others on public and private lands.

[1] See Chapter I for details on rehabilitation terminology.

Forest cover increased on 28 project sites sampled in this study while planted areas were largely destroyed on 12 sites (Chapter III). The problems were mainly social, institutional and financial rather than technical. The 12 sites included most Forestry Sector Project I sites (FSP I funded through an ADB loan) and government reforestation sites with limited short-term or ad hoc funding and little local involvement and stake. These projects failed to address a key underlying cause of degradation: the livelihood needs of large upland communities with inequitable access to resources. Forestry Sector Project II (FSP II) and other participatory projects with local benefits did better, along with private sector initiatives that could maintain and protect the areas in the long term. However, the long-term sustainability of the rehabilitated areas under FSP II and other recent efforts is uncertain and depends on how production and reinvestment strategies fare in the future. The relative contribution of project-based versus spontaneous tree growing efforts to forest cover increase remains undetermined.

In many government and private sector reforestation sites, **local communities** were mainly provided short-term employment and income, and their claims over the land were not formally recognised through tenure rights. In early Department of Environment and Natural Resources (DENR) projects, local communities were even evicted in some cases. Communities were to derive long-term benefits from agroforestry, timber production and other livelihood schemes[2] in recent participatory projects implemented by peoples' organisations (POs), non-government organisations (NGOs), and some local government units (LGUs) and other government agencies (OGAs). However, on most sites, forest products were yet to mature and other livelihood schemes were yet to generate income. Communities and farmers would need long-term support from government and non-government agencies to effectively harvest and market the forest products and generate income from the rehabilitated areas.

Organised communities were able to obtain secure tenure through community-based forest management (CBFM) and other agreements as part of participatory reforestation projects. However, the granted land tenure can be easily revoked as demonstrated by the DENR in January 2006 when they cancelled all CBFM agreements in eight regions following reports of some logging violations. Not only is land tenure insecure, but also tenure over the resources on the land. The latter is affected by unclear harvesting policies for watersheds and other areas, frequent suspensions of harvesting rights in response to environmental and political crises, and bureaucratic requirements that make it difficult to obtain

[2] 'Livelihood schemes' refers to income-generating activities or projects for communities such as rattan gathering and processing, food processing, livestock raising, and setting up convenience stores. Sometimes farming and growing fruit trees are also considered livelihood activities.

resource use permits. There is no updated legislation that clarifies and secures community land and resource use rights despite communities being appointed as stewards of the nation's forest lands. The last legislation was the forestry code of 1975, when large concessions were the key players and there was little concern for community needs and rights.

However, many foreign-funded participatory projects have helped to organise, train and empower communities to effectively manage and benefit from their lands and resources, and seek outside financial support. Such community empowerment was brought to bear in early March 2006 when the PO federation successfully argued its case with the DENR secretary and persuaded him to annul the blanket cancellation of CBFM agreements in eight regions.

With the large exception of FSP I, the projects (including private sector and DENR projects) may have enhanced **biodiversity** through planting many tree species per site, including native species. Projects that specifically sought to enhance biodiversity also had natural regeneration in the understorey. Pests and disease were not a problem on most sites, thanks to the many species planted. Planting was done mostly on open lands and not by converting existing forests, thus leading to increases in tree or forest-related biodiversity on the project sites. However, at the landscape level, mahogany and *Gmelina arborea* may have become more dominant because they were commonly planted on most sites. Local observers suggest that faunal diversity increased on most sites.

Project managers, evaluators and local observers suggest that the projects have had neutral to positive effects on **soil and water properties,** including peak flood levels and landslide frequency. Opinions, however, tended to vary among and within stakeholder groups. Apart from a few studies that showed that hedgerows on farmlands reduced soil erosion and surface runoff and improved fertility in the Philippines, empirical evidence is scarce on how reforestation projects affect water and soil properties.

The rehabilitation projects have so far contributed little to meeting national **timber needs** and seem unlikely to do so in the near future. Except for the private sector, most project implementers have no clear marketing plans or strategies. The Government and civil society have failed to create an enabling environment for timber production and income generation through rehabilitating degraded forest lands, despite engaging the community and private sector to do so. Disincentives to forest plantation establishment include:

- High production costs and poor markets for plantation-grown timber and timber products, particularly in Region XI where natural forest timber is plentiful

- Lack of marketing support
- Harvesting policy conflicts
- Frequent logging suspensions, and
- Bureaucratic procedures.

Plantation-grown timber cannot compete against cheap imports and illegal natural forest timber. Where there was an enabling environment such as scarce resources and good demand in the local area, spontaneous tree growing had occurred on public and private lands.

Rehabilitation of the vast upland areas is **increasingly critical** to meet the nation's environmental, timber and socio-economic needs in the face of rising resource scarcity and environmental problems. About 5.5 million ha may need to be rehabilitated (see Chapter II). However, the Philippines appears to be moving backwards on achieving this goal. All sectors have reduced their rehabilitation efforts over the last decade due to political instability, lack of incentives and funding. Government agencies conduct sporadic reforestation activities based on available external funding and political interests. The private sector indicates interest in investing in rehabilitation but finds the incentives are inadequate. The communities depend on the forest lands for their livelihoods and could continue to rehabilitate and manage areas allocated through small grants or income generation and reinvestment. However, future income generation depends on the enabling policy framework.

The most **promising approach** at the moment is *enabling local communities and farmers* to rehabilitate and manage the forest lands and directly benefit from their efforts. This could be achieved with strong support from government and non-government agencies. This approach could address the underlying degradation causes (local livelihood pressures and inequitable access to resources) and lead to better livelihood options, community empowerment, long-term maintenance and productive use of the land for multiple benefits. Since DENR already declared CBFM as the national strategy for sustainably managing the forest lands, the Government should focus on providing three main enabling factors for success: stable supportive policies; secure resource rights; and marketing and other support. *Private sector efforts* could pay off too if they engaged better with the communities and also had a more enabling policy environment and marketing support. The Paper Industries Corporation of the Philippines' (PICOP) tree planting partnerships with farmers in the 1970s is a good example of what partnerships can potentially provide. Issuing *short-term reforestation contracts* to different actors as under FSP I is an inferior model that failed on many fronts: low tree survival, inadequate socio-economic benefits and uncertain timber production.

Most forest lands under government administration without community or private tenure agreements have no effective and operational long-term plans and maintenance, and depend on ad hoc funding. Many direct *government-implemented reforestation* efforts failed to provide for long-term local livelihood needs, address the underlying degradation causes, maintain the rehabilitated areas or produce timber. The government agencies and NGOs are better off providing a support function while communities, farmers and the private sector rehabilitate and manage the forest lands for timber and other commercial and household benefits. The *government and non-government agencies* could be more directly involved in rehabilitating conservation areas for biodiversity and other environmental services, but they still need to design the projects better to actually meet these objectives and also involve and benefit local communities for long-term sustainability.

Many foreign-funded projects supporting farmer and community efforts such as FSP II came at a high **economic cost**. They cannot be replicated at the local level and big loans lead to much indebtedness, particularly in the absence of operational-cost recovery and reinvestment mechanisms once the projects end. Similar sorts of projects with local community participation and benefits and strong technical assistance have been attempted with some success by certain LGU, OGA and foreign grant-supported local projects at lower costs (≤ 10,000 pesos per ha). These projects may not have undertaken intensive community organising activities as under FSP II, yet they appear promising. This suggests that participation, technical assistance and deriving local benefits are particularly critical for success.

Dependence on high-cost donor projects, huge loans and ad hoc public funding from the Government does not favour **long-term sustainability**. Huge public investments and grants are not as valued as local personal investments and they also lead to graft and corruption. If there is an enabling environment, a little investment is often sufficient or even private investment will be undertaken as long as stable income can be generated from the activities. This is also amply demonstrated by spontaneous tree-growing activities undertaken when there is local demand for forest products and people adopt successful examples from neighbouring farmers and communities. Local communities and farmers may need modest financial support from LGUs and DENR or even foreign donors for the initial rehabilitation, after which the efforts could be self-sustained through production, income generation and reinvestment. Taxes generated from income earned could be used by LGUs for further investments.

Key recommendations

Below we present specific strategic and operational recommendations for policy makers, national and local government agencies, NGOs, POs and farmers' groups, the private sector, donors and research institutions to support, plan, implement and sustain forest rehabilitation in the Philippines.

Policy makers and legislators

1. Provide a stable and long-term enabling environment for sustainable forest rehabilitation and management by endorsing an updated legislation that recognises and secures tenure holders' rights and responsibilities and harvesting policies for different areas. The legislation should be drafted through a well-facilitated public consultation process involving all stakeholders and using the latest scientific information.
2. In view of the livelihood needs of large upland populations, acknowledge and involve communities as partners in forest rehabilitation and management and incorporate community participation into the legislation.
3. Define the roles of various actors in forest rehabilitation and incorporate those roles into the legislation. Entrust commercial forest rehabilitation and management to communities, farmers and the private sector, with the government agencies and NGOs playing a long-term supportive role. Government agencies and NGOs could focus on rehabilitation and management of conservation areas for environmental services and biodiversity but even here they should involve and benefit communities for long-term sustainability.
4. Acknowledge the forests' production and income generation functions and incorporate these functions into the legislation. Provide adequate incentives to communities, farmers and the private sector for viable commercial production through rehabilitating degraded forest lands. Incentives could include credit facilities, tax and fee reductions, technical assistance, marketing support, longer-duration tenure, revised wood import regulations to better favour local tree growers, and incentives to forest industries to obtain timber from rehabilitated areas.
5. Develop clear and consistent legislated policies for timber harvesting and other resource use on lands with different legal status and tenure arrangements such as timberlands, watersheds, protected areas, industrial and socialised industrial forest management agreements (IFMA and SIFMA) and CBFM agreements. Simplify policies and bureaucratic requirements to avoid confusion, misinterpretation and abuse, and enable effective management and legal compliance.
6. Earmark an adequate annual budget for government agencies to support rehabilitation and management activities executed by local people and the

private sector, as well as for direct administration of conservation areas. Avoid accepting any more large forestry sector loans; they are unsustainable. Explore alternative finance mechanisms, for example the evolving Clean Development Mechanism.
7. Generate new jobs and income-generating options in the lowlands to avoid further mass migration to the uplands for economic reasons.

DENR and other government agencies

1. Avoid setting up own independent rehabilitation projects for production; these have little chance of success. Instead provide technical, marketing, management and financial support to POs, farmers and the private sector. Build their capacity and empower them to sustainably rehabilitate and manage the forest lands, derive benefits and generate or raise the necessary funds. Increase the number of local extension workers and ensure knowledge is properly transferred when DENR staff turn over, to provide continued support.
2. Allocate remaining open-access lands to local farmers, communities and the private sector, and provide secure tenure and income-generating options. Retain only priority conservation areas under direct government administration.
3. Improve road and transport systems[3], and provide marketing support for products arising from the rehabilitated areas. Support the development of market associations, information systems and other marketing support tools.
4. Support and encourage private sector-community partnerships such as outgrower schemes or joint management with profit-sharing.
5. Design appropriate rehabilitation projects for biodiversity and watershed conservation in protected areas and reservations, such as developing complex forests of mixed species and strata for biodiversity conservation. Engage communities in managing these areas as well through participatory processes and allow communities to benefit from fruits, other non-timber forest products (NTFPs) and livelihood schemes, if not from timber. Set up long-term management plans and provide staff and financial resources to administer these areas.
6. Develop quality planting material of different species and establish regional seed centres and nurseries with support from academic and research institutes.
7. Monitor and evaluate the physical, environmental and socio-economic outcomes of rehabilitation in collaboration with academic and research institutions to ensure that the initiatives meet their objectives, reduce undesirable impacts and enable adaptive management.

[3] Note that improving roads and transport systems can be counter-productive to forest protection because it increases access for outsiders. Thereby clear land ownership and protection measures should be simultaneously ensured.

8. Assess changes in forest cover resulting from rehabilitation efforts and spontaneous tree growing activities using remote sensing and geographic information systems (GIS). Develop an up-to-date database of rehabilitation initiatives and a user-friendly management information system to facilitate science-based management decisions and keep track of rehabilitation progress.
9. Strengthen forestry law enforcement. Penalise only individual violators and those who patronize the illegal activities, not all actors. Acknowledge those who fulfil their responsibilities and abide by the rules.
10. Cross-link and integrate forest rehabilitation with other sectoral concerns within DENR and outside DENR. Integrate forest rehabilitation efforts into the land use and development plans of LGUs to ensure sustainability after formal project support ends.
11. Given limited resources and the need for income generation to be successful, prioritise rehabilitation activities in forest-poor areas with high demand for forest-related products such as Region VII where the chances of success are higher. Region XI, with its large natural forest area, should focus more on plantation products that have stable market demand such as *Paraserianthes falcataria*, rubber and fruit trees. Develop criteria for prioritisation based on the total potential benefits to be derived from rehabilitating different areas.

NGOs

1. Avoid setting up own independent rehabilitation projects with a pure conservation goal; these have little chance of success. Instead, provide technical, marketing, management and financial support to POs and farmers, and help them develop viable livelihood schemes. Build their capacity and empower them to sustainably rehabilitate and manage the forest lands, derive benefits and generate or raise the necessary funds. Strengthen community associations to be able to negotiate successfully and safeguard community interests in the face of disruptive policy changes and other events.
2. Help design, implement, monitor and evaluate rehabilitation projects for biodiversity and livelihood benefits.
3. Acknowledge and support the forests' production and income generation functions to succeed in and sustain any rehabilitation efforts. Production is required to meet industrial and household demand, and generate income for impoverished upland communities and funds for managing the area. Not all logging is destructive and forests can be sustainably managed for various goods and services. Logging violations by some should not lead to pressures for total logging bans, harming the well-intentioned actors as well.
4. Recognise that forests can affect peak river flows and floods on a small-scale, but their effects on major flood and landslide events over a large basin are relatively small. Political lobbying to curb all logging because of perceived links

between forests and major floods could end up destroying local livelihoods and incentives for tree growing along with related environmental benefits.
5. Lobby for community/farmer upland rehabilitation and management for multiple benefits. This is the only model that has a high chance of succeeding in the populated uplands, while providing access to resources and income to poor local communities.

LGUs

1. Avoid own independent projects and instead support community/farmer upland rehabilitation and management for multiple benefits in areas without timber harvesting restrictions. In areas with timber harvesting restrictions such as watersheds, ensure a high degree of local participation and benefits from NTFPs and other livelihood schemes.
2. Support self-sustaining and low-cost initiatives at the local level that generate revenue while providing environmental services and supporting local livelihoods.
3. Create "Environment and Natural Resources Officers (ENROs)" in LGUs as a focal point to provide continuing support to projects despite changes in local politicians and turnover in administration.
4. Improve roads and transport[4], and provide marketing support for products from rehabilitated areas.
5. Integrate forest rehabilitation efforts into LGU's land use and development plans to ensure sustainability after formal project support ends.

POs and farmer groups (with support from other agencies)

1. Match species to sites, use appropriate silvicultural techniques, and use mixed species to reduce pest and market risks. Incorporate fruits and other NTFPs to get shorter-term income and reduce market risks.
2. Promote collective action, learning and information exchange among community members and other stakeholders in the area to build local capacity to rehabilitate and sustainably manage the areas.
3. Generate income through sale of forest products or other livelihood schemes, and reinvest in the area to make it self-sustaining.
4. Explore the markets, develop marketing strategies and plant marketable species. Develop marketing associations and community-based market information systems. Add value to products.
5. Explore private sector-community partnerships in the production and marketing of timber.

[4] See footnote 2

6. Avoid abusive practices and violations of the law that will backfire later in the form of policy constraints that affect the entire sector.
7. Strengthen community organisations and network with other communities and agencies to be able to negotiate successfully and safeguard community interests.

Private sector

1. Match species to sites, use appropriate silvicultural techniques, and use mixed species to reduce pest and market risks.
2. Develop marketing strategies and plant marketable species. Develop marketing associations and market information systems. Add value to products and explore certification for higher value.
3. Develop partnerships and share responsibilities and benefits with local communities to avoid failure and fulfil social responsibilities.
4. Avoid abusive practices and violations of the law that will backfire later in the form of policy constraints that affect the entire sector.

Donors and development agencies

1. Support participatory rehabilitation projects benefiting communities or farmers that can be replicated locally at little cost and are self-sustaining. Bear in mind that past high-cost projects have not been sustainable or replicable.
2. Have longer project durations for sustained impact. Help to develop local institutions for long-term management after the project ends and ensure continued financial sustainability through income generation and reinvestment.
3. Design the projects to meet specific objectives such as improving livelihoods or water quality, and consider all relevant technical and socio-economic issues.
4. Support the development of market information systems and other marketing support tools.
5. Include participatory action research and technical evaluation of environmental and socio-economic impacts in the project design and implementation.
6. Support participatory action research and empirical research assessing the environmental and socio-economic impacts of forest rehabilitation (project-based and spontaneous).
7. Support policy reform processes related to forest rehabilitation such as the pending Sustainable Forest Management legislation.

Academic and research institutes

1. Provide training to government agencies (LGUs and DENR field staff), NGOs, POs and the private sector engaged in rehabilitation on species-site matching, silvicultural techniques, participatory methods, sustainable management, production, marketing, organisation and finance. Also provide training

on rehabilitation project design for specific objectives such as biodiversity conservation or arresting soil erosion.
2. Incorporate the whole range of rehabilitation issues into university curricula and turn out trained professionals who can provide technical assistance to project implementers and support agencies.
3. Perform participatory action research and technical evaluations of environmental and socio-economic impacts of rehabilitation (project-based and spontaneous) and disseminate the information widely.
4. Assess changes in forest cover as a result of rehabilitation efforts and spontaneous tree growing activities using remote sensing and GIS.
5. Perform policy research, provide empirical information and engage in discussions for policy reform.
6. Disseminate scientific findings and engage in a dialogue with NGOs and civil society to alter prevailing attitudes that all timber harvesting is negative. Timber harvesting can be a part and parcel of sustainable forest management which includes plantation establishment, maintenance, protection, harvesting, and income generation.

Review of Forest Rehabilitation

Lessons from the Past

SERIES

Rehabilitación de áreas degradadas en la Amazonía peruana
Revisión de experiencias y lecciones aprendidas

Recuperação de áreas alteradas na Amazônia brasileira
Experiências locais, lições aprendidas e implicações para políticas públicas

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One century of forest rehabilitation in the Philippines
Approaches, outcomes and lessons

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Histories, realities and futures

Has all the effort and money spent on rehabilitation in the Philippines over the last century actually increased forest cover? Has it helped impoverished upland communities, enhanced biodiversity and environmental services or contributed to meeting timber needs? Were the underlying causes of degradation addressed and were rehabilitated areas maintained in the long term? What are the most promising approaches?

Forest rehabilitation is increasingly critical to meeting the nation's environmental, timber and socio-economic needs as resources become scarcer and environmental problems worsen. This report presents the main results of a study assessing past and ongoing rehabilitation efforts. It includes a national-level review of forest rehabilitation, detailed analysis of 46 sample projects, and stakeholder perspectives from the three study regions (Regions III, VII and XI).

The initiatives analysed range from government-implemented reforestation projects to community-based forest management and private sector initiatives. They differ in scale, objectives, costs, implementation strategies, and how much socio-economic and institutional aspects were considered. The study revealed that the most promising approaches were those that enabled local communities and farmers to rehabilitate and manage the forest lands in a participatory manner and directly benefit from their efforts. However, long-term sustainability depends on stable, supportive policies; secure resource rights; and marketing and other support. The report provides specific recommendations for policy makers, national and local government agencies, NGOs, people's organisations and farmers' groups, the private sector, donors and research institutions to support, plan, implement and sustain forest rehabilitation in the Philippines.

Review of Forest Rehabilitation
Lessons from the Past

This publication is part of a series of six country reports arising from the study "Review of forest rehabilitation - Lessons from the past" conducted by CIFOR and partners simultaneously in Indonesia, Peru, the Philippines, Brazil, Vietnam and China. The content of each report is peer reviewed and published simultaneously on the web in downloadable format (www.cifor.cgiar.org/rehab). Contact publications at cifor@cgiar.org to request a copy.

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