

Main Text

CHAPTER 1 INTRODUCTION

1.1 Authority

In response to an official request from the Government of the Republic of the Philippines (GOP), the Government of Japan (GOJ) decided to conduct a master plan study for watershed management in the Upper Magat and Cagayan River Basin in the Republic of the Philippines (the Study) and dispatched a preparatory study team to the Republic of the Philippines (the Philippines) in December 2000. An implementing arrangement on the technical cooperation for the Study (I/A) was agreed upon between the Department of Environment and Natural Resources (DENR) of the Philippines and the preparatory study team of Japan International Cooperation Agency (JICA) on December 13, 2000.

In accordance with the I/A, JICA entrusted the Study to a study team consisting of experts from Nippon Koei Co., LTD and Japan Overseas Forestry Consultants Association (Study Team).

This Final Report has been prepared by the Study Team in accordance with the I/A and taking into account the comments raised by Regional Steering Committee and Technical Working Group and National Steering Committee and Technical Working Group at presentation meetings on a draft final report on the Study on December 4 and 8, 2003, respectively.

1.2 Objectives of the Study

The objectives of the Study are as follows:

- 1) To formulate a master plan (M/P) for watershed rehabilitation and management, with the target year of 2015, which would show, among other things, priority areas for reforestation based on the results of the natural and socio-economic conditions survey and the findings of the pilot study conducted in the model sites.
- 2) To transfer relevant technology to the Philippines counterpart personnel through on-the-job training in the course of the Study.

1.3 Study Area

The Study area covers the watershed of the Upper Magat and Cagayan River Basins, which encompasses Ifugao province in the Cordillera Autonomous Region (CAR) and Quirino, Nueva Vizcaya and Isabela provinces in Region 2, with a total area of approximately 880,000 ha (**Location Map**).

1.4 Scope of the Study

The I/A stipulates that, in order to achieve the stated objectives, the Study shall consist of two phases that include the following:

Phase 1 Study (Master Plan Study)

- To collect and review the existing data and information relevant to the Study and conduct field surveys and interviews;

- To analyze the collected data and information, and identify major constraints and potentials for rehabilitation of the watershed;
- To analyze satellite data and prepare a land-use & vegetation map at a scale of 1:50,000;
- To hold a workshop for the People's Organization; and
- To formulate the master plan for watershed management.

Phase 2 Study (Pilot Study)

- To select model sites taking into account the capacity of the People's Organization, natural conditions, accessibility, etc.;
- To conduct the pilot study for watershed management in the model sites;
- To evaluate and assess the pilot study and feed back the results to further refine the master plan.

1.5 Summary of the Study

1.5.1 Study Procedure

The Phase 1 Study was conducted in three steps between March and December 2001, while the Phase 2 Study was to be carried out in eight steps during January 2002 and February 2004. Work period and major activities/output for each step are shown below.

Work Steps	Period	Activities/Output	
1. Phase 1 Study			
(1)	Preparatory work	3 '01	Preparation of Inception Report (Ic/R)
(2)	First Field Work	3 – 9 '01	Surveys, research, analyses, and preparation of Progress Report
(3)	First Domestic Work	10 – 12 '01	Analyses and formulation of draft M/P, which is compiled into the Interim Report (It/R) Selection of Target Pilot Project Sites
2. Phase 2 Study			
(4)	Second Field Work	1 – 3 '02	Preparatory work for the Pilot Study, preparation of draft Implementation Program for the Pilot Project (I/P), and preparation of the Progress Report I (P/R1) in Japanese
(5)	Third Field Work	4 – 8 '02	Preparatory work for and implementation of the first year Pilot Project, implementation of the first year Pilot Project, and preparation of the Field Report I (Fd/R1)
(6)	Second Domestic Work	9 – 9 '02	Preparation of the Progress Report for the Pilot Study (PS-Pr/R)
(7)	Fourth Field Work	1 – 3 '03	Preparatory work for the second year Pilot Project implementation, and preparation of the Progress Report 2 (Pr/R2) in Japanese.
(8)	Fifth Field Work	4 – 8 '03	Implementation of the second year Pilot Project, evaluation and analysis of the Pilot Project, and preparation the Field Report 2 (Fr/R2)
(9)	Third Domestic Work	9 – 10 '03	Refining the draft M/P and preparation of draft final M/P and preparation of the Draft Final Report (Df/R).
(10)	Sixth Field Work	12 '03	Presentation of the Df/R and conduct technology

			transfer seminar.
(11)	Fourth Domestic Work	10 '04	Preparation of the Final Report (F/R)

1.5.2 Final Report

The Final Report consists of Volume I (Main Text), Volume II (Pilot Study), and Volume III (eight Appendixes).

The Volume I presents the final M/P. Chapter 1 provides an introductory description of the Study. Chapter 2 describes the present national and regional socio-economic conditions including regional/provincial long-term development plans. Chapter 3 briefly presents institutional framework for forest/watershed management. Chapter 4 summarizes the present conditions of the Study area. Chapter 5 shows outlines of the Pilot Study. Chapter 6 discusses constraints on sustainable watershed management identified during the Study. Chapter 7 explains the proposed basic concept for the watershed management plan. Chapter 8, which is a key chapter, discusses the proposed watershed management plan. Chapter 9 shows the proposed implementation plan of the watershed management plan. Chapter 10 gives the results of the initial environmental examination of the watershed management plan. Chapter 11 presents conclusions and recommendations on the M/P.

The Volume II summarizes the methodology of the Pilot Study, outlines of the Pilot Project and results of the Pilot Study, in which lessons learned from the Pilot Study and recommendations to the M/P are discussed.

The Volume III is of details of survey, analysis, plan and so on of the sectors relevant to the M/P.

1.6 Organization for the Study

1.6.1 General

The Study is being conducted by a composite study team (the Study Team) from Nippon Koei Co., Ltd. and Japan Overseas Forestry Consulting Association (JOFCA) as part of technical cooperation under Japanese Official Development Assistance (ODA) to the Philippines, which is provided by the Ministry of Foreign Affairs via JICA. The Study Team was selected by JICA, which is the sole agency responsible for implementing technical cooperation. A JICA advisory committee has also been formed to advise JICA concerning the Study.

The Study Team is comprised of the Team Leader, 10 experts and one coordinator as shown below:

	Designation	Name of Experts	Total M/M (Field/Domestic Work)
1	Team Leader/Watershed Management	Seiji KOYANAGI	16.43 / 3.90
2	Forest Management / Natural Environment 1	Tatsuka NUMATA /Toshiaki TSUCHIYA	9.63 / 2.70
3	Forest Management / Natural Environment 2	Motohiro HASEGAWA	4.87 / 2.40
4	Community Forestry	Yuta HARAGO	5.40 / 1.80
5	Participatory Approach Development	Shinichiro TSUJI	12.46 / 2.97

6	Institutional Development	Marcelino V.DALMACIO /Florentino O.TESORO	6.70 / 2.20
7	Socio-economy	Tomoo AOKI	2.27 / 1.23
8	Agroforestry	Patric C. DUGAN	4.50 / 0.6
9	Soil and Water Conservation	Norihiko INOUE	1.50 / 0.70
10	Monitoring and Evaluation	Kazuyuki SATO	3.37 / 0.00
11	Satellite Image Analysis	Shouji SAKAINO	1.00 / 0.00
12	Coordinator	Daisuke HAMADA /Aki BABA	-

1.6.2 Philippine Counterpart

(1) Counterpart Personnel

The counterpart personnel for the Study Team were first designated in a letter from RED Alfredo S. Pascual, Regional Executive Director for Region 2, to Mr. Motofumi Kohala, JICA Philippine Office dated March 21, 2001. They consisted of four persons from DENR Region 2 office, three persons from DENR PENRO Nueva Vizcaya, and five persons from DENR PENRO Quirino. However, the counterpart personnel from PENRO offices were re-designated at the Inception meeting. The following tables show the counterpart personnel who participated in the Study.

	Name	Position	Designation	Office
1	Salome G. Bonnit	Engineer-II	Soil Conservation & Watershed Management	Region 2
2	Robert Rivera	Forester-I	Agroforestry/ISF	Region 2
3	Bernardino T. Ulep	Engineer-II	Planning/GIS	Region 2

	Name	Position	Designation	Office
1	Delia Baculanta	Forester-II	Chief Soil Conservation and Watershed Management Section	Nueva Vizcaya
2	Racheael Villanueva	LMO-II ¹	Chief Land Management Section	Nueva Vizcaya
	Laulence Agonoy	LMO-I	Land Management Officer	Nueva Vizcaya
3	Marcelino Viernes	Forester-II	Chief Law Enforcement Unit	Nueva Vizcaya
4	David Yanguas	Forest Ranger	Chief Watershed Management	Quirino
5	Alex Daniel	Forester III	Office of PENRO	Quirino
6	Edison Vergara	Forester I	T/L Community Based Indigenous Forest Management System	Ifugao
7	Sonia Vidad	Forest Ranger	Information & Communication Officer	Ifugao
8	Carol Agnapan	Forest Ranger	Assistant Planning Officer	Ifugao
9	Wenceslao Castillo	Forester I	Chief Watershed Management, S. Isidro	Isabela

/1: LMO: Land Management Officer

(2) Steering Committees

For the smooth and efficient implementation of the Study, Steering Committees have been formed at the national and regional levels. The Committees are composed of representatives from the following institutions:

1) National level

Special Order 349-01, Jul. 19, '01	
1	Director Romeo T. Acosta, FMB
2	Assistant Director Neria A. Andin FMB
3	Director Eriberto C. Argete Planning and Policy Studies
4	Mr. Robert S Jara, FASPO
5	Ms. Noriko Bamba Assist. Resident Representative, JICA

2) Regional level

Stated in I/A ¹	DENR Special Order 245-03, Jul.29 '03
1 DENR Region 2 (Chairperson)	1 DENR Region 2 (Chairperson)
2 DENR CAR	2 DENR CAR
-	3 RTD DENR Region 2
-	4 REA DENR Region 2
3 PENRO Nueva Vizcaya	5 PENRO Nueva Vizcaya
4 PENRO Quirino	6 PENRO Quirino
5 PENRO Ifugao	7 PENRO Ifugao
6 PENRO Isabela	8 PENRO Isabela

(3) Technical Working Groups

To support the Committees, the Technical Working Groups (TWG) have also been formed at the national and regional levels. The TWG national level is composed of FMB and FASPO representatives, while the regional level working group consists of representatives from the Regional DENR and PENRO Ifugao.

1) National level

Special Order 349-01, Jul. 19, '01	
1	Forester Jesus Javier, FMB(Chairperson)
2	Forester Domingo Bacalla, FMB
3	Forester Shoshi Tanaka, JICA Expert for FMB
4	Forester Lourdes Wagan, FMB
5	Forester Luis P Gonzaga, FMB
6	Forester Eddie P. Abugan, Jr, FMB
7	Ms. Maddel Villalon, FASPO

2) Regional level

Stated in I/A ²	DENR Special Order 245-03, Jul.29 '03
1 AREDO Region 2 (Chairperson)	1 Foresters and Engineers DENR Region 2
2 PENRO Ifugao	2 PENRO Ifugao
3 Forester & Engineer, DENR Region 2	3 Forester & Engineer, DENR CAR
4 Forester & Engineer, DENR CAR	4 CENROs concerned

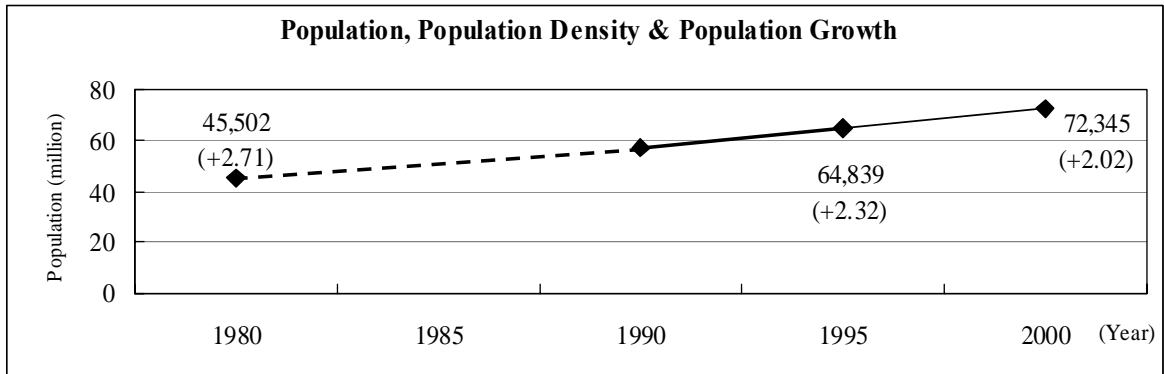
1 Minutes of Meeting on Implementing Arrangement on the Technical Cooperation for the Master Plan Study for Watershed Management in Upper Magat and Cagayan River Basin

2 Minutes of Meeting on Implementing Arrangement on the Technical Cooperation for the Master Plan Study for Watershed Management in Upper Magat and Cagayan River Basin

CHAPTER 2 PRESENT NATIONAL AND REGIONAL SOCIO-ECONOMIC SITUATION

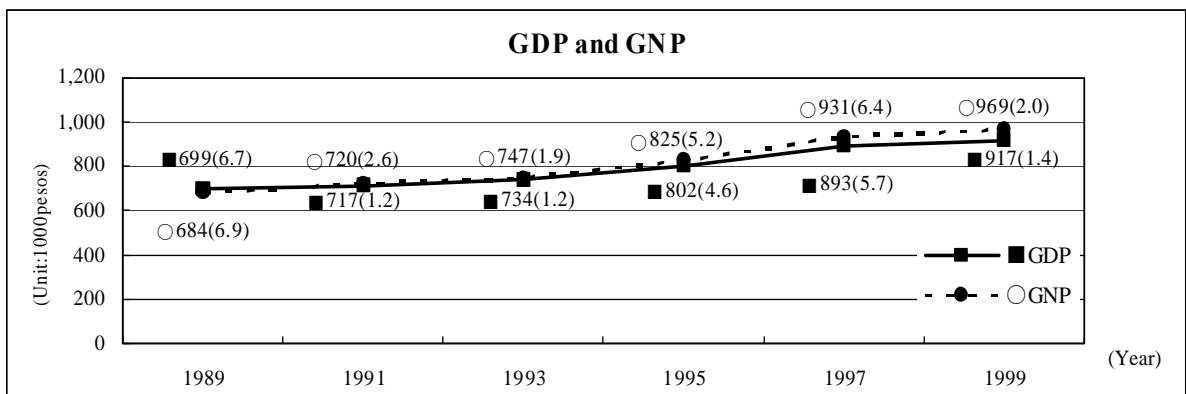
2.1 National Socio-economy

The population of the Philippines was 45.5 million in 1980, which increased to 72.3 million by the year 2000. The population density was 194.6 persons/km² in 1980 and reached 245.6 persons/km² in 2000. Average population growth rate per annum for the last two decades was 2.4 % during 1980-1990 and 2.1 % during 1990-2000.



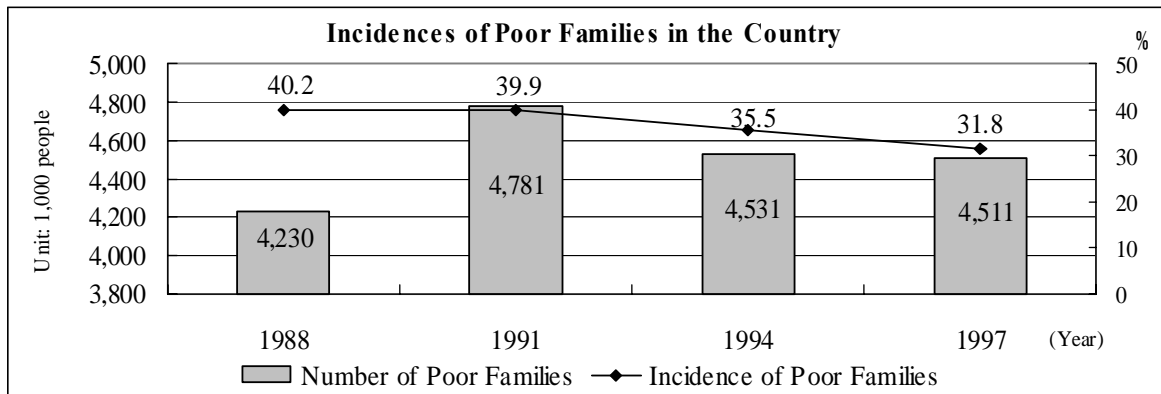
Source: 2000 Philippine Statistical Yearbook, NSCB

The average annual growth rate of the Gross National Product (GNP) during 1989-1999 was recorded at 4.2%. After economic stagnancy during 1991-1992, GNP growth gradually accelerated and reached 7.2% in 1996. However, the path to sustained growth was derailed by the drought of 1998, the worst in the last 31 years, which caused enormous impact on agriculture. In addition, the 1997-98 Asian economic crisis resulted in the peso depreciation against the US\$ by 48 % at the end of 1998. The following table shows GDP and GNP during the last 10 years.



Source: 2000 Philippines Statistical Yearbook, NSCB

In 1988, the ratio of Filipino households below the poverty threshold was 40.2% of the total number of households. The ratio went down to 32.1% in 1997 but much of the improvement took place in the National Capital Region (NCR). While the poverty incidence rate for the areas outside the NCR fell at a lower rate from 43.1 to 36.2% during 1988-1997. In the rural areas, the decrease in poverty incidence was smaller, from 46.3% in 1988 to 44.4% in 1997.



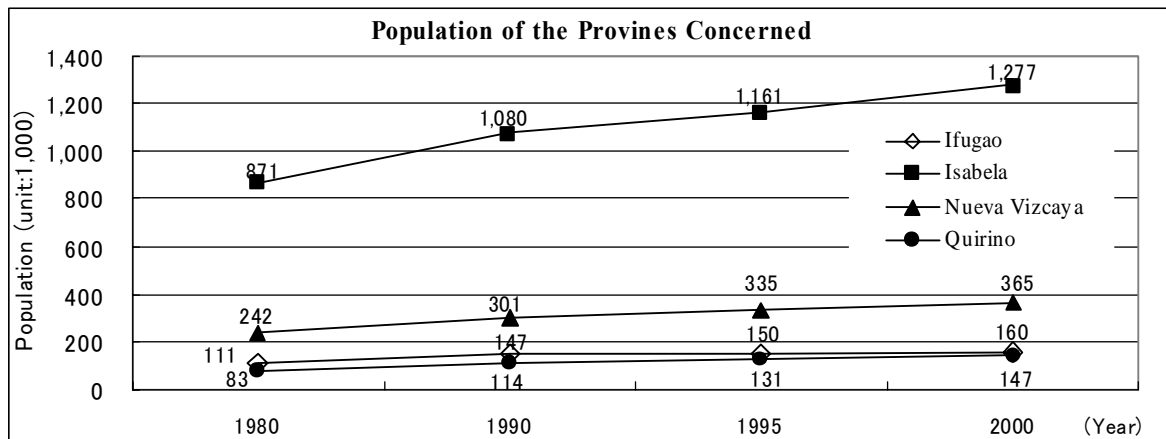
Source: Technical Working Group on Income and Poverty Statistics, NSCB

Main cause of the poverty problem was traced to the low productivity of the agricultural sector, which remains the primary source of income for most of the poor. As of 1998, the sector accounted for 39.2% of total employment but contributed only 19.4% to gross domestic product (GDP).

2.2 Regional Socio-economy and Regional Physical Framework Plan

2.2.1 Population

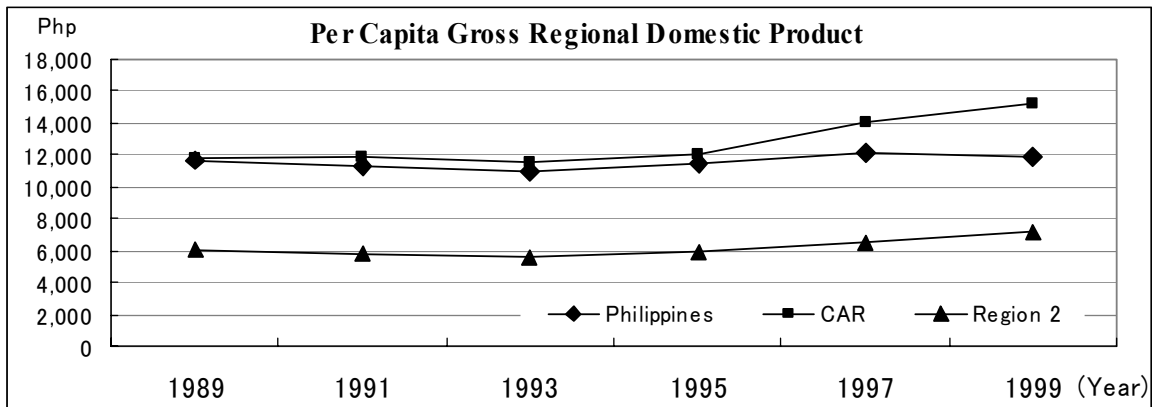
The population densities in the four provinces in the Study area are relatively low compared with the national average. The population trends of the provinces in the Study area are shown below.



Source: 2000 Philippines Statistical Yearbook, NSCB

2.2.2 Regional Economy

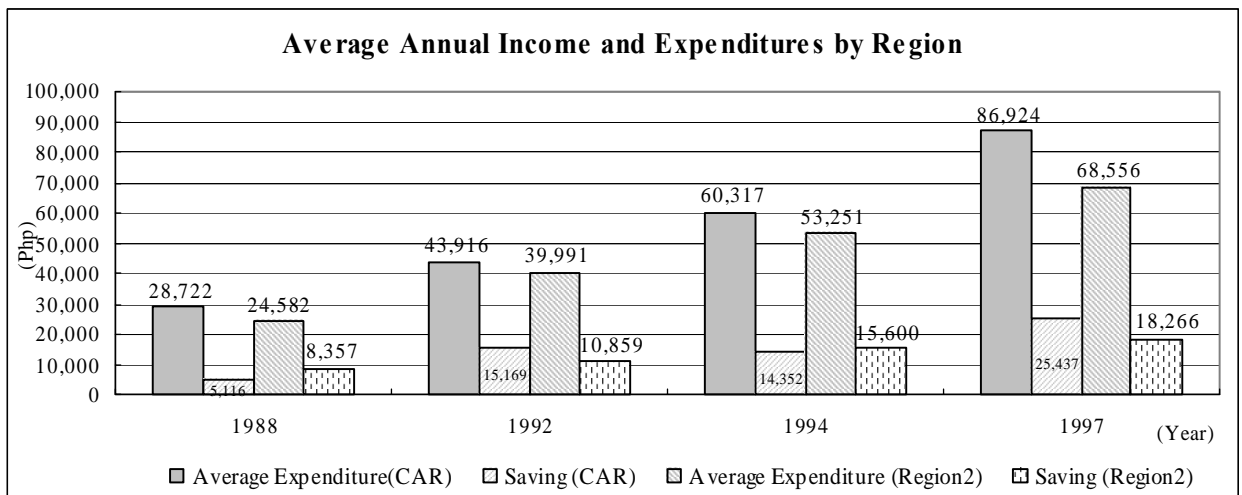
During 1989-1999, per capita Gross Regional Domestic Product (GRDP) of CAR increased by 30% from ₱ 11,769 in 1989 to ₱ 15,206 in 1999 at constant 1985 prices. Per capita GRDP in Region 2 during the same period was significantly lower than the national GDP, and fell from ₱ 6,103 in 1989 to ₱ 5,591 in 1993, then turned to an uptrend, reaching ₱ 7,211 in 1999.



Source: National Statistical Coordination Board

2.2.3 Annual Income and Poverty Level

Average annual income of CAR increased from some ₱ 33,800 in 1988 to ₱ 112,400 in 1997, and for Region 2, it increased from ₱ 33,000 to ₱ 86,800. The average annual savings of CAR increased from ₱ 5,100 to ₱ 25,400 and for Region 2 from ₱ 8,400 to ₱ 18,300 over the same period.



Source: 2000 Philippines Statistical Yearbook, NSCB

Poverty incidence of CAR was almost constant over the period of 1988-1997, while that of Region 2 during the same period improved from 40.4 to 32.1%, which was almost the same level as the national rate of 31.8%. More detailed information is given below.

Annual Per Capita Poverty Thresholds and Incidences of Families by Region

Year	Annual Per Capita Poverty Threshold (year/pesos)		Number of Poor Families		Incidence of Poor Families (%)	
	CAR	Region 2	CAR	Region 2	CAR	Region 2
1988	5,116	4,934	89,572	177,072	41.9	40.4
1991	8,332	7,035	111,030	211,839	48.8	43.3
1994	10,853	8,316	122,942	185,708	51.0	35.5
1997	12,836	9,880	110,142	188,286	42.5	32.1

Source: Technical Working Group on Income and Poverty Statistics, NSCB

2.2.4 Industries

In the agriculture, fishery and forestry sectors, CAR and Region 2 are not major contributors to the total national agricultural gross value added (GVA). Contribution to the national economy of the mining and quarrying sectors of CAR was significant, while that of Region 2 was negligible. The following table shows the GVA of each sector during the last 10 years.

Gross Value Added (GVA)

(Unit: million pesos at constant 1985 price)

Region	1989	1991	1993	1995	1997	1999
Agriculture, Fishery and Forestry						
Philippines	159,964	162,937	167,053	172,848	185,004	183,407
CAR	2,821	2,721	2,908	3,388	3,378	3,348
Region 2	7,851	7,377	7,583	8,782	10,026	11,474
Mining and Quarrying						
Philippines	11,389	10,770	11,571	10,035	10,338	9,736
CAR	2,485	2,840	2,621	1,656	2,122	2,085
Region 2	108	48	49	116	134	109
Manufacturing						
Philippines	179,152	183,111	181,289	203,271	223,672	224,667
CAR	2,558	2,793	3,791	5,069	7,191	7,410
Region 2	607	632	916	631	704	718
Construction						
Philippines	39,878	35,285	38,344	44,492	57,322	50,988
CAR	1,047	1,395	476	721	1,003	3,076
Region 2	1,225	1,595	595	795	1,094	2,010
Electricity, Gas and Water						
Philippines	18,756	19,552	20,255	26,060	29,357	31,259
CAR	900	869	1,080	1,199	1,322	1,357
Region 2	218	200	239	312	340	357
Service Sector						
Philippines	290,310	304,866	315,643	345,518	387,458	417,325
CAR	3,440	3,433	3,762	4,042	4,626	5,026
Region 2	4,717	4,863	5,078	5,506	6,151	6,669

Source: 2000 Philippine Statistical Yearbook

In October 1999, the total labor force in CAR and Region 2 was 603,000 and 1,349,000 persons, respectively. Of the labor force, 563,000 (93 %) and 1,299,000 (96 %) persons were employed in CAR and Region 2, respectively.

The agriculture, fishery and forestry sectors absorbed 820,000 persons (63%) out of the total employed persons of 1,299,000 in Region 2, and 328,000 persons (58%) of the 563,000 in CAR. More than 60% of unemployed people are residing in rural areas.¹

¹ 2000 Philippine Statistical Yearbook

2.3 Regional Physical Framework Plan (RPFP)

2.3.1 RPFP of Region 2, Cagayan Valley (1993-2022)

(1) Region 2 and Study Area

Region 2 consists of five provinces with a total area of 2,683,993 ha. The provinces in the Region 2 are Batanes (21,160 ha), Cagayan (900,267 ha), Isabela (1,066,456 ha), Nueva Vizcaya (390,390 ha) and Quirino (305,720 ha) (**Table 2.3.1**). Of these provinces, most of Nueva Vizcaya and Quirino and the southern tip of Isabela are included in the Study Area (**Section 4.2**).

(2) General Objectives of RPFP Region 2

The RPFP of Region 2 embodies a set of policies and a graphic translation of the desired spatial arrangement of land-use activities to: a) affect a rational distribution of the regional population; b) facilitate access by the regional population to basic services; c) guide public and private investments to ensure optimum and sustained use of natural and man-made resources; and d) protect the integrity of the physical environment.

(3) Policy Guidelines

Because of the dwindling forest resources of the region, harvesting timber from the areas is restricted to selective logging for domestic requirements. Exports are limited to non-timber forest products. Specific policies on production forests are:

- i) Production forests with second growth vegetation shall be utilized for industrial tree plantations and agroforest areas to provide livelihood opportunities for upland dwellers and minimize their indiscriminate tree-cutting activities for firewood and charcoal;
- ii) Timberlands should be well monitored to prevent over-logging. Full support of DENR's monitoring personnel should be extended; and
- iii) Community logging should be promoted to motivate communities in the vicinity of timberlands to value and protect such resources.

For protected forests the policy guidelines are:

- i) Economic and other forms of development activities within protection forests should be discouraged. However, research, institutional and related uses may be allowed subject to their being non-detrimental to the environment;
- ii) The rehabilitation and protection of forest resources shall be continued and strengthened.
- iii) Settlements located in protection and rehabilitation areas shall be restrained from further growth. Appropriate measures shall be provided to prevent further environmental degradation of the critical areas due to the presence of settlements; and

- iv) Lands considered as the ancestral domain of indigenous communities shall be surveyed and delineated to determine the actual extent. The type of development interventions to be undertaken should consider the rights, livelihood, and spiritual integrity of the indigenous peoples (IPs) and at the same time the protection of the environment.

(4) Land Use in 1992

Land use in the region has been categorized as: a) Production Land use; b) Protection Land use; c) Built-up Areas & Infra/utilities; and d) Unclassified Lands. Size of area for different land use patterns in each province is shown in **Table 2.3.1**.

(5) The Physical Framework Plan

The RPPF consisted of the following four component plans:

- Production Land Use Component;
- Environmental Rehabilitation and Conservation Component;
- Population and Settlements Plan; and
- Infrastructure Plan Component.

(6) Proposed Land Use Plan

The existing (1992) and proposed land uses (2022) of the region by province are shown in **Table 2.3.1**. It is proposed that the aggregated production forest of the region would be reduced from 811,103 ha in 1992 to 751,045 ha in 2022; that existing protected land use of 883,052 ha would be kept unchanged until 2022; and that built-up areas would be expanded by 60,236 ha from 207,449 ha in 1992 to 267,685 ha in 2022. This implies that the 60,058 ha would be converted into the built-up areas by 2022.

The reduction of 60,058 ha in the production forest would come from the following land use plan.

Land Use	Regional Total Area (ha)		
	1992	2022	Difference
Residual dipterocarp	313,353	219,348	- 94,005
Grazing land	400,380	220,208	- 180,172
Industrial forest plantation	44,279	104,336	+ 60,057
Agro-forestry	53,091	113,148	+ 60,057
Community forestry	0	94,005	+ 94,005
Total	811,103	751,045	- 60,058

Source: Regional Physical Framework Plan, Region II, 1993-2022

The residual dipterocarp forest in the production forest is expected to be reduced from 313,353 ha in 1992 to 219,348 ha in 2022. The “grazing rangelands” in the region are likely to decrease by 180,172 ha from 400,380 ha in 1992 to 220,208 ha in 2022. From 44,279 ha it is proposed that by 2022 the industrial forest plantation areas in the production forest expand to 104,336 ha. The area for agroforestry is to similarly increase, from 53,091 ha to 113,148 ha. In 1992 there was no area listed as community forestry. By 2022 it is proposed to develop 94,005 ha of this land use with 10,604 ha in Nueva Vizcaya, 5,224 ha in Quirino and 40,577 ha in Isabela.

The total protection land use for NIPAS and Non-NIPAS areas is 883,052 ha in the region. By the year 2022, the protection land use area is likely to be 179,942 ha for Nueva Vizcaya, 160,160 ha for Quirino and 272,515 ha for Isabela. The reserved second growth forests, mangroves, old growth forests, mossy and pine forests as well as parks is to remain constant in area up to 2022. Grasslands and brushlands as well as plantations within areas with slopes of 50% and greater and those in elevations higher than 1,000 m above sea level are part of the protected lands. These forests should be protected to maintain water yield of reservoirs and major rivers of the region and to preserve biodiversity and ecological balance.

2.3.2 RPPF of Cordillera Administrative Region (CAR), 1994 - 2023

(1) CAR and Study Area

CAR has five provinces and one city with a total area of 1,829,368 ha. Provincial/City breakdown of CAR area is as follows: Abra (397,555 ha), Apayao (419,358 ha), Benguet (265,538 ha), Ifugao (251,778 ha), Kalinga (285,406 ha), and Mt. Province (209,733 ha) (**Table 2.3.2**). Out of the five provinces, about 70%, of the land area of Ifugao is included in the Study Area (**Section 4.2**).

(2) General Objectives

The CAR RPPF covers a 30-year period from 1994 to 2023. The general objectives are to:

- Attain a rational distribution of the population;
- Facilitate access by the regional population to basic services;
- Guide the public and private investments to ensure optimum and sustained use of natural and man-made resources; and
- Safeguard and protect the integrity of the physical environment.

The fourth objective seeks to ensure a quality environment free from pollution, soil erosion, forest denudation and other forms of environmental degradation.

(3) Regional Physical Framework Plan

The underlying principle of the RPPF of CAR is the management of urban expansion to ensure that forests and agricultural areas (rural areas) will be conserved and protected. The vision of the plan is to attain an equitable socio-economic development within the context of environmental quality and sustained utilization of physical resources. In addition, the development strategy to be adopted should be culturally and environmentally sensitive.

(4) Land Use in 1990

According to the DENR-CAR ENR Regional Development Plan for the Medium Term (CAR Medium Term Plan), almost 85% of CAR or 1,488,712 ha was classified as forestlands with only 15% or 340,656 ha as alienable and disposable (A&D) in 1990 (**Table 2.3.2**). DENR-CAR divided forestlands into protection forest and production forest.

Protection forest includes old growth forest, mossy forest, pine forest on lands of more than 84% slope or higher than 1,500m in elevation, other vegetation on the lands with more than 50% in slope or higher than 1,000 m in elevation, and the land areas established by law, such as Critical Watersheds and National Park.

Production forest covers pine forests on land less than 50% in slope or lower than 1,500 m in elevation, and all land with below 50% slope and less than 1,000 m in elevation. According to this classification, production forest and protection forest lands in CAR were estimated at approximately 996,799 ha and 491,913 ha, respectively in 1990. Out of these, the production and protection forests of the province of Ifugao were placed at 167,789 ha and 58,580 ha, respectively.

(5) Regional Land Use Plan

Protection Forest Land Use – The CAR RFPF shows the proposed regional configuration of the protection forests in 2023 as follows.

	Area (ha)	
	in 1990	in 2020
1. Areas established by laws	25,653	15,157
1) National Park	15,758	15,157
2) Critical Watersheds	9,895	-
2. Forest/Military/Civil Reservation	-	583,143
3. Other Protection Forest	466,260	114,104
1) Old growth	216,812	-
2) Mossy forest	141,593	39,471
3) Pine forest >84% slope &/or El. 1,500m	29,452	24,618
4) Dipterocarp forest >50% slope &/or El. 1,000m	78,403	50,015
Total	484,008	712,404

Source: RFPF-CAR, 1994-2023

The protected forest in CAR is planned to increase by 220,491 ha or 45% from 491,913 ha in 1990 to 712,404 ha in 2023. Significant changes in land use between the present and proposed ones are: i) inclusion of the proclaimed forest/military/civil reservation (plus 583,143ha) as forest reserves; ii) reduction of other protection forest (minus 352,156 ha), in particular, the loss of all old growth of 216,812 ha and reduction of mossy forest from 141,593 ha to 39,471 ha. Another distinction in the CAR is that RFPF proposes to reduce the area of protected forest by 10,496 ha by reclassifying (in legal terms) areas that have been used for agricultural purposes or have become built-up areas.

No provincial breakdown on the above is available.

Production Forest Land Use – There are no indications concerning proposed land use plans for production forests in the CAR RFPF.

Built-up Areas - CAR RFPF proposed an average annual increase in built-up areas of 10.85 % by 2020. In general, expansion of the built-up areas is proposed in such areas as : i) A & D and other lands less than 18% in slope exclusive of agricultural lands and protection forests; ii) areas of the public domain 19 - 30% in slope exclusive of agricultural lands and outside protection forests; iii) areas of the public domain 31 - 50% in slope exclusive of agricultural lands and outside of protection forests; and iv) potential agricultural expansion areas for probable conversion to urban use. It is proposed that the

existing built-up area of 10,170 ha for the region become 164,306 ha in 2023 (**Table 2.3.3**).

For Ifugao it is proposed that the built-up area be increased from the existing 490 to 9,332 ha. The largest increase will take place in the A & D and other lands with a slope less than 18% but outside of agricultural lands and protection forests where 5,580 ha is likely to be built-up by 2020.

Agricultural Lands – To secure food production, a total of 186,875 ha was identified as protected agriculture areas, which are restricted from conversion. Of the 186,875 ha, 25,331 ha are categorized as ecologically fragile agriculture land that represents lands within the critical watershed/brackish and freshwater wetland.

2.4 Provincial Comprehensive Land Use Plan/Provincial Physical Framework Plan

2.4.1 Local Government Code

The Local Government Code of 1991² devolved to the province the power to review and approve comprehensive land use plans and zoning ordinances for the component cities and municipalities and to adopt a comprehensive land use plan for the province. This implies that the provincial and municipal governments have joint responsibility for planning and managing the use of their lands and other natural resources.

2.4.2 Nueva Vizcaya

The province of Nueva Vizcaya prepared and adopted a 30-year Comprehensive Land Use Plan (CLUP) covering the period of 1995 - 2025. A 5-year medium term plan entitled the Provincial Comprehensive Development Plan (PCDP) for the period of 2001 to 2004 has also been prepared. Information and data in this section were obtained from these two documents.

(1) Physical Attributes

The province has a total land area of 390,390 ha, which consists of 88,921ha of A&D and 301,469 ha of Forestlands/Protected Areas in terms of land classification.

Actual land use in 1995 differed from the land classification stated above, and was broadly divided into production A&D of 54,843 ha, production forest of 83,947 ha, and protection forest of 251,600 ha. This difference between the land classification and the actual land use implies that the area of 34,078 ha in the 88,921 ha classified as A & D was most probably categorized as production/production forest. The 256,100 ha of protection forests were covered with: i) second growth forest of 84,786 ha (33.69%); ii) old growth forest of 11,395 ha (4.53%); iii) mossy forest of 2,013 ha (0.81%); iv) pine forest of 1,600 ha (0.64%); v) grassland of 142,278 ha (58.14%); vi) cropland areas of 5,508 ha (2.19%); and vii) others of 4,020 ha.

² Republic Act 7160 (RA 7160) Local Government Code, 1991

The DENR survey of forest occupants conducted in 1989 revealed that there were 4,749 settlers in the protection forest occupying a total of 12,639.21 ha in Mt. Pulag, the Salinas Forest Reservation, Casecnan Forest Reservation and other non-NIPAS areas.

(2) Development Plans in CLUP

The CLUP indicates no quantitative development plan but a conceptual land use plan summarized as follows.

Activities in production forest should be limited to grazing and pasture, agro-forestry, terraced farming, and timber production. Local requirements for timber would be met by lowland forests while raw material for the handicraft industry would be provided by upland forests including the protection forests. Activities that could be undertaken in the protected forestland areas range from restoration, and rehabilitation to complete prohibition of entry. However, scientific or educational research, outdoor recreation, observance of religious and cultural events and non-destructive production activities like forest farming will be allowed in the same. Actions on NIPAS land areas should be in accordance with the NIPAS Law. For non-NIPAS protected areas, the province would either propose to establish these areas as part of the NIPAS or manage the areas itself.

(3) Development Plans in PCDP

Based on the 30-year CLUP, the 5-year PCDP2001-2004 was generated. One development strategy of the PCDP is the protection and conservation of watersheds. Among the targets of the 2001-2004 PCDP pertaining to the environment and natural resources are restoration and rehabilitation of watersheds and denuded open areas such as:

- 13 hectares – Bangan Hill
- 24,000 ha – Lower Magat Forest Reserve
- 750 ha – Tree for Legacy Program
- 329 ha – Barobbob watershed
- 800 cu m Kasibu and Casecnan slope stabilization project
- 250 issuances and 40 CBFM claims to be administered
- The Multi-Sectoral Forest Protection Committee (MFPC) to be strengthened and one provincial MFPC to be established, and
- Implement the Social Forestry Productivity Enhancement Program to cover 179,942 ha protection area and 121,527 ha production area.

2.4.3 Quirino

The Provincial Physical Framework Plan (PPFP) for Quirino was formulated to provide an overall framework for socio-economic development planning for a long-term period. The PPFP serves as guide for the municipalities to prepare their Comprehensive Land Use Plans (CLUP). The PPFP available covers the planning period of 1993 - 2002.

(1) Physical Attributes

PPFP Quirino classified its land uses of a total land area of 305,718 ha³ into six categories. Forestlands occupy 60% (184,019 ha) of the total land area. This is followed by pastureland (64,420 ha or 21 %) and lowland paddy rice fields (24,801 ha or 8 %). Perennial fruit trees and other fruits occupy 17,460 ha (6 %), cultivated annual crops, 10,507 ha (3 %) and the residential area with only 4,509 ha or 1 %.

In terms of the land classification of Quirino, production forests of the province are placed at 113,679 ha while 133,591 ha are protection forests. The protection forest includes part of the Casecnan Protected Landscape.

(2) Development Plans

The original CLUP 1999 - 2003 is being updated but the revision is still to be deliberated upon. **Table 2.4.1** shows the targets, activities and estimated costs for the management of Integrated Protected Areas System (IPAS) in the provinces, management of upland communities and development of watersheds. The management plan for the IPAS in 2003 includes the management of 1,175 ha of buffer zones, management of about 42,370 ha of virgin forest, protection of about 92,710 ha of forests and the restoration of about 470 ha of forest areas.

2.4.4 Ifugao

The province of Ifugao formulated a 10-year Master Development Plan (MDP) covering the period from 1994 to 2003.

Among the objectives of the MDP related to forests and the environment are to:

- Resolve ancestral domain issues in favor of the Ifugao people (100% issuance of individual land titles covering 10,000 ha)
- Protect and enhance the natural environment and Ifugao culture (60% forest cover at the end of the planned period, 100% preservation of material culture and full documentation of province's history and oral traditions)
- Develop eco-cultural tourism as the anchor industry of the province (100,000 visitors annually)

(1) Physical Attributes

Ifugao has a land area of 251,778 ha. Extensive mountains that rise as high as 2,523 m above sea level characterize the province. Steep slopes account for 55% of the total land area of the province while the flat and undulating areas account for only 8%.

³ This figure is quoted from PPFP for Quirino and different from the figure (305,720 ha) in Section 2.3.2 (1) quoted from RPPF Region 2

(2) Development Strategy for Ifugao

The development strategy for Ifugao is to address matters of urgency exemplified by the alarming state of forest denudation in the province that threatens agricultural production and the useful life of the Magat Dam.

A major program under the PFP is the community-based Comprehensive Natural Resources Management Program (CNRMP). The program aims to stem further ecological degradation and restore ecologically sustainable economic activities in Ifugao.

The components of the program are as follows:

- Erosion Control and Watershed Management - This component aims to restore 71,000 ha to alleviate severe erosion. The sub-components are: a) Reforestation of severely eroded areas (46,500 ha); and b) Agroforestry on moderately eroded areas (24,500 ha)
- Terrace Rehabilitation – Rehabilitate and restore productivity of 80% of idle and abandoned rice terraces (3,500 ha)
- Cultural Development and Community Mobilization – research and documentation of environment-anchored cultural systems and practices, information campaign, training, and formal/non-formal education modules
- Research, Development & Extension for Appropriate Resource Management Technology – Research and propagation of appropriate resource management technologies and practices as part of capacity building of the communities under the program
- Biodiversity Program – Restoration of Ifugao’s forests and thorough inventory of biological resources, establishment and maintenance of special nurseries, greenhouses and others.

CHAPTER 3 PRESENT INSTITUTIONAL FRAMEWORK FOR FOREST/ WATERSHED MANAGEMENT

3.1 National Policy

3.1.1 Land Classification in the Philippines

(1) Classification of the Public Domains of the Philippines

The 1987 Constitution of the Philippines classifies lands of the public domain of the Philippines into: i) Agricultural Lands; ii) Forest or Timber Lands; iii) Mineral Lands; and iv) National Parks.¹ The Agricultural Lands are alienable to individuals and hence regarded as synonymous with Alienable and Disposable (A&D) Lands, while the other three categories are inalienable as a rule.² Since the term of Protected Areas is customarily used as a synonymous with National Parks, Protected Areas will be used in this report.

(2) Classification of Forestland in the Philippines

PD705³ determines basic criteria to classify lands into Forestlands. Lands with more than 18% slope are classified as the Forestlands. No grazing land is permitted in the Forestlands with 50% in slope or over. In addition, the lands below 18% slope with specific conditions are classified as Forestlands.

(3) Classification of Protected Areas in the Philippines

National Integrated Protected Areas System (NIPAS) was enacted through the Republic Act 7586 (RA 7586)⁴ to establish and maintain the Protected Areas in the country.

The policy of the NIPAS is to: i) secure all native plants and animals; and ii) conserve soil and water in critical watersheds through the establishment of a system of integrated protected areas within the classification of the Protected Areas as provided in the Constitution. Basic policy for the establishment of the Protected Area is to identify virgin forests, including mossy forest, as well as any contiguous residual forest of good quality and the lands above 1,000 m in elevation and/or with slopes of 50% or over.

The Protected Area is defined in the NIPAS Act as: identified portions of land and water set aside by reason of their unique physical and biological significance, managed to enhance biological diversity and protected against destructive human exploitation. It includes the following sub-classes for management purposes:

¹ Article XII Section 3

² DENR Administrative Order (DAO) No. 15, May 1995: Revised General Guidelines in the Implementation of the Sub-classification of forestlands and other inalienable lands of the public domain

³ Presidential Decree No. 705, 19 May 1975: Revised Forestry Code of the Philippines known as the "forest law" As amended by PD Nos. 865, 1775, 1559; by EO Nos. 273 and 277 Series of 1987.

⁴ NIPAS Act (RA 7586): An Act Providing for the Establishment and Management of National Integrated Protected Areas System, Defining its Scope and Coverage, and for Other Purposes. June 1, 1992.

- Strict nature reserves
- Natural Parks
- Natural monuments
- Wildlife sanctuaries
- Protected landscapes and seascapes
- Resource reserves
- Natural biotic areas
- Other categories established by law, conventions or international agreements to which the Philippine Government is a signatory.

3.1.2 The Master Plan for Forestry Development of the Philippines

(1) Background

The forestry sector of the Philippines was one of its anchor resources in its development efforts. It consistently contributed about 30% of the GDP for almost two decades prior to 1990⁵. Agriculture, logging, mining and fisheries together contributed ₱ 15.8 billion of the gross value added in 1970 and almost double that amount (₱ 29.4 billion) in real terms in 1988. The share of the logging sub-sector was 13 % in 1970 but started to decline and in 1988 it dropped to only 2 %. The forest-based outputs were contracting, from ₱ 3.2 billion in 1970 to only ₱ 2.0 billion in 1988. The wood-based manufactures contributed 10 % of all manufactures in 1970 but only 5 % in 1988.

Forestry related industries provided about 274,000 positions for full-time employment in reforestation, wood production, wood processing such as in lumber, veneer, plywood, pulp, furniture and other wood products manufacture and in non-wood industries⁶. In addition, the government employed about 18,500 persons in forestry education, research and development and in administration.

The importance of the forestry sector, however, started to decline starting in early 1980s because of the continued degradation of the forest resources. Contributing to the massive destruction of the forest is the increasing population in the upland who utilize the Forestlands for farming purposes. It was estimated that as early as 1984 there were 18 million people in the Forestlands trying to eke out a living through upland farming. What is worse was that they were practicing shifting cultivation or *kaingin*. Most of these people exploited the Forestlands in the wake of logging operations by clearing the residual forest using fire with few environmental considerations.

The consequences of the rapid destruction of forestlands were high soil erosion rates and the sedimentation of rivers, lakes and other water bodies, flash floods or drought. The declining wood supply caused a reduction in investments in the forestry sector resulting in the loss of employment of people in the forest industries, thus aggravating the situation in the upland since many of the people who lost their jobs turned into upland farmers.

⁵ 1989 Philippine Statistical Yearbook, National Statistical Coordination Board. Manila. 1990.

⁶ The Master Plan for Forestry Development, Department of Environment and Natural Resources. 1990.

(2) Formulation of the Master Plan for Forestry Development (MPFD)

Alarmed by the rapid decline of the forest cover of the country, DENR proposed to the Asian Development Bank (ADB) in cooperation with the Finnish International Development Agency (FINNIDA) the preparation of a Master Plan for Forestry Development (MPFD). The main objectives of the MPFD were to:

- Meet the needs of the country for wood and other forest products;
- Contribute to the production of food, water, energy, and other needed commodities;
- Protection of land and its resources against degradation and ecological damage;
- Conserve forest ecosystems and their diverse genetic resources;
- Contribute to employment and growth of local and national economies through fully developed forest-based industries; and
- Promote social justice and recognition of the rights of indigenous peoples in the management, conservation and utilization of forest resources.

(3) Programs under the MPFD

The MPFD consists of three umbrella programs, namely: i) man and the environment programs; ii) forest management and products development program; and iii) the institutional development program.

The man and the environment program consists of sub-programs that aim to: i) rehabilitate the forest resources through local communities and indigenous peoples who are allowed to access to forest resources; ii) conserve soil and water through sound management of watersheds; iii) establish integrated protected area systems for biodiversity conservation; iv) reduce pollution in urban and metropolitan areas; and v) protect forest resources from illegal logging, poaching and forest fires as well as from biological factors such as pests and diseases.

The forest management and products development program aims to bring the forests, particularly the dipterocarp forests, to a condition of sustainable yield and a concomitant environmental stability. This is to be accomplished through the establishment of a permanent forest estate, enhancing the production capacity of the second growth forests, the management of mangroves and the pine forests and other natural forest types. Plantations and tree farms are established to supplement the products coming from the natural forests. Furthermore, the forest-based industries are rationalized in order to be able to supply the country with needed forest products.

The institutional development program aims to develop policy and legal framework to establish the proper business climate for the forest-based industries to contribute to economic development. It includes the strengthening of organizations both government and private so that they contribute to the economic development of the country. It also includes human resources development through strengthening of education, research and extension services.

(4) Implementation of the MPFD

Sec. Fulgencio Factoran, Jr. of the DENR presented the Master Plan to then President Corazon Aquino in October 1990. It was adopted as the blue print for forestry development in the country and was immediately implemented.

(5) Review and Revision of the MPFD

In 1999, UNDP sent a fact-finding mission to the Philippines for a preliminary review of the implementation of the MPFD. It was observed that the major program did not progress as expected. The mission recommended the revision of the MPFD. In 2000, ADB hosted a forum on the MPFD. An action agenda was proposed calling for the revision of the MPFD.

The UNDP through FAO funded the revision of the MPFD. It commenced in September 2002 and completed by the end of September 2003. The objectives of the review included the assessment of the accomplishments of the MPFD relative to its objectives, to ascertain to what extent its implementation contributed to the alleviation of poverty in the uplands, to revise and update the MPFD wherever appropriate, and to identify and recommend remedial measures, including strengthening of policies and institutions to fully attain the objectives of the MPFD⁷.

3.1.3 Participatory Forest Management Policies

(1) People-Oriented Forestry Programs

A number of people-oriented forestry programs started-developing the Forestlands in the 1970s. These programs included Forest Occupancy Management (FOM), Family Approach to Reforestation (FAR), and Communal Tree Farming (CTF). In the 1980s, there were two main people-oriented forestry programs. One was Integrated Social Forestry Program (ISFP), and the other one was the Community Forestry Program (CFP).

In 1995, the government adopted Community Based Forest Management (CBFM) as the national strategy for sustainable management of the country's Forestlands.⁸ The CBFM program foresees to develop, protect and conserve the existing resources in the delineated Forestlands under CBFM agreement.⁹

(2) Significance of CBFM Program

CBFM applies to all areas classified as Forestlands, including allowable zones in the Protected Areas not covered by prior vested rights. The program aims to integrate previous participatory forestland management approaches, including ISFP, Community Forestry Program (CFP), Coastal Environment Program (CEP), and recognition of

⁷ Carandang, A. 2003. Initial Observations, Issues/Problems, Indicative Plans, Review/Updating of the Master Plan (Project PHI/01/010). Presented during the consultative workshop on the MPFD Review. Quezon City. June 2003.

⁸ Executive Order (EO) No. 263 in 1995: Adopting Community-Based Forest Management as the National Strategy to Ensure the Sustainable Development of the Country's Forestlands Resources and Providing Mechanism for its implementation

⁹ DAO No. 96-29: Rules and Regulations for the Implementation of Executive Order No. 263, Otherwise known as the Community-Based Forest Management Strategy (CBFMS).

Ancestral Domains. The CBFM may be implemented in the eligible areas in uplands and coastal lands of the public domain except in the following:

- i) Areas covered by existing Timber License Agreements, Pasture Lease Agreements, Industrial Forest Management Agreements and other forest land contracts, leases, permits or agreements.
- ii) Protected Areas exclusive of multiple use zones, buffer zones.
- iii) Forestlands assigned by law under the administration and control of other government agencies except upon written consent of the OGAs.
- iv) Certified ancestral lands and domains and other areas occupied by indigenous cultural communities, except where IPs/ICCs opt to participate in CBFMP, and the community opts to join CBFM.
- v) Other areas occupied by ICCs/IPs that are known to be ancestral lands but not yet covered by CADC/CALC, unless IPs/ICCs opt to participate in CBFMP.

3.1.4 Jurisdiction over Watersheds Areas

Section 2, Article XII of the Constitution 1987 provides that all lands of the public domain, waters, minerals, coal, petroleum and all sources of potential energy, fisheries, forests, timbers, wildlife, flora and fauna, and other natural resources belong to the State, and therefore, title to them can only emanate from the State.

(1) Definition of Watershed and Watershed Management

PD 705 defines watershed as land drained by a stream or fixed body of water and its tributaries having a common outlet for surface run-off. As a topographic and hydrologic unit, DAO No. 99-01¹⁰ defines **watershed** as “an area of land from which rainwater can drain, as surface run-off, via a specific stream or river system to a common outlet point that may be a dam, irrigation system or municipal/urban water supply take off point or where the stream or river discharges into larger river, lake or sea.”

PD 705 and the Philippine Mining Act (RA 7942) introduce the element of criticality of a watershed. The common usage of the term "critical watershed" is that the watershed supports existing and proposed hydroelectric power generation and irrigation work or existing water facilities needing protection and rehabilitation. Regardless of whether it needs immediate rehabilitation and protection or not, it is a critical watershed and closed to logging until it is fully rehabilitated.

Watershed Management is defined as 1) the process of guiding and organizing the use of land and other resources found inside the watershed to provide desired goods and services without adversely affecting soil and water resources; 2) the application of business methods and technical principles to the manipulation and control of watershed resources to achieve desired results such as maximum supply of usable water, minimization of soil erosion and siltation and the reduction of the occurrence of floods and droughts¹¹.

¹⁰ DENR Administrative Order No. 99-01, Adopting the Watershed and Ecosystems Planning Framework. January 11, 1999. The definition of watershed in DAO No. 99-10 is similar to the definition found in “Guidelines for Watershed Management and Development in the Philippines”, Book Series No. 166-1999. DOST, DENR, DA and UP at Los Banos.

¹¹ *Op cit.* Guidelines for Watershed Management and Development in the Philippines

(2) Jurisdiction of Watershed Areas through Legislation

a) Revised Forestry Code (PD 705, 1975)

The overall jurisdiction and authority over Forestlands, grazing lands and forest reservations including watershed reservations presently administered by other government agencies was given to the Bureau of Forest Development (now the Forest Management Bureau: FMB) through PD 705. Executive Order (EO) No. 192¹² placed primary responsibility for the conservation, management, development and proper utilization of natural resources including watersheds to the DENR. With the conversion of FMB to a staff bureau its line functions have been transferred to the DENR regional and field offices.

b) NIPAS Act (RA 7586, 1992)

The NIPAS is under the administration and control of the DENR. The Protected Area and Wildlife Division (PAWD), which coordinates and monitors the activities related to Protected Area management and Wildlife resources conservation within the region, was created at the Regional Office of DENR. A Protected Area and Wildlife Section created at the PENRO coordinates and monitors the Protected Areas at the provincial level.¹³

c) Indigenous Peoples' Rights Act (RA 8371, 1997)

RA 8371¹⁴ recognizes the rights of indigenous peoples to own, manage, develop and conserve their ancestral domains and all natural resources found therein. This vests the management of ancestral domains, on the Indigenous Cultural Communities/Indigenous Peoples (ICCs/IPs). They have the rights of self-governance and self-determination over the use, management and conservation of their domains. The jurisdiction over the management of watersheds and protected areas covered by Certificate of Ancestral Domain Claim (CADC), according to EO 192, PD 705 and RA 7586, is now transferred to the ICCs/IPs by virtue of RA 8371.

d) Philippine Mining Act (RA 7942, 1995)

RA7942 provides that, subject to existing rights, reservations and prior agreements, all mineral resources in public and private lands, including timber and Forestlands may be opened to Mineral Agreements and Financial and Technical Assistance Agreements (FTAA), mineral production sharing agreement (MPSA), exploration permit (ExP) and exploration permit application (ExPA). It also defines areas to be excluded from Mining Agreements such as military and government reservations, areas covered by small mining claims, old growth or virgin forests, all areas prohibited under the NIPAS Act and areas under RA 8371.

¹² Executive Order 192: Providing for the Reorganization of the Department of Environment, Energy and Natural Resources, Renaming it as the Department of Environment and Natural Resources, and for other Purposes. June 10, 1987

¹³ DAO No. 25 Series of 1992: National Protected Areas System (NIPAS) Implementing Rules and Regulations, Section 36, Chapter VI. June 29, 1992.

¹⁴ RA No. 8371: An Act to Recognize, Protect and Promote the Rights of Indigenous Cultural Communities/Indigenous Peoples, Creating a National Commission on Indigenous Peoples, Establishing Implementing Mechanisms, appropriating Funds, therefore, and for other Purposes. Section 7, Chapter III.

(3) Jurisdiction through Proclamations

The President of the Philippines is empowered by PD 705 to proclaim portions of the public domain for special purposes. Proclamations of watersheds for special uses such as for hydropower generation and/or irrigation purposes have been made. In a number of cases the jurisdiction over the watershed is transferred from DENR to the agency managing the infrastructure.

Through the proclamations several watersheds are being managed by other government agencies (OGAs) such as NIA, the Philippine National Oil Corporation and the National Power Corporation (NAPOCOR)¹⁵ (Section 4.7.2).

In all the watershed areas where the management has been transferred to other agencies, DENR retains supervision over the areas.

(4) Jurisdiction through Devolution (RA 7160)

The Local Government Code (RA 7160, 1991) also mandated the Local Government Units (LGUs) to share with the national government the responsibility in the management and maintenance of ecological balance within their territorial jurisdiction. The Code devolved the following forest management functions, subject to the supervision, control and review by DENR:

To the Provinces: enforcement of forestry laws limited to community-based forestry projects, pollution control laws, small-scale mining laws, and other laws on the protection of the environment, and mini-hydro electric projects for local purposes; and

To the Municipalities: implementation of community-based forestry projects which includes Integrated Social Forestry Program (ISFP) and similar projects, management and control of communal forests with an area not exceeding 50 km²; establishment of tree parks, greenbelts and similar forest development projects.

Further to the above provision, DENR through DAO No. 30 Series of 1992 devolved additional forest management functions to LGUs, which includes the management, protection, rehabilitation and maintenance of communal forests and community watershed areas that are sources of local water supply.

3.1.5 Jurisdiction over Forest Products

PD 705 prescribed that the Bureau of Forest Development (BFD) was responsible for harvesting and use of forest products and the implementation of multiple-use and sustain-yield management of forestlands.

Subsequently, EO 192 transferred the regulatory authority of BFD to the regional and field units of DENR as part of their absorbed functions from the defunct Forestry Districts of the BFD. The authority over the collection and disposition of forest products is not relinquished by DENR even in forest areas managed by other agencies or organizations.

¹⁵ Formulation of a Watershed Management Strategy and Investment Program, Review of Policy and Legal Framework Working Paper No. 3. DANIDA-DENR, July 1998

While NIA has been granted authority to construct, develop, operate and maintain infrastructures in the Cacecnan Multipurpose Irrigation and Power Project (CMIPP), all cases of clearing, timber cutting and related activities shall be coordinated and approved by the DENR.

One of the products from watersheds is water. However, this is often not under the purview of DENR's authority to supervise and control its use because other government agencies such as the National Water Resources Board (NWRB) have been given the authority for distributing and taxing its use.

3.1.6 Land Uses and Tenure Instruments in Watershed Areas

(1) Certificate of Stewardships Contract (CSC)/Certificate of Community Forestry Stewardship (CCFS)

ISF Program¹⁶ was formally launched in 1982 to respond to the needs of the upland dwellers. Regulations on the ISF Program were further revised in 1991.¹⁷ It aimed to achieve poverty alleviation, conservation, development and protection of Forestland and social justice. Tenure instruments for ISF Program were: i) Certificate of Stewardship Contract (CSC) for individual households; and ii) Certificate of Community Forestry Stewardship (CCFS) for associations or communities of forest occupants. The duration of tenure for both cases is 25 years renewable for another 25 years.

ISFs have been devolved to LGU since 1992, but this process has not been completed. Remaining ISFs are still in the process of devolution, and those existing CSCs remain as tenurial instruments and are eligible for renewal until their final expiration. However, new CSCs will no longer be issued.

The land secured under CSC is applicable for tree planting, agriculture and agro-forestry. It was observed that one of the most common practices of CSC areas is agro-forestry. Mango, Jackfruits, avocado and other fruit bearing trees are frequently planted. Rice is also often cultivated on the paddy field equipped with small irrigation facilities.

(2) CBFM Agreement (CBFMA)

DENR allows various land uses and occupancy in watershed areas by granting tenure rights over these areas through the Community-based Forest Management Agreement (CBFMA). It also aims to consolidate all the previous tenure instruments under the CBFMA. However, the Certificate of Stewardship (CS) is still retained valid to individual farmers/families managing farms inside CFBMA areas.

¹⁶ Letter of Instruction No. 1260 July 1982: Implementation of the Integrated Social Forestry Program to be known as Program for Ecosystem Management II for Kingineors and Other Forest Occupants and Communities Dependent for Forestlands for Livelihood

¹⁷ DAO No.04,1991: Revised Regulations Governing the Integrated Social Forestry Program

DAO No.98-41¹⁸ allows the establishment of CBFM projects within watershed reservations. DAO No. 2000-44¹⁹ provides specific guidelines for the establishment and management of CBFM within the Protected Areas. Protected Area Management Board (PAMB) and Protected Areas Superintendent (PASU) are to take active roles in all stages of project implementation, and an issue of CBFMA has to be endorsed by PAMB and approved by the RED-DENR. The CBFMA within the Protected Areas is permitted under the following conditions.

- Allowable areas: multiple use zones and buffer zones of the Protected Areas
- Qualified participants: tenured migrant communities as defined under the NIPAS law

(3) Integrated Forest Management Agreement (IFMA)

DAO 99-53²⁰ stipulates objectives of Integrated Forest Management Program (IFMAP) as to: i) rehabilitate degraded Forestlands; ii) ensure continuous supply by encouraging the private sector to engage in industrial forest development; and iii) improve economic well being of forest communities. The tenurial instruments of the IFMAP are the Industrial Forest Management Agreements (IFMA), none of which exist in the Study Area at present. The IFMA is not applicable for the protected area under NIPAS, ancestral land and domains, CBFM program areas, and areas under existing valid permits, leases or agreements. Size of the IFMA is 500 – 40,000 ha.

(4) Socialized Industrial Forest Management Agreement (SIFMA)

According to DAO 96-24²¹, a Socialized Industrial Forest Management Agreement (SIFMA) is to grant security of land tenure for the purpose of allowing the people to actively participate in forest plantation development. Areas available for SIFMA are denuded production forestlands with no existing tenurial instrument to be identified and approved by the Secretary. Size of the SIFMA is 1 to 10 ha for individuals/single families and 10 to 500 ha for associations/cooperatives.

(5) Forest Land Management Agreement (FLMA)

This program was established in DAO 71 dated August 9, 1990. It was an outgrowth of the contract reforestation initiative launched in 1988 with financial support from the Overseas Economic Cooperation Fund (OECF) and Asian Development Bank (ADB). Under the Forest Land Management Program, areas previously developed via contract reforestation were turned over to private parties through issuance of a Forest Land Management Agreement (FLMA) that has a duration of 25 years, renewable for another 25 years. Under terms and conditions in the FLMA, the private party is responsible for sustained maintenance and management of the area previously reforested via contract. The FLMA allows harvesting of the planted trees when they mature.

¹⁸ DAO No. 98-41 Guidelines on the Establishment and Management of Community-Based Forest Management (CBFM) Projects within Watershed Reservations, June 24, 1998.

¹⁹ DAO No. 2000-44 Amending Certain Provisions of DAO 96-29 and Providing Specific Guidelines for the Establishment and Management of Community-Based Projects within Protected Areas, June 6, 2000.

²⁰ DAO No. 99-53 Regulations Governing the Integrated Forest Management Program (IFMP), December 23, 1999.

²¹ DAO No. 96-24 Rules and Regulations Governing the Socialized Industrial Forest Management Program, August 29, 1996.

(6) Forestland Grazing Management Agreement (FLGMA)

Forestland Grazing Management Agreement (FLGMA) is a new tenurial instrument, which is a production sharing agreement between a qualified person, association and/or corporation and the government to develop, manage and utilize grazing lands (DAO 99-36)²². The existing tenurial instruments such as Pasture Lease Agreements (PLA) and Forest Land Grazing Lease Agreements (FLGLA) are no longer eligible for renewal. However, there has been a five-year transitory period since 1999 to allow PLA and FLGLA holders to convert them into FLGMA. Within the Protected Areas, grazing is allowed only in multiple use zones and buffer zones. Grazing is prohibited in certified ancestral lands and domains (CADCs/CALCs), except when the Indigenous Cultural Communities (ICCs)/Indigenous People (IPs) opt to participate.

(7) Certificate of Ancestral Domain Claims (CADC) and Certificate of Ancestral Land Claims (CALC)

To secure all the rights of Indigenous Cultural Communities (ICCs) and Indigenous Peoples (IPs), tenurial instruments were legitimated for ancestral domains/lands used by ICCs and IPs. The instrument for the ICC is the Certificate of Ancestral Domain Claims (CADC), while the one for IPs is the Certificate of Ancestral Land Claims (CALC).

CADC and CALC would be converted to land titles under the Certificate of Ancestral Domain Titles (CADT) and Certificate of Ancestral Land Titles (CALT). All areas within ancestral domains, whether delineated or not, are presumed to be communally owned and, pursuant to the indigenous concept of ownership, could not be sold, disposed of nor destroyed.

(8) Certificate of Land Ownership Award (CLOA)

The Comprehensive Agrarian Reform Program (CARP) was started in 1988 according to RA 6657 for the purpose of sound rural development and industrialization. Under this program, a maximum of 3 ha of land title can be given to the beneficiaries as a Certificate of Land Ownership Award (CLOA). The provision of the land title allows the owner to cut, collect and dispose of timber stands in the area with the purpose of development of the settlement, subject to forestry rules and regulations.

3.2 Forest Products

3.2.1 License for Timber Production

The 1987 Philippine Constitution no longer allows the Timber License Agreement (TLA) system to harvest timber in natural forest but the remaining TLA holders are allowed to continue operations until their scheduled expiration. The license of the last TLA will expire in 2011. As of Year 2000 there was one suspended TLA in the Study Area.

²² DAO No. 99-36 Revised Rules and Regulations Governing the Administration, Management, Development and Disposition of Forestlands Used for Grazing Purposes, as amended by DAO No. 2000-23, March 3, 2000.

The CBFMA is another type of timber production sharing instrument between DENR and a People's Organization (PO) that allows the PO to harvest timber from natural forests based on the Resource Use Plan (RUP) to be prepared by the PO with the affirmation of DENR²³.

3.2.2 Access to Non-timber Forest Products

Out of 195 rattan-cutting permits granted in the country in 1999²⁴, two each were in Isabela and Nueva Vizcaya. There was also one permit in Quirino. The total allowable cut of the five permits was 3.95 million lineal meters.

CBFMA holders are also qualified to extract non-timber forest products (NTFP) within their area. Indigenous cultural communities and POs are now given priority to extract NTFP within their areas whenever existing cutting permits terminate or expire.

3.3 Organization and Responsibility

This section reviews the structure of organizations as well as functions of government agencies mandated to administer and manage watershed areas and resources.

3.3.1 Department of Environment and Natural Resources (DENR)

DENR is the primary government agency responsible for the conservation, management, development and proper use of the country's environment and natural resources (EO 192). It regulates the utilization of these resources to ensure equitable sharing of the benefits.

Powers and Functions - The functions of DENR relevant to the M/P Study are shown in **Table 3.3.1**. These concern the formulation and implementation of policies, plans, programs, rules and regulations pertaining to the exploration, development, conservation, protection, extraction, disposition and use of natural resources.

Structural Organization - The DENR is headed by the Department Secretary and the offices consist of the department proper (central office), staff offices, staff bureau and the regional, provincial, and community environment natural resources offices. Offices at the department proper and the sector bureaus assist the Secretary.

The field offices of DENR are the Environment and Natural Resources Regional Offices in the 15 administrative regions, the Provincial Environment and Natural Resources Offices (PENRO), and the Community Environment and Natural Resources Offices (CENRO). **Figure 3.3.1** shows the organization and structure of DENR.

Organization and Functions of Regional Offices - DENR SO No. 2003-330²⁵ reverted the organizational structure of DENR to the one prescribed originally in EO 192. **Figure 3.3.2** shows the current organizational structure of DENR Region 2. The current organizational structure of the regional offices is divided into 4 services namely: Forestry,

²³ DENR AO No. 2000-29 Guidelines Regulating the Harvesting and Utilization of Forest Products within Community-Based Forest Management Areas, March 14, 2000.

²⁴ The Philippine Forestry Statistics, DENR-FMB, 1999

²⁵ DENR SO No. 2003-330. Assignment of Regional Technical Directors. May 12, 2003.

Land Management, Protected Areas, Wildlife, Coastal Zone and Marine Resources Management, and Ecosystems Research and Development. A Regional Technical Director (RTD) heads the service. Coastal Zone and Marine Resources Management is an addition to the Protected Areas and Wildlife Service.

The relevant functions of the Regional Offices as defined by EO192 and DAO 88-01²⁶ are shown in **Table 3.3.1**. The functions of the regional offices revolve about the implementation of pertinent laws, rules, regulations, plans and programs for the promotion of sustainability and productivity of natural resources, social equity in resource utilization and environmental protection. EO 192 did not specify monitoring of projects as a function. DAO 88-01 added this to the functions of the regional offices.

Organization and Functions of the PENRO and CENRO - EO 192 and DAO 88-01 do not define the manner in which the PENRO and CENRO are organized. However, current organization of these offices in Region 2 follows the structure of the Regional Office (**Figure 3.3.3**). However, the CENRO Technical Services has only two units, the Lands Management Unit and the Forest Resources Conservation Unit (**Figure 3.3.4**).

Forest management activities are implemented by PENRO and CENRO based on their authorities and mandates. Main functions of PENRO are to conduct planning, coordination, controlling and updating plans for the various activities in the province and also provide guidance, supervision, advising and logistics to CENRO operations.

The PENROs and/or CENROs have authority over selected forest management functions as summarized below.

PENRO - Approval of CBFMA and issuance of rattan cutting permits.

PENRO and CENRO – (i) confiscation of illegal forest products: issuance of apprehension receipts, seizure receipt/orders, (ii) disposition of confiscated forest products via donation or through public auction, (iii) issuance of cutting permits, (iv) renewal of ordinary minor forest products licenses except rattan (PENRO), (v) issuance of cutting permits for planted trees within A & D lands, and (vi) issuance of tenurial instruments such as CSC and SIFMA.

CENRO – (i) issuance of certificates of origin for timber, lumber, veneer, plywood, and minor forest products, certificates of verification for planted trees, and special cutting permits for trees in ISF/CSC areas, (ii) the field work in the forest, on farms, and related activities affecting the lives of people in rural areas.

Organization and Functions of the Staff Bureau – There are three staff bureaus of DENR that are relevant to the M/P Study. These are the Forest Management Bureau (FMB), the Protected Areas and Wildlife Bureau (PAWB) and the Ecosystems Research and Development Bureau (ERDB). The functions of these bureaus are shown in **Table 3.3.1**.

²⁶ DAO No. 1 series 1988 Implementing Guidelines for the Reorganization of the Department of Environment and Natural Resources Pursuant to Executive Order No. 192

The FMB and PAWB recommend policies, programs and projects for the effective implementation of their respective programs. FMB is in charge of supervising the implementation of the CBFM Program and the monitoring and evaluation of forest management programs including watershed management and soil conservation. The main function of the PAWB is to establish NIPAS areas.

The ERDB is entrusted with the formulation and recommendation of an integrated research program relating to ecosystems and natural resources and the generation of technologies relevant to the sustainable uses of Philippine ecosystems and natural resources.

Organization and Functions of the Mines and Geosciences Bureau – The Philippine Mining Act of 1995 transformed the Mines and Geo-sciences Bureau (MGB) from staff to a line bureau. As such, it is mandated to establish regional offices. The functions of the MGB ascribed to it by RA 7942 area are also shown in **Table 3.3.1**.

3.3.2 Local Government Units

The mandate of the Environment and Natural Resources Offices (ENRO) is to carry out the environment and natural resources functions of a province. Isabela, Nueva Vizcaya and Quirino have established such offices. The office of Quirino is called the Provincial NREO, while the one in Ifugao is named the Provincial Agricultural, Environment and Natural Resources Office (PAENRO).

The functions and organizational chart of the ENROs are shown in **Table 3.3.1** and **Figure 3.3.5**, respectively. The ENRO has two operating divisions, the Environment and Mineral Resources Management Division and the Forest Conservation and Development Division. The Watershed Management and the Community-based Forest Management/Integrated Social Forestry Management Section implement forest management and environmental programs.

3.4 Monitoring and Evaluation System

3.4.1 Standard Operating Procedures (SOP) for Performance Monitoring

The Planning and Policy Service Office of DENR has a standard operating procedure (SOP) for performance monitoring prescribed under DAO 92-33²⁷ and amended by DAO 99-38²⁸.

Operating units report every month the outputs of all programs/projects including those funded from sources other than DENR appropriations. Details of the monitoring system are shown in **Table 3. 4.1**.

²⁷ DAO No. 33 S1992 Manual for Performance Monitoring of DENR Programs and Projects. July 13, 1992

²⁸ DAO No. 99-38 Revision of the Standard Operating Procedure (SOP) for Performance Monitoring Prescribed Under DAO No. 33 Series of 1992.

3.4.2 Monitoring and Evaluation by Project

Foreign Assisted Projects - The Foreign Assisted and Special Projects Office (FASPO) use the results of the Monitoring and Evaluation System for foreign assisted projects (FAPs). Resolution No. 14 Series of 1999 of the NEDA mandated the system. The monitoring sub-system ascertains physical and financial accomplishments and the timeliness of inputs and outputs. The evaluation sub-system ascertains performance, efficiency and effectiveness.

Monitoring and Evaluation of Foreign Funded Projects, Case of JBIC - JBIC adopted its own monitoring system for the FSP (MC 2001-04)²⁹. The physical accomplishments of the PO and the socio-economic and environmental impacts of the project are monitored and evaluated.

Monitoring and Evaluation of a Co-Managed Project - Monitoring and evaluation of the Lower Magat Watershed Management Project (LMFMP) is conducted at two levels. One level is monitoring the performance of farmers related to their development plans and the other level is monitoring the LMFMP. The LMFMO does the actual field monitoring of the farmer's accomplishments measured according to the approved development plan.

The Project itself is monitored on the basis of its management and development plan. The LMFMO reports its accomplishments during the quarterly meeting of the Provincial Environmental and Natural Resource Committee (PENRC) or during special meetings of the Committee.

Monitoring and Evaluation of an LGU Managed Project - Likewise, the Barobobob Watershed Management Project is monitored at the farmer's and at the project levels. The Provincial Project Development Office (PPDO) monitors the project. An inter-office team led by the Provincial ENRO conducts monitoring and evaluation of the farmer's performance. Reports are submitted to the Chief of ENRO, which also go to the PPDO and the Governor. Feedback is provided to the farmers.

Monitoring of Watershed Management Projects by FMB - The unit of FMB directly responsible for monitoring, assessment and evaluation of watershed management projects is the Watershed Management Section of the Reforestation Division. Reports of projects on watershed management projects implemented by the regional offices are submitted to DENR central office, which are to be forwarded to FMB.

3.5 Annual Budgets and Budgeting Procedures

3.5.1 Budgeting Procedures at the National Level

The budget process of DENR is prescribed in DAO 98-18³⁰. General procedures of the planning and budgeting procedures of DENR are shown in **Figure 3.5.1**. It starts with the call for the submission of budget proposals from the Department of Budget and

²⁹ DENR MC No. 2001-4 Revised Guidelines on the Conduct of Monitoring and Evaluation of the Forestry Sector Project, January 10, 2001

³⁰ DAO 98-18 Prescribing the standard operating procedures in the preparation of the agency/region/bureau office work and financial plan. April 20, 1998

Management (DBM) around November every year or about 14 months before the start of the plan period. The DBM indicates the budget ceiling for each of the departments and national offices. The various central staff bureaus and regional offices of the department are instructed to prepare their work targets and budget estimates taking into consideration their specific goals and plans. Regional development strategies, including physical framework and resource use plans, are considered in the preparation of targets and budgets. These are presented to the Regional Development Council (RDC) for endorsement to the DENR Central Office around the second week of March of the ensuing year. The Policy and Planning Service Office (PPSO) and the Budget Division of the Finance Management Service of DENR review the budgetary proposal and work targets of the various offices from the third to fourth week of March.

The work targets and budget proposals are consolidated and presented to DENR top management within the first week of April and then submitted to DBM about the middle of April. Technical budget hearings at the DBM take place around the first week of May. Revision of the targets and budget proposal, if needed, are done after the technical hearing.

The budget proposal is then submitted to Congress around the third week of August. Members of Congress (House of Representatives) are briefed on the work targets and budget proposals for their districts. The budget is then presented to the House Committee on Appropriations or its subcommittees, generally chaired by the Chair of the Committee on Environment and Natural Resources about the third week of September. Similar presentations are made at the Senate Committee on Appropriations or its subcommittees. In the plenary session, the House of Representatives deliberate on the proposed appropriations of the various departments and offices. This is repeated in the Senate. A bilateral committee of the House and the Senate finalize the budget and send it to the Office of the President for approval.

The budget is normally approved before Congress adjourns before the end of the year. When Congress fails to pass the budget for the following year, the budget of the previous year is used, as in the Year 2001.

The approved agency budget contained in the General Appropriations Act for the Budget Year becomes the basis for reprogramming or revising the agency targets for the year. Work and financial plans based on the approved budget are prepared, reviewed and consolidated for submission to DBM. The approved work and financial plans serve as the regional operations plan.

3.5.2 Budgeting Procedures at the Bureau and Regional Level

The budgeting procedure at the Bureau and the Regional DENR is similar to the national one. The Bureau and Regions are given their budgetary ceilings. The staff Bureau directs the submission of budget proposals from its units indicating the ceiling for the entire Bureau. The various units of the Bureau submit their proposals based on proposed targets of programs and projects of the unit. The Budget and the Planning Offices consolidate the proposals for deliberation of the Bureau during which a final budget proposal is agreed upon. This proposal is then submitted to the Department.

At the regional level, the field units (PENROs and CENROs) are instructed to prepare activities and targets for budget proposals based on the identified programs and projects

by the Department. A regional planning workshop, in which the Planning and Budget Officers participate, is conducted where the ceiling for the region is announced including the ceiling for each of the PENROs. Based on the previously identified targets and activities, the Planning and Budget Officers of PENROs and CENROs finalize their budget proposals. These are consolidated at the PENRO level and submitted to the Regional Office for deliberation. A regional budget proposal is agreed upon and submitted to the Planning Office of the DENR through the Regional Development Council.

3.5.3 Budget of DENR for Forestry Purposes

The budgets of DENR for the last five years (1997-2001) are shown in **Table 3.5.1**. The budget is distributed according to the allocation of the various sectors under DENR. Although the budget for forest management has been decreasing slightly since 1997 the allocation has been consistently more than 30% of DENR's appropriation. This shows the importance of forest management in the DENR's priority of activities.

CHAPTER 4 PRESENT CONDITIONS OF THE STUDY AREA

4.1 Location

The Upper Cagayan River and the Magat River join to form the Cagayan River that winds its way through Cagayan Valley. Cagayan Valley is a watershed with an area of about 2,728,100 ha. The Study area, encompassing Upper Magat and Cagayan River basin, is located within the watershed covering an area of 879,958 ha in the northern part of the Cagayan Valley. It is surrounded by the Cordillera Mountains to the west, the Sierra Madre Mountains to the east and the Caraballo Mountains to the south (**Location Map**).

4.2 Administrative Jurisdiction

The Study area covers Ifugao Province of CAR and Quirino, Nueva Vizcaya and Isabela Provinces of Region 2. Out of the 879,958 ha of the Study area, 869,328 ha (98.8 %) falls within the four provinces, the rest of the area is under the jurisdiction of Benguet Province. The size of each province within the Study area is shown in the following table.

Size of Each Province within the Study Area

Province	Total Area (ha) ¹	Size in the Study Area (ha) ²	Proportion (%)
1. Nueva Vizcaya	390,390	357,689	40.6
2. Quirino	305,718	230,194	26.2
3. Isabela	1,066,456	106,508	12.1
4. Ifugao	251,778	174,936	19.9
Sub-total	2,014,342	869,327	98.8
5. Benguet		10,631	1.2
Total		879,958	100

Source: /1: Briefing Kit of PENRO Nueva Vizcaya, Brief Provincial Profile of Quirino Province Provincial Development Plan (1999-2004), PENRO Isabela Profile (2000)
/2: Study Team

Most of Nueva Vizcaya, Quirino and Ifugao are included in the Study area. Only 10% of the most southern part of Isabela belongs to the Study area. The Study Team identified a total of 631 *barangays* in 39 municipalities within the four provinces of the Study area. The number of *barangays* within each municipality is summarized in **Table 4.2.1**.

A *barangay* boundary map prepared by the Study Team discovered many cases of conflict in the boundaries between/among adjoining *barangays*. As a result, the total administrative areas of the 613 *barangays* within the Study area based on the boundary map come up with 902,225 ha despite the spatial extent of the Study area being 879,958 ha. This implies that there are overlapping areas of 22,267 ha due to the boundary conflicts.

4.3 Natural Conditions

4.3.1 Topography, Geology and Soils

Topography of the Study area is classified into: very steep to steep land-forms of 175,107 ha, rolling to steep of 232,613 ha, moderately steep of 173,017 ha, and gently sloping of 299,221 ha (**Figure 4.3.1**). Large areas of the Cordillera Mountains ranging from 1,200 to 2,900 m in elevation have been used for agricultural and grazing purposes, while the

Sierra Madre Mountains with elevations ranging from 1,100 to 1,400 m have relatively large areas of natural forest (**Figure 4.3.2**).

Soil type of a considerable part of the Study area has been unidentified (**Figure 4.3.3**). It is generally characterized in various forms of clay loam and sandy loam soils. Soil types of a large portion of Nueva Vizcaya are Guimbalaon clay loam and Annam clay loam. Representative soil types of Ifugao are Nayon clay loam, Mayoyao clay loam and Longa silty clay loam. A large part of Isabela has Cauayan sandy loam, while Rugeo clay soil has been identified in Quirino. Geological condition in the Study area is shown in **Figure 4.3.4**.

4.3.2 River Systems and Sub-Watersheds

The Upper Cagayan River, the main river of the Study area, flows along the foothills of the Sierra Madre Mountains from south to north for 220 km in the east of the Area (**Figure 4.3.5**). Main tributaries in the Area are the Upper Magat River consisting of the largest watersheds, and the Addalam River forming a smaller sized watershed in the center of the Area. The other tributaries are generally steeper in slope and smaller in size. The Study area is broadly divided into the three watersheds of these major rivers, where the Upper Magat River watershed holds the largest portion (48%) of the total Study area followed by the Upper Cagayan River watershed (39%) and Addalam River watershed (13%).

Major Watershed	Area (ha)	No. of Sub-watershed
-Upper Magat River Watershed	417,663	61
-Upper Cagayan River Watershed	342,166	54
- Addalam River Watershed	114,773	18
Sub-total	874,602	133
- Magat Reservoir	5,356	
Total	879,958	

Source: JICA Study Team

For management purposes, these three watersheds were further divided into 133 sub-watersheds by the Study Team based on mountain ridges or river lines (**Figure 4.3.6** and **Table 4.3.1**).

4.3.3 Meteorology and Hydrology

According to the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), most of the Study area falls under climate Type III. This climatic type is characterized by not very pronounced seasons with relatively dry weather conditions from November to April while the remainder of the year is noted as receiving relatively higher rainfall. The rest of the Study area, especially the western part, falls under Type II, which has two pronounced seasons, dry from November to April and wet for the rest of the year.

The Study area is affected by the southwest monsoons and northeast monsoons. The southwest monsoons bring a large portion of the annual rainfall. Major storms, including typhoons, often strike the area from July to December. Overall annual rainfall of the Cagayan River Watershed is estimated at 2,600 mm. The maximum monthly rainfall appears in July or August. Rainfall records at various stations are listed in **Table 4.3.2** and **Figure 4.3.7**.

The hottest month of the area is April or May, while the coldest month is January. The monthly mean ambient temperature ranges from 23.1 °C in January to 29.0 °C in May. Ambient temperature is summarized in **Tables 4.3.3** and **4.3.4**.

Evaporation is highest in April and lowest in December. Relative humidity is relatively high in the area ranging from 70 to 90%.

A stream flow analysis in the Feasibility Study of the Flood Control Project for the Lower Cagayan River¹ estimated annual average run-off of the Upper Cagayan River and Magat River at 289.3 and 269.8 m³/s, respectively.

4.3.4 Fauna and Flora

(1) Fauna

Biological diversity of the Philippines is considered high, and endemism of wildlife is as high as 67%. Of the total 561 bird species, 177 species are considered endemic to the Philippines. According to the IUCN Red List, 86 species of birds are considered as threatened species and 49 species are near-threatened.

There is a record of 180 mammalian species inhabiting the Philippines, and 110 species of which are endemic. Most mammalian species occur only in lowland forest, montane forest, or mossy forest. Bat species are distributed widely in the lowlands and decrease with increase in elevation. Small animals other than the bat, on the other hand, show a steady increase in diversity with increasing elevation. Therefore, it is necessary that protected areas include the full vertical gradient so that many important wildlife species can be secured effectively.

(2) Flora

It is known that approximately 79 families and 298 plant species exist in the Cagayan Valley. Some endangered tree species including Kalantas (*Toona kalantas*) grow in Nueva Vizcaya. It is said that there are still unknown plant species within the area particularly in the tropical pristine forests. Unidentified species could be as many as 300.

In Ifugao, dipterocarp species cover approximately 34% of the forestland, and Benguet Pine (*Pinus kesiya*) is relatively abundant in Asipulo, Banaue, Hungduan and Tinoc. Dominant species of natural forest in Quirino are, Dao (*Dracontamelon dao*), Dungon (*Heretiera silvatica*), Mayapis (*Shorea palosapis*), and White lauan (*Shorea contorta*).

¹ The Study was commenced in March 2000 and completed in January 2002 by another JICA Study Team.

4.4 Socio-Economic Conditions of the *Barangays*² in the Study Area

(1) *Barangays* within Study Area

There are 631 *barangays* within the Study area (Appendix 6), out of which 408 *barangays* have Protected Areas and/or Forestland covering more than 20% of the whole *barangay* area (Figure 4.4.1).

(2) Sizes of *Barangays* in the Study Area

According to the Official Master list of *Barangays*³, the total area of the 408 *barangays* is 855,706 ha. An administrative boundary map prepared by the Study Team revealed that the total spatial area of the Protected Areas and Forestland in the 408 *barangays* is 660,328 ha, while the Official Master list shows that area to be 676,782 ha. The difference is most probably derived from the fact that there are cases where administrative boundaries overlap each other between/among contiguous *barangays* and the areas in the Official Master list employed the areas insisted on by the individual *barangays* with the boundary conflict.

The average *barangay* area among the 408 *barangays* is 2,097 ha. The *barangay* that has the smallest area is Aromin, Echague Municipality in Isabela Province with 104 ha. The largest is Matmad, Nagtipuna Municipality in Quirino province with 26,998 ha.

Sizes of *Barangays*

	Ifugao	Isabela	N. Vizcaya	Quirino	Whole
Smallest	134	104	232	251	104
Largest	19,585	4,684	11,563	26,998	26,998
Average	1,509	1,417	2,334	3,017	2,097
Total	206,758	36,844	434,130	177,974	855,706

Source: Official Master list of *Barangays* as of June 1996

(3) Population of the *Barangays* in the Study Area

Total household population of the 408 *barangays* is 566,654, of which 359,600 are considered to be residing within the Protected Areas and Forestland⁴. Population ranges from 110 in Banga, Lagawe Municipality in Ifugao to 3,945 in Bone South, Aritao Municipality in Nueva Vizcaya. Average *barangay* population is 881. Average number of households by *barangay* is 174 with an average family size of 5.1 persons.

² The smallest unit of administrative boundary (i.e. village)

³ Official Master list of *Barangays* prepared by Department of the Interior and Local Government National *Barangay* Operations Office as of June 30, 1996

⁴ Table 3.4.1 of Appendix 6 Socio-Economy, Volume III of the Final Report

Population, Household Number/Size of the 408 *barangay* within the Study Area

	Ifugao	Isabela	N. Vizcaya	Quirino	Whole
a) Number of <i>barangay</i>	130	34	185	59	408
b) Household population	(Unit: person)				
<i>Barangay</i> Average	821	501	1,010	831	881
Total within the Study Area	<u>106,687</u>	<u>17,024</u>	<u>186,862</u>	<u>49,028</u>	<u>359,601</u>
b) Household number	(Unit: HH)				
<i>Barangay</i> Average	157	101	201	167	174
Total Number	20,427	3,434	37,109	9,850	70,820
c) Household size	(Unit: person)				
Average Size	5.2	4.9	5.0	5.0	5.1

Source: *Barangay* profile survey conducted by the Study Team

The lowest population density among the targeted *barangays* is Matmad of Nagtipuna municipality in Quirino at 1.7/km², and the highest density is Poblacion of Kiangnan Municipality in Ifugao with 1,195.2/km². Average population density of all the 408 *barangays* is 103.1/km². Spatial distribution of the population density of the 408 *barangays* is shown in **Figure 4.4.2**.

Average Population Density of *Barangays*

(Unit: person/km²)

	Ifugao	Isabela	N. Vizcaya	Quirino	Whole
Population Density	123.2	105.3	95.7	79.0	103.1

Source: *Barangay* profile survey conducted by the Study Team

(4) Tribal Groups and Religions in the *Barangays* in the Study Area

According to the *barangay* profile survey conducted by the Study Team, 28 tribal groups live in the 408 *barangays*. Major tribal groups are Ilocano and Ifugao. There are some *barangays* in Ifugao and in Nueva Vizcaya where only one tribal group resides. The highest number of tribal groups, 28, lives in Villa Coloma, Bagabag Municipality in Nueva Vizcaya. Spatial distribution of the variety of tribal groups in the 408 *barangays* is shown in **Figure 4.4.3**.

Average Number of Tribal Groups in one *Barangay* of the Provinces

	Ifugao	Isabela	N. Vizcaya	Quirino	Whole
Number of Tribal Groups	4.5	4.4	8.4	6.4	6.6

Source: *Barangay* profile survey conducted by the Study Team

The Roman Catholic is the major religious sect, second is the Church of Christ. Average number of religious sects in one *barangay* is 6.7 as the following table indicates. Spatial distribution of the variety of religious groups in the 408 *barangays* is shown in **Figure 4.4.4**.

Average Number of Religions in one *Barangay*

	Ifugao	Isabela	N. Vizcaya	Quirino	Whole
Number of Religions	6.4	5.6	6.9	7.1	6.7

Source: *Barangay* profile survey conducted by the Study Team

(5) Poverty Line of the *Barangays* in the Study Area

The percentage of population of the various *barangays* under the provincial poverty line varies widely, ranging from 0 to 100% with the average at 46.7%. Spatial distribution of the percentage of population under the poverty line of the 408 *barangays* is shown in **Figure 4.4.5**.

Barangay Average Percentage of Population below the Poverty Line
(Unit: %)

	Ifugao	Isabela	N. Vizcaya	Quirino	Whole
Percentage of BPL	70.4	22.5	36.6	33.9	46.7

Source: *Barangay* profile survey conducted by the Study Team
BPL: Below poverty line

(6) Socio-economic Classes within *Barangays* in the Study Area

The socio-economic classes were identified through a PRA workshop held for eight sample communities by the Study Team (**Appendix 3**), and the table below shows the **Summary of Socio-Economic Classes**.

(8 sample *barangays*, 331 participants)

Better-Off/Rich	Average	Poor	Very Poor
Definitions (What do they have?)			
<ul style="list-style-type: none"> -Possess a high quality and large house, home appliances, vehicles and a bank account -Possess 3 to 20 ha of titled farmland and forestland including wetland -Possess land outside the community -Possess an irrigation system -Possess post harvest facilities -Own a deep well or depend on public water supply 	<ul style="list-style-type: none"> -Possess a medium size concrete house, home appliances, a second hand vehicle and a bank account -Occupy 3 to 9 ha of farmland and forestland, a part of which has an official land title and stewardship -Possess an irrigation pump and chainsaw -Possess inexpensive farm equipment -Own a deep well 	<ul style="list-style-type: none"> -Possess a small semi-concrete house with cogon roofing -Own a radio -Occupy 1 to 3 ha of farmland, most of which has no official land title -Portion of their land is uncultivated due to the lack of capital -Access to a well, creeks or public water system for domestic water needs 	<ul style="list-style-type: none"> -Possess a small house with cogon roofing and bamboo walls built on rented land -Own a radio -Possess very little land and rent farmland -Access to a well, creeks or public water system for domestic water needs
What do they do and participate in?			
<ul style="list-style-type: none"> -Farming and logging using modern techniques and equipment -Slash & burn farming -Business as consumer stores, money lending, trading and processing -Political activities at the provincial and municipal levels -Community activities as a fund provider -Higher education & training 	<ul style="list-style-type: none"> -Farming, farm laboring and logging -Slash & burn farming -Business as petty store and a local distributor -Political activities at the municipal and village levels -Community activities as a food provider and leader -Higher education and training 	<ul style="list-style-type: none"> -Farming, farm laboring and logging laboring -Slash & burn farming -Income generating activities as carpentry and hunting & gathering for the well-offs -Political activities at a village levels -Community activities as a leader, laborer and food provider -Few reach higher education 	<ul style="list-style-type: none"> -Farming, farm laboring and logging laboring -Slash & burn farming -Income generating activities as carpentry and hunting & gathering for the well-offs -Depend for their livelihood on extended families -Social welfare programs -Community activities as laborer -No one reaches higher education
What do they use and consume?			
<ul style="list-style-type: none"> -Large volume of housing materials as timber, gravel and sand -Logs for commercial purposes -Minor forest products for commercial purposes -Chemical farm inputs -Large volume of water for irrigation -Higher domestic consumption (food, fuel wood and water) 	<ul style="list-style-type: none"> -Medium volume of housing materials -Logs and fuel woods for domestic use -Minimum volume of minor forest products for domestic use -Medium volume of water for irrigation 	<ul style="list-style-type: none"> -Small volume of housing materials -Little fuel wood and charcoal -Rented farming tools 	<ul style="list-style-type: none"> -Cogon and bamboo for housing -Little fuel wood and charcoal -Local foods

Who are they and how many?			
-Owner farmers and landlords -Livestock raisers and slash & burn farmers -Businessmen -Politicians -Professionals -IPs and lowlanders 0 to 5 % of population in an upland community	-Owner farmers and landlords -Farm laborers -Slash & burn farmers -Small vendors -Local politicians -Professionals and government officials -Indigenous Peoples (IPs) and lowlanders -Important consumers of local products 0 to 25 % of local population	-Small owner farmers -Tenant farmers and farm laborers -Slash & burn farmers -Daily laborers -Local vendors for minor forest products -Community leaders and local politicians -Drivers and domestic helpers -IPs and lowlanders 5 to 60 % of local population	-Small owner farmers -Tenant farmers and farm laborers -Slash & burn farmers -Daily laborers -Local vendors for minor forest products -Drivers and domestic helpers -IPs and lowlanders 20 to 95 % of local population

Source: JICA Study Team

The households that fell into “the very poor” represented 20 % in one community whereas they were 95 % in another place. This shows the great socio-economic diversity of those communities within the Study area.

(7) Education

Literacy level, population with no education, and collage-graduated population by *barangay* in the Study area are summarized as shown below.

Statistics on Educational Level

(Unit: %)

	Ifugao	Isabela	N. Vizcaya	Quirino	Whole
Average Literacy Rate (simple level)	57.0	40.9	71.4	73.4	64.9
Average % of People who Have No Education	20.2	7.8	13.6	13.6	15.4
Average % of Collage-graduated Population	9.9	5.0	6.4	3.8	7.1

Source: *Barangay* profile survey conducted by the Study Team

(8) Economic Activity

In the 408 *barangays*, 73% of the labor force is engaged in an agriculture related activity. Spatial distribution of the percentage of population engaged in agricultural activities of the 408 *barangays* is shown in **Figure 4.4.6**.

Barangay Average Percentage of Population who Engage in Agricultural Activity

(Unit: %)

	Ifugao	Isabela	N. Vizcaya	Quirino	Whole
Percentage of Agricultural Activities	79.8	85.3	65.9	74.2	73.0

Source: *Barangay* profile survey conducted by the Study Team

(9) Gender Relations

The worksheet below shows the summary of ratios of working population (approximately 18 to 60 years old) at the community who have an easy access and decision-making authority in each activity listed in the worksheet. The rations are disaggregated by male and female as to illustrate one aspect of gender relations at a community level in the Study area.

Summary of Access and Control Analysis by Gender Groups

(8 sample villages, 331 participants)

ACTIVITIES	ACCESS (%)		CONTROL (%)	
	Men	Women	Men	Women
Domestic Concerns				
- Fuel wood collection	82.5	38.1	90.6	35.0
- Child Rearing	39.4	97.5	75.6	88.8
- Food Preparation	98.8	98.8	65.0	93.8
- Washing of Clothes	25.0	100.0	24.2	100.0
- Fetching Water	78.6	87.1	65.0	94.3
- Education	43.8	57.5	80.0	75.6
Average	61.4	79.8	66.7	81.25
Productive Concerns (Agriculture)				
- Land Ownership	83.1	29.0	81.4	22.4
- Land Preparation	100.0	75.6	90.0	53.0
- Planting	93.8	77.5	85.0	71.9
- Maintenance (Weeding, fertilizing, pesticizing)	97.5	95.0	94.4	80.0
- Harvesting	86.3	66.3	97.5	61.9
- Post harvest activities	97.5	57.5	98.8	53.8
- Irrigation	96.3	18.8	98.8	21.9
- Marketing	61.3	70.0	75.0	62.5
Average	89.5	61.2	90.1	53.4
Community Activities				
- Meetings	63.8	56.9	41.4	38.9
- Supporting Works	47.9	17.6	34.6	7.4
Average	55.9	37.3	38.0	23.1
NR Management				
- Data Gathering and Project Conceptualization	20.8	14.8	16.1	3.4
- Project Implementation & Monitoring	65.7	42.0	29.8	17.6
- Membership	66.8	63.8	51.5	31.6
- Capability Building/Training	38.8	35.0	24.1	17.0
- Project Management	39.4	25.8	22.8	16.8
Average	46.3	36.3	28.9	17.3

Source: PRA Workshop conducted at 8 communities by JICA Study Team

Note 1: "Access" shows the ratio of working population who participate in the referred activity or uses the referred resource. "Control" refers to those who make decisions on the referred items.

The items showing "MA - MC < WA - WC" are interpreted that men deprive women's decision-making authority in those areas.

Where:

MA=Men's Access (%), MC=Men's Control (%), WA=Women's Access (%),
WC=Women's Control (%).

(10) Interactions of Communities with External Societies

The table below shows the summary of interactions between the sample communities within the Study area and external societies.

Summary of Interactions between Communities and External Societies

(8 sample villages, 331 participants)

External Societies		Descriptions
Governments	LGUs	Provides public goods and services directly to communities or through markets, NGOs and other entities. A community often provides labor and necessary supports.
	Line Agencies	Provides public goods and services mainly through LGUs, markets, NGOs and other entities. They provide social welfare services directly to communities. A community often provides necessary supports.
Individual Politicians		Provides resources and opportunities directly to communities. Their support is often ad-hoc and arbitrary.

Semi-Governmental		Include CECAP, CASCADE and RP-German established through the collaboration between a foreign donor and the Philippine government. Provides resources, information and skills through various projects and training.
Local NGOs, Co-ops and Churches		Usually work directly with communities and provide minimum resources. Active in training, technology transfer and networking. They are usually supported by the government and foreign donors. The boundary between a community and these entities would become indistinct when successful.
Foreign Donors	Governments	Provide resources and technologies, mainly to governmental agencies and local NGOs. Initiate the establishment of semi-governmental organizations. For forestry projects, some foreign donors provide resources directly to community/POs.
	NGOs & Churches	Foreign NGOs and religious organizations work directly with communities and provide resources, information and skills. They also work closely with local NGOs, churches and other institutions.
Markets		Some communities are physically far from the markets and have limited access. When accessible, community members often play key roles as traders, distributors and vendors in addition to buyers. Not only resources but also information and culture are exchanged through the market.

Source: PRA Workshop conducted at 8 communities by JICA Study Team

4.5 Industries in the Study Area

4.5.1 Forestry

On a national scale, the Philippine forest industry has been on a downward trend since its peak in the 1950s to 1970s. The situation in the Study area has followed the same trend. In the 1980s, there were eight Timber License Agreements (TLA) covering more than 150,000 ha in the Study area. By the end of the 1990s only one TLA remained. At present, the sole surviving TLA is Liberty Logging Corporation in Isabela Province covering about 26,000 ha. This corporation is still legally allowed to log until its TLA expires in 2011 (**Section 3.2.1**). However, it is not currently operating.

Under such situation, timber production in Isabela was limited at a range from 4,500 to 16,000 m³/year based on the statistical information between 1996 and 2000.

Rattan (split and unsplit), bamboo and almaciga resin were the only reported non-timber forest products (NTFP) produced in the Study area in 1999. Isabela and Nueva Vizcaya are the main producers of unsplit rattan. For the year 2000 rattan was the only reported NTFP produced (**Table 4.5.1**). Data from CENRO in Nueva Vizcaya reports production of 60,850 m of rattan by six rattan permittees in 2000.

In accordance with the declining production of timber stated above, the number of wood processing plants has drastically declined. There were formerly several large sawmills in the Study area, each having a daily production capacity of around 1,415 m³. By the end of the 1980s all of these mills ceased to operate.

According to official record, there is only one existing mini-saw mill in Isabela. It is estimated that there are about 70 furniture makers in the Study area⁵. However, there is no record of log production in Yemane (*Gmelina arborea*) although several cutting permits were granted to ISF farmers in Nueva Vizcaya (**Table 4.5.2**).

⁵ Record of the Department of Trade and Industry (in Ifugao 16, in Nueva Vizcaya 70 as of 1998)

4.5.2 Agriculture

(1) Ifugao province

The province of Ifugao has a total land area of 251,778 ha. Of the total land area, about 30% or 79,050 ha have potential for agricultural production. Presently, actively cultivated area measures 26,677 ha, and 52,373 ha are regarded as an agricultural expansion area according to Bureau of Agriculture Statistics (BAS).

Agricultural Land Area and Crop Production of Ifugao in 1997

Description	Land Area		Planted Area (ha)	Production (MT)
	(ha)	(%)		
Active Agricultural Areas	26,677	23.8		
- Rice land	13,674	47.1	13,674	41,472
- Corn	6,497	22.4	6,497	10,647
- Vegetables	746	2.1	608	2,276
- Legumes	223	0.8	223	73
- Coffee	2,560	8.8	2,560	1,319
- Fruits	1,379	4.4	1,287	10,391
- Root crops	1,519	5.0	1,446	4,153
Agricultural Expansion Area	52,373	66.2		
Total	79,050	100.0	29,028	84,875

Source: Bureau of Agricultural Statistics

The majority of the province's existing/active agricultural land area is occupied by palay at 13,674 ha or 47.1% of the active agricultural areas mostly having slopes of 30-50%. These are largely irrigated rice terraces. Other crops planted included coffee, corn, fruits, vegetables and legumes. The active agricultural lands are mostly located in Banaue, Kiangnan and Hingyon Municipalities and some parts of Hungduan Municipality.

Agriculture is the main source of livelihood of the Ifugao people. Around 53% of the Ifugao households draw their livelihood from this sub-sector. As of 1997, there were about 18,000 persons employed in agriculture, accounting for about 70 % of the total employed.

During the period of 1995-1997, the area planted to various crops increased from 21,674 ha in 1995 to 29,028 ha in 1997. Production likewise increased from 60,979 MT in 1994 to 84,875 MT in 1997.

(2) Isabela province

The average palay area harvested in the province for the crop year 1996 totaled 214,014 ha for all types, 193,560 ha for irrigated and 20,454 ha for rainfed. Palay production totaled 840,586 MT for all types, 790,018 MT for irrigated and 50,568 MT for rainfed while the yield of palay was 3.93 t/ha for all types, 4.08 t/ha for irrigated and 2.47 t/ha for rainfed.

On the other hand, the average corn area harvested in the province for the same crop year totaled 146,259 ha for all types, 10,605 ha for white corn and 135,654 ha for yellow corn. Corn production totaled 330,998 MT for all types, 17,341 MT for white corn and 299,512

MT for yellow corn. The yield was 2.26 t/ha for all types, 1.64 t/ha for white corn and 2.21 t/ha for yellow corn⁶.

(3) Quirino province

The major contributor to the province's economic activity is agriculture. In 1995, the agriculture sector dominated the work force of the province, accounting for almost 70% or 32,959 out of the total labor force of 47,583 with the age of 15 years and above⁷.

Of the total labor force engaged in the agriculture sector, about 50 % are for corn farming, 34 % in palay farming, 12 % in banana farming, 6 % in other agricultural crops and animal farming².

Corn and rice are the major crops produced in the province. For the year 1997, the Regional Field Unit (RFU), DA reported a total cropland area of 40,931.4 ha for a variety of agricultural crops.

The municipalities of Diffun and Saguday are major palay production areas, claiming respectively 27.7% and 19.3% of the total paddy land areas of 10,149 ha. This consisted of 7,303 ha of irrigated paddy land, 1,344 ha of rainfed paddy and 1,502 ha of upland paddy.

An aggregate area of 13,343 ha was devoted to corn production. The municipalities of Aglipay and Maddela led in corn production with their shares of 33.7% and 25.5%, respectively. White and yellow corn were grown on 516 and 12,827 ha, respectively

For permanent crop production in the province, banana is grown in a commercial scale. Other fruits grown are mango, citrus, jackfruit, santol, papaya, etc.

(4) Nueva Vizcaya province⁸

In Nueva Vizcaya agricultural land in 1998 was 23.6% of the total land area.

A farming household of the province has an average of 1.9 ha of farmland. In the upland areas 95% of the total number of the farming households depended for their livelihood on income from crop production and livestock farming.

Paddy is the major crop grown in the province, with a total area of 44,847 ha or 46.5% of the total agricultural land, of which 99% was irrigated and 1% was rainfed. The province used to produce more rice than its consumption requirement.

Corn production in the province was not as intensive as paddy production. The agricultural land devoted to corn production was 11.3 % of the total cropping area. During 1994-1998 the area planted with corn increased by an average of 0.8% per annum, while production and yield increased annually by 10.5% and 8.5%, respectively.

⁶ Socio-economic profile Isabela, 1997

⁷ 1995 NSO CP Report No.2-76B

⁸ Socio-economic profile Nueva Vizcaya, 2000

Nueva Vizcaya has established itself as the major producer of both tropical and temperate vegetables in Region 2. Of the total agricultural land, 3-5 % has been devoted to vegetable growing. Baguio beans, cabbage, carrots, potatoes, tomatoes, onions and squash were the most popular vegetables grown in the province. Vegetable growing has proved to be very profitable. Despite potential for high profitability, the marketing of vegetables is plagued by the large number of market players between the producers and the end consumers. This resulted in a lower farm gate price and a higher retail price.

The province produces fruits with high commercial value, such as mango, pineapple, banana and citrus. As of 1998, 25,600 ha, representing 26.6% of the total agricultural land, were devoted to orchards. Among the aforementioned fruits, mango growing occupied the largest area while pineapple was the least.

According to the data in 1998, only 2,655 mango trees out of the total of 11,741 were fruit bearing trees. Around 1,501 households were engaged in mango production, reaping a volume of 4,407 tons per harvest season. Of the mango harvested, 65 % was sold to mango buying stations, local traders and local processors, 5% was for home-consumption, and the remaining 30% were treated as rejects.

The growing of citrus is fast becoming a major activity of fruit growers. Total area actually planted was around 614 ha with another 141 ha as potential production area.

4.5.3 Livestock

The livestock reviewed in this section are carabaos, cattle and goats. Livestock production in the four provinces within the Study area consists of backyard and commercial production. Backyard production is basically to meet individual household needs. Commercial production exists but only on a limited scale. The discussion on livestock production is limited to grazing animals whose production requires large open spaces often in the Forestland and therefore has negative impacts.

The population of grazing animals in Ifugao in 1997 is shown in the table below. Backyard population far exceeded population in commercial farms. There were an estimated 12,346 head of carabao in backyard farms compared to only 708 head in commercial farms or a mere 5.7 %. The main reasons for the high number of carabaos are that they are utilized for farming and that Carabao's meat is preferred over beef in Ifugao.

Animal Population in Ifugao

(Unit: head)

Livestock	Type of Farm (Head)		Total
	Backyard	Commercial	
Carabao	12,346	708	13,054
Cattle	5,639	11,172	16,811
Goat	3,183	215	3,398
Total	21,168	12,095	33263

Source: Bureau of Agricultural Statistics, Lagawe, Ifugao

In 1997 Isabela produced an estimated total number of grazing animals, carabao, cattle and goats, of 73,972. The breakdown of this figure is shown in the table below. There was no reported population of carabao and goats in commercial farms in Isabela in 1997.

Animal Population in Isabela

(Unit: head)

Livestock	Type of Farm (Head)		Total
	Backyard	Commercial	
Carabao	33,195	-	33,195
Cattle	25,912	4,410	30,322
Goat	10,455	-	10,455
Total	69,562	4,410	73,972

Source: Bureau of Agricultural Statistics, Isabela

Grazing animal population in 1997 in Nueva Vizcaya is summarized in the table below. Carabao and cattle population in backyard and commercial farms was almost the same. Nueva Vizcaya farmers use the carabao for farming chores and this could be an explanation for the high household carabao population in the province.

Animal Population in Nueva Vizcaya

(Unit: head)

Livestock	Type of Farm (Head)		Total
	Backyard	Commercial	
Carabao	24,386	708	25,094
Cattle	25,620	14,077	39,697
Goat	15,336	1,716	17,052
Total	65,342	16,501	81,843

Source: Bureau of Agricultural Statistics, Bayombong, Nueva Vizcaya

Carabao population in Quirino Province in backyard farms was estimated to be 17,519 head, far more dominant over cattle population of only 6,361 head. There was, however, no reported carabao population in commercial farms in 1997. Cattle population in commercial farms that year was reported to be 1,409 head. Carabao is also used for farming purposes in Quirino province.

Animal Population in Quirino

(Unit: head)

Livestock	Type of Farm (Head)		Total
	Backyard	Commercial	
Carabao	17,519	-	17,519
Cattle	6,361	1,409	7,770
Goat	6,031	200	6,231
Total	29,911	1,609	31,520

Source: Bureau of Agricultural Statistics, Cabarroguis, Quirino

4.6 Land Use and Vegetation

4.6.1 Satellite Image Analysis

A thematic map of present land use and vegetation in the Study area was prepared by the Study Team using satellite image analysis with the aid of field surveys and other relevant information.⁹ Analysis on the present land use and vegetation was made with 11 categories, definitions of which are given in **Table 4.6.1**.

⁹ Methodology and procedure of the satellite image analysis is presented in Appendix 8, Interim Report Volume 2: Appendices, The Master Plan Study for Watershed Management in Upper Magat and Cagayan River Basin, December 1991.

4.6.2 Land Use and Vegetation within each Land Classification

Overall land use and vegetation in the Study area is shown in **Figure 4.6.1**. The table below shows land use and vegetation within each land classification (**Section 3.1.1**).

Most of the natural forests such as old growth and mossy forest occur in the Protected Areas and Forestland in the Study area. Total area of the natural forest accounts for 35.8% of the Protected Area. The largest area in the Protected Areas is residual forest (37.4%). Reproduction brush and grassland occur in 9.5% and 8.2% of the Protected Area, respectively.

The largest vegetative cover in the Forestland is residual forest (32.1%) followed by old growth forest (20.8%). There are relatively large areas of grassland (17.1%) within the Forestland, which indicates there are many gaps and open space in the Forestland.

Land Use and Vegetation Type of the Land Classification within the Study Area

(Unit: ha)

Category	Protected Area	Forestland	Civil Reservation	A & D	Total
1. Old Growth Forest	29,321	118,636	614	2,060	150,631
2. Mossy Forest	2,555	4,665	2	26	7,248
3. Residual Forest	33,334	183,595	1,775	14,428	233,132
4. Sub-marginal Forest	3,608	19,652	52	4,573	27,885
5. Pine Forest	28	613	0	56	697
6. Reproduction Brush	8,453	75,515	571	21,485	106,024
7. Other Plantation	302	9,492	19	7,607	17,420
8. Grass Land	7,313	97,635	965	64,319	170,232
9. Agricultural Land	3,262	50,514	349	75,485	129,610
10. Bare/Rocky Land	834	10,839	108	18,596	30,378
11. Built-up Area	3	2	0	253	258
12. Water body	45	199	0	687	931
13. Unidentified	9	147	0	0	156
Sub-Total	89,067	571,505	4,455	209,575	874,602
<i>Magat Reservoir</i>					5,356
TOTAL					879,958

Source: Study Team

There is one Civil Reservation in the Study area located in Conwap Valley between Nueva Vizcaya and Quirino. The largest portion of the area is residual forest (40.0%), which was used as a source of wood for the settlers. There also exists a relatively large area of grassland (21.7%) in the Reservation.

Much of the A & D area is agricultural land (36.0%) and grassland (30.7%). There is not much forest in this area, although plantation (3.6%), including private plantation forests, occurs in flat areas.

4.6.3 Land Use and Vegetation in Each Province

Land use and vegetation type of each province is summarized in the following table. A relatively large area in Nueva Vizcaya is residual forest (27.7%) followed by grassland (20.6%) and reproduction forest (19.4%). Old growth accounts for only 15.6% of the province.

Land Use and Vegetation type of Each Province within the Study Area

(Unit: ha (%))

Category	N. Vizcaya	Quirino	Isabela	Ifugao
1. Old Growth Forest	55,649 (15.6)	61,485 (26.7)	2,274 (2.1)	29,569 (16.9)
2. Mossy Forest	2,391 (0.7)	1,667 (0.7)	2 (Nil)	788 (Nil)
3. Residual Forest	99,990 (27.7)	79,852 (34.7)	9,033 (8.5)	40,587 (23.2)
4. Sub-marginal Forest	4,383(1.2)	16,217 (7.0)	2,698 (2.5)	4,564 (2.6)
5. Pine Forest	552 (Nil)	11 (Nil)	16 (Nil)	65 (Nil)
6. Reproduction Brush	69,542 (19.4)	8,029 (3.5)	6,156 (5.8)	20,721 (11.8)
7. Other Plantation	2,766 (0.8)	10,022 (4.4)	4,466 (4.2)	164 (Nil)
8. Grass Land	73,777(20.6)	22,354 (9.7)	34,151 (32.1)	39,810 (22.8)
9. Agricultural Land	42,585 (11.9)	22,707 (9.9)	33,069 (31.0)	31,140 (17.8)
10. Bare/Rocky Land	5,724 (1.6)	7,486 (3.3)	12,203 (11.5)	4,963 (2.8)
11. Built-up Area	250 (Nil)	-	303 (Nil)	6 (Nil)
12. Water body	267 (Nil)	234 (Nil)	0 (0)	127 (Nil)
13. Unidentified	25 (Nil)	131 (Nil)	0 (0)	0 (0)
<i>Magat Reservoir</i>	788(Nil)	0 (0)	2,135 (2)	2,432 (1.4)
Total	357,689 (100)	230,194 (100)	106,508 (100)	174,936 (100)

Source: Study Team

The largest portion of the Forestland in Quirino is residual forest (34.7%). The province has the largest area of old growth (61,485 ha) among the provinces within the Study area. Most of the old growth occurs in the Sierra Madre Mountains, in the eastern side of the province. There is also a fair amount of agricultural land (9.9%) and grassland (9.7%) in the province.

Approximately half of the total area of Ifugao consists of residual forest (23.2%) and grassland (22.8%). About 92 % of the province is classified as Forestland, but old growth only exists on 16.9% of the total land. The proportion of the agricultural area in Ifugao is relatively high compared to the other provinces in the Study area.

Unlike the other provinces, A & D occupies as much as 76.0% of the land in Isabela within the Study area, accounting for 32.1% of the grassland and 31.0 % of the agricultural land. Bare and Rocky land (11.5 %) in Isabela is highest compared to the other provinces, but it seems that agricultural activities might have affected satellite imagery, particularly in the season for tillage.

4.6.4 Land Use and Vegetation on Different Slopes¹⁰

The following table summarizes current land use and vegetation on different slopes in the Study area. Out of 299,221 ha of land below 18% in slope, agriculture land and grassland occupy 88,269 (29.5%) and 84,399 ha (28.7%). In the land with 18-30 % slope of 173,017 ha, residual forests cover the largest area of 52,694 ha, followed by grassland of 33,195 ha. The land with a slope of 30-50% of 232,613 ha, consists mainly of residual forests of 80,133 ha and old growth forests of 54,392 ha. Out of 175,107 ha of land over 50% in slope, 50,430 ha is covered by old growth forests and 63,575 ha is of residual forests.

¹⁰ Section 8.1.1.(2) Slope categories are defined by Bureau of Soils and Water Management of Department of Agriculture (DA)

Land Use and Vegetation by Slope

(Unit: ha (%))

Category	Slope < 18%	18% < Slope < 30%	30% < Slope < 50%	Slope > 50%
1. Old Growth Forest	16,116 (5.5)	29,693 (17.2)	54,392 (23.4)	50,430 (28.8)
2. Mossy Forest	380 (0.1)	754 (0.4)	1,944 (0.8)	4,170 (2.4)
3. Residual Forest	36,730 (12.5)	52,694 (30.5)	80,133 (34.4)	63,575 (36.3)
4. Sub-marginal Forest	6,637 (2.3)	6,493 (3.8)	8,690 (3.7)	6,065 (3.5)
5. Pine Forest	95 (0.0)	82 (0)	192 (0.1)	328 (0.2)
6. Reproduction Brush	28,265 (9.6)	25,262 (14.6)	31,113 (13.4)	21,384 (12.2)
7. Other Plantation	8,982 (3.1)	4,397 (2.5)	3,252 (1.4)	789 (0.4)
8. Grassland	84,399 (28.7)	33,195 (19.2)	34,608 (14.9)	18,030 (10.3)
9. Agricultural Land	88,269 (29.5)	16,846 (9.7)	15,446 (6.7)	9,049 (5.2)
10. Bare/Rocky Land	22,798 (7.8)	3,564 (2.1)	2,791 (1.2)	1,225 (0.7)
11. Built-up Area	253 (0.1)	0 (0)	3 (0)	2 (0)
12. Water body	931 (0.3)	0 (0)	0 (0)	0 (0)
13. Unidentified	10 (0.0)	37 (0)	49 (0)	60 (0)
14. Magat Reservoir	5,356 (1.8)	0 (0)	0 (0)	0 (0)
Total	299,221 (100)	173,017 (100)	232,613 (100)	175,107 (100)

Source: Study Team

4.6.5 Vegetation and Land Use in Possible Protected Areas

Areas for the possible Protected Areas were identified at a total of 347,705 ha by the Study Team in accordance with the policy of the NIPAS Act¹¹ (Figure 4.6.2). Present vegetation and land use in the 347,705 ha is as follows.

Vegetation	Area (ha)	Vegetation	Area (ha)
1. Old Growth Forest	150,636	8. Grassland	22,427
2. Mossy Forest	7,248	9. Agricultural Land	13,126
3. Residual Forest	108,308	10. Bare/Rocky Land	1,465
4. Sub-marginal Forest	6,865	11. Built-up Area	2
5. Pine Forest	469	12. Water body	43
6. Reproduction Brush	36,018	13. Unidentified	130
7. Other Plantation	968	Total	347,705

Source: Study Team

4.7 Present Watershed Management

4.7.1 Present Land Classification in the Study Area

(1) Size of Area for Each Land Classification

According to the classification of the public domains in the Philippines (Section 3.1.1), the Study area is presently composed of the following size of areas, information of which was obtained from various tracing maps provided by the PENROs and CENROs concerned. Figure 4.7.1 shows distribution of these areas. The Forestland and Protected Areas make up nearly 75% of the total Study area.

¹¹ It prescribes a guidelines of the potential Protected Areas as the land with 50% in slope or more, more than 1,000 m in elevation, old growth forest, or mossy forest.

Size of Areas for each Land Classification in the Study Area

Land Classification	Area (ha)	% of the Study Area
1. Protected Area	89,067	10.1
2. Forestland	571,505	65.0
3. Civil Reservation	4,455	0.5
4. A & D	209,574	23.8
Sub-Total	874,602	
Magat Reservoir	5,356	0.6
Total	879,958	100

Source: the Study Team

(2) Protected Areas in the Study Area

The Protected Areas under NIPAS in the Study area are 100,282.8 ha in total, breakdown of which is listed in the following table. There are some discrepancies between the figure in the following table and the one indicated in the table of land classification in the previous section. This is probably due to the difference in the data source. General features and current condition of each Protected Area are described in **Appendix 1**.

List of the Protected Areas within the Study Area

Name	Procl. No.	Date Proclaimed	Location	Area (ha) ¹⁾
1. Bangan Hill National Park	RA7954	29 Mar '95	N. Vizcaya	12.0
2. Casecnan Protected Landscape ¹²⁾	289	23 April '00	N. Vizcaya & Quirino	88,846.8
3. Mt. Pulag National Park	75	20 Feb '87	N. Vizcaya & Ifugao	5,860.0
4. Salinas Natural Monument	275	23 Apr '00	N. Vizcaya	5,564.0
Total				100,282.8

Source: Socio-economic Profile of Salinas Natural Monument, General Management Plan on Mt. Pulag N.P. (2000), Proclamation 289

(3) Proclaimed Forest Reserves in the Study Area

Seven forest reserves listed in the following table were proclaimed before the establishment of the present land classification system that had been introduced mainly with PD 705 in 1975, the Constitution 1987 and NIPAS Act in 1992. According to the proclamations, the forest reserve was defined as the forest that is reserved for wood production, watershed, soil protection and other forest purposes, subject to private rights. In this definition, the clear cut concept of the land classification was not reflected yet.

List of Proclaimed Forest Reserves in and around the Study Area

Name	Proc. No.	Proc. Year	Province	Area (ha)
1. Bontoc-Ifugao Forest Reserve	636	1940	Ifugao	1,006.0
2. Central Cordillera Forest Reserve	217	1929	Mt. Province, Benguet, Ifugao, Kalinga, Apayao, N. Vizcaya	74,630.0
3. Central Mayoyao Forest Reserve	156	1969	Ifugao	13,420.0
4. Ifugao-Isabela Forest Reserve	76	1961	Ifugao, Isabela, Mt. Province	35,750.0
5. Magat River Forest Reserve	573	1969	N. Vizcaya	430,860.5
6. Mt. Santo Domingo Forest Reserve	73	1966	Ifugao	9,693.0
7. Natonin Forest Reserve	166	1967	Mt. Province, Ifugao, Isabela	7,836.0
Total				572,189.5

Source: Each Proclamation

¹² This protected landscape includes Dupax Watershed Forest Reserve of 424.8 ha that was proclaimed in 1934 (Proclamation 720).

(4) Currently Proposed Protected Area in the Study Area

PENRO Ifugao proposed six areas for the Protected Areas with a total area of approximately 10,100 ha within the province. These proposed areas are situated at the primary source of water for the Magat reservoir.

4.7.2 Government Management of the Protected Areas and Forestland

The Study area comprises approximately 571,000 ha of the Forestlands and 89,000 ha of the Protected Areas (**Section 4.7.1 (1)**). Direct responsibility for the management of these lands rests with the government. However, the government has accorded tenurial agreement on many parts of the Forestlands with communities, upland farmers, and various private entities, for joint management.

(1) Management by DENR, through Regional offices, PENROs and CENROs

DENR implements programs relevant to forest management in watersheds through its field offices. The Study area involves RED Region 2 and RED-CAR that control the following four PENROs and nine Community Environment and Natural Resources Offices (CENROs). The following table shows the regional DENR offices involved in the management of the Protected Areas and Forestland in the Study area.

RED	PENRO	CENROs
Region 2	Nueva Vizcaya	Northern Nueva Vizcaya ¹³ , Dupax, and Aritao
	Quirino	Nagtipunan, and Diffun
	Isabela	Cauayan, and San Isidro
CAR	Ifugao	Lamut, Alfonso Lista, and Maoyao

Source: Study Team

(2) Management by Other Government Agencies

The following watersheds in the Study area are under management of other government agencies (OGAs) in coordination with DENR:

1) Watersheds under Management of National Irrigation Administration (NIA)

Letter of Instruction No. 1002¹⁴ granted the NIA authority to manage, protect, develop and rehabilitate certain portions of the watersheds of Pantabangan and Magat multi-purpose dams. The NIA has implemented tree plantation and agroforestry projects on 7,500 ha of the watershed. A total of 6,808 ha were planted at the end of the project in 1989. However, more than 50% of the 6,808 ha were burned. Assessment made in June 2000 showed that 4,196 ha remained, including more than 2,000 ha of re-plantation area. In 1995, NIA transferred to the NAPOCOR about 4,300 ha within Ifugao province, under a Memorandum of Agreement with NPC. The remaining 3,200 ha are retained under the management of NIA. The present situation is shown below.

¹³ Previous CENRO Bayombong

¹⁴ LOI No. 1002 (March 20, 1980) as cited by EO 281 Granting the NIA the Authority to Construct, Develop, Operate and Maintain the Casecnan Multipurpose Irrigation and Power Project Located within the Casecnan River Watershed Forest Reserve in the Province of Nueva Vizcaya. 16 November 1995.

Present situation of NIA Plantation in Magat watershed

Category	NIA area (ha)	NIA-DENR Tie-up	NPC Area	Total
Area Planted, 1980-1989	-	-	-	6,808
Existing area of plantation	2,066	1,113	1,017	4,196

Source: Watershed Management Section, NIA-Magat Dam Division

EO 281¹⁵ granted NIA authority to manage, develop, protect and maintain the watersheds located within the Casecnan River Watershed Forest Reserve (CRWFR) in Nueva Vizcaya and the Pantabangan-Carranglan Watershed in Nueva Ecija for the Casesnan Multipurpose Irrigation and Power Project (CMIPP). It retained the authority of DENR over the CRWFR and portions of the Pantabangan-Carranglan Watershed. The CRWFR area partly overlaps with the area of Protected Landscape under Proclamation No. 289.

2) Watersheds under Management of National Commission on Indigenous Peoples (NCIP)

DENR identified ancestral domains in the Study area and has turned over the jurisdiction of those areas to NPIC (**Section 4.7.5. (6)**). Matters concerning the IPs in the Study area are under the administration of the Office for Northern Cultural Communities (ONCC) which is part of the NCIP.

3) Watersheds under Management of Local Government Units (LGUs)

In Nueva Vizcaya ENRO, forest management activities include: i) 439 ha Barobbob (Masoc) Watershed Management Project; ii) 24,000 ha Lower Magat Forest Management Program including 7,000 ha of A&D land; and iii) the Tree for Legacy Program covering approximately 3,000 ha.

Forest management activities of ENRO Isabela are the production of forest and fruit tree seedlings for distribution but such activities are not undertaken in the Study area.

In Quirino, the vision of the Provincial NREO aims to promote the well-being of the people through sustainable development of forest resources, optimal utilization of lands and minerals, social equity and efficiency in resources use and effective environmental planning and management. The PNREO is actively involved in two German-supported projects, the Debt for Nature Swap Initiative Project and the Community Forestry Project-Quirino. PNREO staff members are seconded in both projects (**Section 4.7.7 (10)&(11)**).

In Ifugao, PAENRO’s activities concentrate principally on food security. The only significant forest-related activity is production of seedlings in nurseries managed by schools and the Provincial Agriculturists Office.

¹⁵ Executive Order No. 281 Granting the NIA the Authority to Construct, Develop, Operate and Maintain the Casecnan Multipurpose Irrigation and Power Project Located within the Casecnan River Watershed Forest Reserve in the Province of Nueva Vizcaya. 16 November 1995.

4.7.3 History and Types of Natural Resource Management at Community Level

(1) Summary of Natural Resource Management at the Community Level

The results of the PRA Workshop unveiled the patterns of historical change in environmental conditions at the community level in varying locations (**Appendix 3**). The patterns of the change were generalized below.

History of Environmental Conditions at a Community Level (Summary)

(N=8, n=331)

<p>[Forest, Forest Products and Wildlife]</p> <ul style="list-style-type: none"> • In the 1960's, the forest area was much wider than today. The area was covered with thick vegetation including big trees that easily filled three trucks for one logged tree. Rich in wildlife and minor forest products without modern hunting and gathering methods. • Large-scale logging and extensive slash & burn farming activities expanded in the late 1960's and continued until mid 1980's. Small-scale tree cutting and slash & burn farming in the forest area still exist in limited areas today. • For logging, roads were improved, and production (migrants from outside and inside the region) increased, construction and fuel as well as minor forest products intensified as population increased. • Natural forests and wildlife mostly disappeared by the end of the 1980's, and the degree of self-sufficiency reduced. Capitalistic social system changed the mentality of local people. • Modernization brought education and awareness in respect of environment to a certain extent. • Re-forestation activities intensified in the 1990's.
<p>[Glassland and Slash & Burn Area]</p> <ul style="list-style-type: none"> • Glassland expanded during the last three decades, due to the increased logged-over area and subsequent slash & burn farming. • Slash & burn farming on glassland is still practiced widely and causing glass/forest fires. • Some glassland area was converted to permanent farmland and residential area. • Glassland and its products (as "Cogon") are underutilized for posturing and commercial-based production due to the lack of capital, steep and rocky topography.
<p>[Bodies of Water]</p> <ul style="list-style-type: none"> • Before the 1970's, the volume of water from natural springs was greater than today. The number of springs decreased after the 1970's. • The water at creeks was colder, and river colored blue before the 1970's. Because of domestic wastes, water at same creeks are no long safe to drink today in spite of chemical farm inputs still being unpopular in many upland communities. • Aquatic flora and fauna were abundant before the introduction of modern fishing methods using poisons and electricity in the 1980's. • Water consumption was intensified on the population increase. Some creeks dry up during the summer due to the exceeding extraction of spring water for drinking and irrigation.
<p>[Farmland]</p> <ul style="list-style-type: none"> • Permanent farmland expanded as population increase during the last three decades. The soil fertility seems to have reduced as the farming becomes relatively intensified. • Vegetable gardens expanded in certain areas in the 1990's. • Perennial crop farming area is historically limited due to the unsuitable climate for fruits cultivation. • Wetland farming in the upland communities is limited to the areas with water streams, except the famous Banaue rice terraces. • Soil conservation measures as contour ridging or hedgerows are historically not practiced.

The natural resource managements historically employed at the community level were classified into five types as shown below.

Types of Natural Resource Management at the Community Level

(8 sample villages, 331 participants)

Type of NR Management	Description
Laissez faire	This is the most common type, especially before the 90s. It is the unregulated, free use of natural resources. Under this system, local people are free to extract from communal land, and there is no particular person or entity monitoring the utilization of natural resources. Due to the prevalence of individualism today, people are psychologically restricted to use natural resources within their formally and informally determined private land. Mere individual effort is applied for maintenance.
Muyong system	A traditional forest management mechanism employed by Ifugao tribes. Family clans regulate, by unwritten rules, the utilization and maintenance of individually owned <i>Muyong</i> forests that are traditionally considered to belong to the members of clan ¹⁶ . Clan members must plant a number of trees after cutting. The system is somewhat dying in certain communities.
Bayanihan system	A traditional mutual community aid whereby co-villagers are expected to give contributions either in the form of labor or physical/financial resources to help other members of a clan, associations or neighbors. The system used to be employed for farming and construction/maintenance of public and private infrastructures and forests. The system is no longer employed for the extraction of trees mainly due to the control of logging and the shift of construction materials to sand and gravel.
Local government initiated	A set of rules and regulations in the form of <i>Barangay</i> ordinances to control and manage natural resources, particularly lumber and water. <i>Barangay</i> councils take initiatives. Village governments sometimes do not consult with DENR thus village ordinances or policies are not in line with the national laws and regulations.
State-initiated	DENR initiated the contract reforestation projects and introduction of forest/grassland fire control. DENR also introduced various resource management programs such as the Integrated Social Forestry Program (ISFP), Center for People Empowerment in the Upland (CPEU), Community-Based Forest Management (CBFMP) and others.

Source: PRA Workshop conducted by JICA Study Team

In general, the effectiveness of natural resource management at the community level is limited since arbitrary, discretionary laissez faire management is the most popular system presently. Even within the private property, the management is unsystematic because of the informality of property rights in many communities. At this conjunction of history, traditional management systems such as *Muyong* or *Bayanihan* are inclining to elude their effectiveness due to the modernization of societies, and modern management instruments as village ordinances and governmental programs are yet reinforced extensively at a community level.

(2) Traditional Forest Management System

In Ifugao province in the Study area, indigenous people have applied traditional forest management systems for many generations. It is believed that these systems have contributed significantly to forest development and conservation. Principal objectives of the traditional forest management are: i) the production of timber and non-timber forest products; and ii) the protection of small watersheds of adjacent irrigated rice-paddies.

¹⁶ According to existing literature, there are some communities in Ifugao where the *Muyong* system is governed by a community, not by a clan. See Draft Report on the Study of Traditional Forest Related Knowledge of the Ifugao and Bontoc Ethnic Groups in the Cordillera Region of the Philippines, prepared by Bagong Pagasa Foundation, Japan Overseas Forestry Consultants Association, 2000.

There are two types of the system, namely, i) private woodlots called “*muyong*”¹⁷; and ii) communal forests (“*Ala-a*” or “*inalahan*”).

a) Private Woodlot Management System (Muyong System)

Muyong is a private woodlot that evolved from clan-owned swidden fields that were left in fallow. Segregation into individually-owned plots occurred when a clan member, with consensus from other members, converted part of swidden fields into his own private woodlot.

Almost all *muyongs* fall within the areas classified as Forestland owned by the state. However, most of these have been privately managed and handed down for at least three generations. There are no written records of when and where the *muyong* practice began.

The *muyong* owner¹⁸ practiced tending like weeding, removal of vines and undesirable trees, keeping the boundary clean and protection of brush and preferred tree species, including fire prevention, thus gradually developing a woodlot. Furthermore, many *muyong* owners also implemented inter-planting either by direct seeding or transplanted wildlings from natural forests.

There are three types of woodlots: i) being handed down through generations; ii) being recently established out of fallowed swidden; iii) being established within the natural forest through a claim. A woodlot can only be designated as such once transferred to next of kin, subject to recognition of the transaction by the community. A family may have one or more woodlots that may or may not be adjacent.

The average *muyong* woodlot is less than 1 ha. According to DENR Partial Survey of Legitimate *Muyong* holders in only Banaue, Hungduan and Hingyon municipalities of Ifugao, the existence of 2,294 *muyong* woodlots covering more than 2,000 ha have been confirmed. According to the information from DENR personnel, there should be additional *muyong* woodlots still to be identified.

Recently, with the introduction by DENR of the *Muyong* Resource Permit (MRP) and the advent of commercial harvesting, some woodlots have been claimed within the natural forest. In 2001, DENR has issued 84 MRPs covering approximately 240 ha since 1996¹⁹.

b) Communal Forest Management System

Besides the privately owned *muyong*, the communal forest (*Ala-a*) management system is also important in the context of traditional forest management. The *Ala-a* is generally located on lands: i) not cultivated as swidden; ii) too far from a settlement to be covered by a private claim; or iii) identified as hunting grounds. The *Al-a* are communally managed for collecting fuel, construction materials, food, medicine and other products that may be used in the household or farm.

¹⁷ For purposes of brevity, the term “*Muyong*” is used in this report in reference to both “*muyong*” in the *Kiangan*, *Lagawe* and *Hingyon* areas and “*pinugo*” in central *Banaue*.

¹⁸ The terms “*muyong* owner” and “*muyong* holder” are used inter-changeably in this document. The people prefer to identify themselves as “owners,” while government considers them “holders” of a resource owned by the government.

¹⁹ Source: PENRO Ifugao as of March 2001

Unlike the *muyong*, *Ala-a* forests are not systematically maintained to improve vegetation. Boundaries are not clear, which can often be a source of conflict. However, use of the *Ala-a* is controlled through a common consensus that the resource has to be shared. There are two basic rules: i) no burning, and ii) gathering not more than they need for their own use.

The *Ala-a* was not perceived as a source of wood for sale outside the village. However, upon the commercialization of woodcarving, people started to harvest trees within the communal areas to generate cash income.

In the village of *Barangay Cambulo*, Banaue, groups comprising 20-35 families protect selected hillside communal forests to ensure that their terraced rice fields will have sustained irrigation water. Disturbance to the trees is not allowed but gathering of medicinal plants and hunting are permitted. Numbers and coverage area of communal forest also have not been surveyed.

4.7.4 Decision-Making Mechanisms over Natural Resources

The table below is the summary of findings from the group discussion during the PRA Workshop with regards to decision-making mechanisms and processes over natural resources at the community level.

Summary of Local Decision-Making Process

(8 sample villages, 331 participants)

Land Types	Decision-Making Process	Authority	Remarks
CBFM area	Individuals who are given the individual land management rights by a PO make decisions Consultation with a PO is made in some cases In a case where land management rights are not given to individuals, PO members make decisions collectively	Land management rights holders PO (Board of Directors)	Decision-making authority of PO, in reality, is limited due to inadequate capability
Common area (State land)	Individual resource users make decisions without consultation (most common) Individuals consult with village leaders and officials Village leaders consult with DENR/ENRO Officials in some cases When <i>Muyong</i> is practiced, collective decision-making through a discussion with clan members	Resource users Village leader and officials DENR/ENRO Clan leaders	Decision-making authority of DENR, in reality, is limited Traditional decision making process does not exist in most upland communities except a few Ifugao tribal areas
Informally owned land (State land)	Informal land holders make their own decisions without consultation Individuals exploit resources without consultation with informal land holders Village officials and DENR intervene in a case of dispute and public enterprises	Land holders Non-land holders DENR and village officials	Decision-making authority of DENR, in reality, is limited
Titled land	Individuals make decisions without consultation	Land holders	Mainly wealthy people acquire a land title
Tenure instrument area	Individuals make decisions without consultation	CSC and other instruments holders	CSC is under CBFMP, but CSC is considered as an individual right
CADC/ CADT area	Individuals who have informally owned the area make decisions People consult with NCIP in some cases, but not in most cases	Land rights holders under IPRA law	Decision-making authority of NCIP, in reality, is limited

Source: JICA Study Team

4.7.5 Present Land Tenure in the Study Area

Various forms of tenurial instruments have been created and applied for different purposes of land management in the Study area, but some of them overlapped each other and brought up some confusion in terms of land tenure. This issue is not only related to how the household members make use of individual land areas but also to the way in which common property resources are utilized (i.e. pasture and forests).

(1) Certificate of Stewardships Contract (CSC)

Within the Study area, CSCs issued were 12,077 in number for an aggregated area of 30,809 ha, the provincial breakdown of which is given below.

Province	No. of Projects	No. of CSCs	Area (ha)
Nueva Vizcaya	210	7,108	14,220
Quirino	97	3,737	9,266
Isabela	12	1,140	2,446
Ifugao	21	587	4,877
Total	340	12,572	30,809

Source: FRDD, DENR Region 2, PENRO Ifugao

(2) CBFM Agreement (CBFMA)

There were 38 CBFM projects, covering 59,303 ha, representing 9.0 % of the aggregated areas of Protected Areas and Forestland within the Study area (**Figure 4.7.2**). Beneficiaries of these CBFM projects are estimated at 3,932 members (**Table 4.7.1**).

The area size per each PO member of each CBFM project was calculated assuming that the area size per each member is to be average management size. The average management size of the 38 CBFM projects is 15.3 ha with a wide range of variation from 108.8 ha to 0.8 ha. The average management size per member by province shows the largest one is in Quirino, 28.36 ha per member, followed by 15.29 ha in Isabela and 10.39 ha in Nueva Vizcaya. The management size per member was smallest in Ifugao, which was 4.42 ha. (**Table 4.7.1**). A sample survey revealed that 78 % of the respondents had total land holdings of less than 5 ha.

A variety of foreign agencies assisted with initial and maintenance funds for CBFM projects (**Table 4.7.2**). Such agencies included the World Bank, ADB, ITTO, EU, JBIC (OEFC), KfW, and USAID. Among 38 CBFM projects existing within the Study area, 10 projects were funded by DENR regular funding, covering 4,518.82 ha, corresponding to 7.6 % of the total CBFM area of 59,303.97 ha. Meanwhile, the remaining 93.1 % or 55,209.18 ha have been assisted with foreign funds. On-going foreign-assisted project coverage amounted to 35,717.00 ha, or 60.2 % of the total CBFM area.

The dependency on foreign funds varied according to provinces. The CBFM projects currently under foreign assistance covered 84.58% in Ifugao, 69.0% in Quirino and 44.6% in Nueva Vizcaya in terms of area coverage. In Isabela none of the three CBFM projects located within the Study area are currently under foreign assistance.

Introduction of the CBFM program into Mt. Pulag National Park and Salinas Natural Monument was proposed, but no CBFMA has been accorded for either area. PAMB of

Salinas Natural Monument is currently in the process of forming a PO for CBFMA. There is no National Park in the Study area where CBFM has been implemented so far.

(3) Integrated Forest Management Agreement (IFMA) and Socialized Industrial Forest Management Agreement (SIFMA)

At present in the Study area there are 95 and 24 SIFMAs in Isabela and Quirino, respectively. All SIFMA holders are individuals with an approximate holding size of 10 ha in Isabela and 2 ha in Quirino except for the one with 48 ha held by Spiritwood Corporation.

(4) Forest Land Management Agreement (FLMA)

Among the sites of the OECF-ADB funded contract reforestation in the Study area, only five sites with a total area of 314 ha are now under management of the FLMAs, all located in Quirino province.

(5) Forestland Grazing Management Agreement (FLGMA)

Total area of the existing pasture lease in the Study area is 4,467 ha (Table 4.7.3). Most of these areas are PLAs (2,927 ha) and FLGLAs (658 ha), and have not been converted to FLGMA. However, there are three FLGMAs, which have a total area of 882 ha. As pasture management, controlled burning takes place once a year with the area controlled of about 1 ha, which is shifted every year. Napier grass (*Pennisetum purpureum*) has been used for pasture improvement.

(6) Certificate of Ancestral Domain Claims (CADC) and Certificate of Ancestral Land Claims (CALC)

There exist the following nine CADCs with a total area of 281,356 ha, out of which approximately 232,600 ha are included in the Study areas. The location of the CADCs is given in Figure 4.7.3.

List of CADC issued by DENR and turned over to NCIP in the Project Area

CADC No.	Municipality	Province	Tribe	Date Issued	Area (Ha)
R2CADC-002	Nagtipunan	Quirino	Bugkalot	14 Jun 94	108,360.00
R2CADC-020	Dupax Norte	N. Viscaya	Bugkalot	29 Jan 96	17,972.31
R2CADC-021	Kasibu	N. Viscaya	Bugkalot	29 Jan 96	2,822.32
R2CADC-022	A. Castaneda	N. Viscaya	Bugkalot	29 Jan 96	21,842.20
R2CADC-023	Dupax del Sur	N. Viscaya	Bugkalot	29 Jan 96	31,112.96
R2CADC-053	Maddela & Nagtipunan	Quirino	Agta	14 Jun 96	10,971.00
R2CADC-118	Aritao & Santa Fe	N. Viscaya	Kalanguya-Ikalahan	19 Mar 98	40,069.30
CARCADC-046	Kiangan	Ifugao		04 Mar 96	20,419.00
CARCADC-036	Tinoc	Ifugao	Kalanguya/Kankama	04 Mar 96	27,787.00
Total					281,356.09

Source: FRDD, DENR Region 2, PENRO Ifugao

Total area of CADC in Casecnan, Nueva Vizcaya is approximately 73,570 ha (sum of R2CADC-020 to 023). This area also includes two rattan permits by Nueva Vizcaya Rattan Association, Inc. and Bugkalot Rattan Association, Inc., which expired in March 2003 covering 18,500 ha.

The Casecnan CADC area is largely overlapped by the Protected Areas. The area still holds large areas of natural forest that are dominated by Dipterocarp species such as White Lauan, Red Lauan, Mayapis and other native species, and it has an important role in watershed management as headwater of the Cagayan River. However, it seems that steep slopes are often used for agricultural purposes and it is unclear how the case should be settled.

(7) ALMA, TFLMA, CTO, CU and LMA

The Provincial Government of Nueva Vizcaya and the DENR through the PENRO are co-signatories to a number of tenure instruments awarded under the Lower Magat Forest Management Project, a co-managed project by DENR and the Provincial Government. Farmer-beneficiaries are awarded the Agro-forestry Land Management Agreement (ALMA), the Tree Farm Lease Management Agreement (TFLMA), or the Community Agro-forestry Land Management Agreement (CALMA) for participating communities. Under the Tree for Legacy Program of the province, a Certificate of Tree Ownership (CTO) is awarded to those who plant trees in areas where harvesting timbers is allowed while the Certificate of Usufruct (CU) is awarded to those who plant fruit trees in areas where the harvesting is not allowed.

The Barobbob Watershed Management Project is a provincial government project on a devolved watershed. The Provincial Government awards Land Management Agreements (LMA) to farmer-beneficiaries.

(8) Certificate of Land Ownership Award (CLOA) and Free Patents

Out of 40,000 ha located in Conwap Valley, covering part of Nueva Vizcaya and Quirino, 20,000 ha were allotted for the CLOAs to settlers by DAR despite the fact that DENR had reallocated only 6,000 ha of the Forestlands into A&D and retained 34,000 ha as Forestland. Most of the settlers within this area were relocated from the construction of Ambuklao Dam and Binga Dam in Benguet. Part of the Conwap Valley was proposed for a Civil Reservation (CRTL No. 11). This reservation was set aside as a resource of timber for the settlers.

A&D in the Study Area

Province	Municipality	Proc. No.	Date	Area (ha)	Land Classification (ha)
N. Vizcaya	Dupax del Norte & Nagtipunan	1498	11 Sep '75	40,000	Forest land: 34,000 A & D: 6,000
Ifugao	Lamut	115	9 May '55	301.4	A & D

Source: the proclamations concerned

Most of the settlers in Lamut, Ifugao, migrated from the construction of Ambuklao Dam and Bokod Dam in Benguet. Approximately 115 free patents were awarded by DENR with a total area of 301.4 ha. All of these areas belong to A & D areas.

(9) Mining Interests

There exist different mining interests in the Study area, consisting of exploration permit applications (EPA), Mineral Production Sharing Agreements (MPSA) and FTAA. A list and locations of the mining interests are shown in **Table 4.7.4** and **Figure 4.7.4** respectively.

4.7.6 Current Forestry Technology

(1) Establishment of Forest Plantations

The most-frequently planted species on a national scale are Yemane (*Gmelina arborea*), large-leaf Mahogany (*Swietenia macrophylla*), Bagras (*Eucalyptus deglupta*), and Falcata (*Paraserianthis falcataria*). While the species commonly used for forest plantation in the four provinces in the Study area are Yemane, Narra (*Pterocarpus spp.*) and Mahogany, Teak (*Tektona grandis*) is the species used in the three provinces except for Quirino (**Table 4.7.5**).

The standards of planting trees for popular species have been issued in the Research Information Series on Ecosystems (RISE) by Ecosystems Research and Development Bureau, DENR (ERDB). The standards deal with site characterization, species-site matching, timing, seed collection methods, seed treatment, nursery practice, planting density, planting methods, frequency of weeding, timing for pruning and thinning and other relevant topics in forestry.

Of these species, the most popular plantation species in the Study area is Yemane that can be found in reforestation projects, industrial tree plantations, parks, backyard gardens, farm boundaries and along roadsides. Planting techniques for Yemane is generally consistent with the methods applied for other tree species commonly-planted in the Philippines.

(2) Improvement of Residual Natural Forest

Within the second-growth natural forests, DENR introduced implementation of selective cutting/sustained yield logging consistent with rules and regulations of the Philippine Selective Logging System (PSLS)²⁰ for decades. The System is anchored on prescriptions of Annual Allowable Cuts (AAC) for each forest management unit. Principal features of the PSLS are: i) pre-harvest inventory; ii) marking of trees to be cut and those to be retained as future crop trees; iii) directional felling; iv) extraction methods that minimize damage to residual trees, soil and water resources; v) post-harvest inventory; and vi) post-logging silvicultural treatments such as timber stand improvement (TSI)²¹ and enrichment planting. Implementation details have to be spelled out in annual, mid-term and long-term forest management plans submitted by forest users (e.g. timber concessionaires) and approved by the government.

²⁰ Implementation of the PSLS is governed by provisions of the HANDBOOK ON SELECTIVE LOGGING, published by the Bureau of Forestry, Second Edition, 1970.

²¹ TSI guidelines are provided in the publication entitled "Aspects of Management and Silviculture in Philippine Dipterocarp Forests" published jointly by the DENR and the Philippine-German Rainforest Development Project in 1982.

TSI techniques incorporated in the PSLS aim at prioritizing the growth of specific premium tree species through application of various silvocultural treatments such as climber cutting, thinning, and felling of dead and diseased trees. The removal of some trees through TSI may induce natural regeneration in the gaps created. Enrichment planting may be applied in these gaps as part of TSI.

(3) Introduction of Pioneer Species in Brush Land and Grassland

The emergence of pioneer tree species in reproduction brush land and grassland is an indicator of an on-going rehabilitation process through a natural biological/ecological succession. In the Philippines, this process is expedited via application of Assisted Natural Regeneration (ANR). The ANR implementation in the Philippines was first initiated in 1978 by the University of the Philippines College of Forestry²², and was officially adopted by DENR in 1991.

The ANR implementation begins with lodging (i.e. pressing) of fire-prone grass species with a lodging board. This retards growth of the grass and facilitates the growth of vines and bushes that shade out the grass. After lodging, ring weeding and tending of the naturally grown pioneer tree seedlings are to be conducted. In areas where the density of wild seedlings is low, additional wildlings, seedlings or seeds of hardy species are to be planted.

By applying ANR, the important initial phases of the forest regeneration process can be completed in a few years. Currently however, no projects implementing ANR are reported in the Study area.

However, the community resource management framework (CRMF) plans prepared by POs under CBFMA indicate the intention to introduce ANR as one of their envisioned activities. As reproduction brush lands and grasslands are widespread in the Study area, ANR is a practical option for restoring forest cover on those lands.

(4) Development/Improvement of *Muyong*

Traditionally, the use of potted seedlings is not included in enrichment planting. There are many *muyong* owners who plant potted seedlings in addition to uprooted wildlings and direct seeding. One species commonly planted by direct seeding is oak (*Lithocarpus llanosii*). Present practices also involve the planting of introduced species such as Mahogany and Yemane. A generation ago, there were extensive plantings of raintree (*Samanea saman*), as evidenced by many mature trees in the Kiangan areas. This is a popular carving wood and many older trees were harvested over the last two decades when there was a strong export market for Ifugao carved wood products. Rattan is also planted in *muyongs* near the owner's house, the most popular species is "lituko" which is known for its fruit. Bamboo is also planted for construction material along with palms (*Areca catechu*) for flumes and betel nut. The woodlots are also inter-planted with fruit trees like citrus. Interviews with some *muyong* owners indicate that they perceive it primarily as a timber management system. Other *muyong* owners contend that their ancestors developed

²² Project report: UP Upland Hydro-ecology Program, which has since evolved into the UP Institute of Environmental Science and Management (IESAM).

the system due to the relationship between a stable water supply and existence of the forest. In either case, it is clear that the system is an important factor in forest management in Ifugao province.

(5) Seed Collection and Tree Nursery

In a number of case studies, seed collection was handled by community members themselves. The seeds were selected carefully from quality mother trees. Seeds of Yemane and Mahogany are generally collected from existing plantations. Using those seeds, seedlings were cultured in a nursery by community members.

(6) Plantation Establishment Costs

Costs per ha for plantation establishment vary. In an ADB funded reforestation project in *Barangay Lublub* in Alfonso Castañeda, a cost of ₱18,000 per ha was incurred during three years between 1991 and 1993. The amount included various components, such as site preparation, seedling production, planting and replanting, in addition to the construction of infrastructures such as bunkhouses and watchtowers.

According to the Forestry Sector Project (FSP) financed by JBIC, a per-hectare plantation establishment cost including nursery operations was at ₱ 12,123, under 2 x 3 m spacing of such species as Yemane (*Gmellina arborea*), *Acacia mangium*, *Eucalyptus* and *Falcata*. In the same assessment, a per-hectare establishment cost for the same operation in case of planting only fruit trees, such as Coffee (*Coffea arabica* Linn), Cacao (*Theobroma cacao* Linn), calamansy orange (*Citrus mudrensis* LOUR) and Guayabano (*Annona muricata* Linn) with 4 x 4 m spacing was estimated at ₱ 5,003²³.

(7) Maintenance Costs of the Plantations

Maintaining established plantations presents one of the major hurdles to be resolved in promoting forest management. A majority of communities were not able to generate management costs for maintenance of the plantation on a sustainable basis. The maintenance cost was basically shouldered by specific funding under reforestation projects. After that the plantation was maintained in an unstable manner. Many communities needed to depend on the institutions' precarious accounts. While maintenance cost was sometimes covered personally by community leaders, the community was burdened by the undependable amount of voluntary labor available among the members.

According to the assessment by the JBIC financed Forestry Sector Project, a three-year maintenance and protection cost was estimated at ₱ 19,866 or ₱ 6,622 per year, in case of a plantation established with 2 x 3 m spacing with forest tree species discussed above. The fruit tree plantation in the above case was estimated to cost ₱ 11,893 during three years for maintenance and protection, or ₱ 3,964 per year. Usually these maintenance costs were covered under conventional reforestation projects such as those financed by ADB and

²³Tables 29 and 33, Assessment of Project Implementation and Revised Implementation Program, Forestry Sector Project, July 2000, Nippon Koei Co., Ltd. in association with OIDCI and Philkoei International Inc.

JBIC. Here, due to the maintenance cost incurred after the third year onward, the community will encounter difficulties.

(8) Harvesting

In a number of instances, communities were not cautious in the prospect of timber harvesting in the future. Concern was expressed on timber poaching among poverty-stricken upland dwellers as reported from Alfonso Castañeda .

On the other hand, Yaway Farmers Co-op in Nueva Vizcaya was one of the POs that are interested in timber harvesting under forest management. The Co-op joined the CBFM scheme in 1995 aiming at promoting erosion control as well as preserving the remaining natural forest. Simultaneously, the Co-op. expects that members' livelihood would be uplifted by sustainable timber harvesting under adoption of forest management.

4.7.7 Major Forestry Projects

Different kinds of programs and projects related with forestry and Forestland, tenure security, and other activities have been or are being implemented in the Study area. The principal programs/projects are briefly described below.

(1) Center for People's Empowerment in the Uplands (CPEU)

Pursuant to DAO 92-30, all ISF Projects, except one model site in each province, including ISF personnel, were turned over to the Provincial government instead of the Municipal government as provided for in the Local Government Code. The model site was further evolved to a project of the Center for People Empowerment in the Upland (CPEU) through DAO No 05 issued on January 28, 1993. The CPEU was developed as a showcase for application of sustainable agroforestry technology, and also as training centers for DENR staff, people's organizations (POs), non-government organizations (NGOs) and other entities. According to DENR records there are now five CPEU sites covering 1,132 ha in the Study area. However, information obtained from DENR counterparts indicates that the CPEU sites in Isabela and Quirino were integrated into CBFM projects and are now serving as provincial model sites for implementation of CBFM.

(2) Forest Production Project (FPP)

The FPP was authorized under two DENR Memorandum Circulars, MC 99-09 issued on April 2, 1999 and MC 99-29 issued on September 21, 1999. The program was first established under MC 99-09, which authorized the setting aside of parcels of forestland for reforestation by DENR employees. FPP has several features that distinguish it from other reforestation programs. They are: i) the principal focus is fruit trees; ii) planting is done through voluntary labor by DENR employees; and iii) it is intended that DENR employees will harvest and sell the products harvested from their plantings and turn over part of the income to the government under a profit-sharing scheme. Under the program, DENR identifies Forest Production Areas (FPA) for FPP implementation. The maximum size of one FPA is 5 ha for an individual and 150 ha for an association composed of DENR employees. DENR provides seedlings and technical assistance. There are currently 85 ha in Quirino and 34 ha in Ifugao developed as FPAs.

(3) Reforestation by Administration: REFO-A

REFO-A comprises reforestation done directly by DENR using waged laborers. REFO-A projects are financed with local funds included in the annual DENR budget. The principal targets are critical watersheds where rehabilitation of forest vegetation is considered urgent. Currently, there are 14 REFO-A projects in the Study area but no new plantations are being established at present due to budgetary constraints. The on-going activities are confined to protection. Meanwhile, two former REFO-A projects in Nueva Vizcaya have been converted into CBFM projects.

(4) Reforestation by Contract: REFO-C

Under REFO-C, the DENR hired private contractors to implement reforestation. The contractors included firms, NGOs, individuals, families, LGUs and civic organizations. REFO-C used to be the major DENR program under the OECF-ADB Loan I. At present, there are no new REFO-C projects due to lack of funds. However, 12 former REFO-C projects in Nueva Vizcaya, seven in Ifugao and 19 in Quirino have been incorporated in the CBFM program. Thus, all existing CBFM projects include former REFO-C project areas.

(5) Watershed Rehabilitation Project (WRP)

This is a DENR project financed by annual appropriations included in the DENR budget. Component activities are tree plantation establishment, construction of check dams, installation of water systems, bench terracing, and vegetative erosion-control measures such as wattling. There are presently three WRP projects in Ifugao, two in Isabela, two in Quirino and five in Nueva Vizcaya. However, activities are limited to small scale constructions and vegetative cover works.

(6) Tree for Legacy Program (TFL)

This is a reforestation program that was initially set up based on Memorandum Order No.14 Series of 1994 or the “Grow a Family Tree for Legacy in DENR Region 2.” In the following year (1995), the program was strengthened and opened to individuals, groups and organizations. DENR implementation in the Study area began in 1996 at Quirino province and in 1997 at Isabela province.

In Nueva Vizcaya, this program is jointly implemented by DENR and the Provincial Government under a Memorandum of Agreement (MOA) signed by the DENR Regional Director and the Provincial Governor on August 7, 1999. The program intends to “restore the depleted forest cover of the province consistent with its vision to make the province the watershed haven of Region 2.” The program promotes involvement of public and private entities and the civil society in reforestation.

The program strategy encourages reforestation by ensuring that tree planters obtain financial benefits through harvesting and sale of products derived from trees they plant. The assurance is provided by issuance of Certificates of Tree Ownership or Certificates of Usufruct for the trees planted.

The program establishes maximum area/size limitations for participants: 5 ha for individuals, 5-10 hectares for associations and cooperatives and above 100 ha for corporations.

At present, there are 1,100 Tree for Legacy sites as of August 2001 in Nueva Vizcaya, 40 sites in Isabela and 115 sites in Quirino as of 2000.

(7) Barobbob Watershed Resource Management Project

Barobbob watershed of about 439 ha is located in Masoc, Nueva Vizcaya. It provides potable water to about 2,000 households in the municipalities of Bayombong and Solano, and irrigation water for about 400 ha of rice fields. Prior to the project there were 134 squatter families and settlers in the watershed conducting subsistence agriculture and illegal logging. Past provincial governments started ejecting the people but the degradation of the watershed continued. In 1992, through the petition of the provincial government, DENR devolved the Barobbob watershed to the province.²⁴

After the MOA, the provincial government conducted consensus building, community mapping, and careful planning for the area with full participation of the people. The people organized themselves into the Barobbob Watershed Occupants Association (BWOA). The provincial government entered into a management agreement with BWOA. The province awards tenure through a Land Management Agreement (LMA) issued to individual occupants who are members of BWOA. The duration is 25 years renewable for another 25 years.

(8) Lower Magat Forest Management Project

This is a Co-Management Project of the DENR and the Provincial Government of Nueva Viscaya. Lower Magat Forest Management Office (LMFMO) was created in 1999 to implement the plans, programs and policies approved by the Steering Committee.

Current activities of the LMFMO include: i) land use validation/verification; ii) community organizing and research extension; iii) conflict management; iv) processing of tenurial instruments; and v) forest protection. Actual activities started in early 2000. The main activity at present is to promote application of tenurial agreements such as Agro-forestry Land Management Agreement (ALMA), Community-Based Agro-forestry Land Management Agreement (CALMA) through appropriate land use.

(9) Caraballo and Southern Cordillera Agricultural Development Program (CASCADE)

Initially, this DA-implemented, EU-assisted project was designed to provide rehabilitation services to victims of an earthquake that occurred in 1990. It was originally

²⁴ MOA between DENR and the Provincial Government of Nueva Vizcaya which, among other things, transferred specific personnel, programs, projects and services including established small watersheds in municipalities. 9 September 1992. Also: Letter of DENR RED Leonardo A. Paat to the Provincial Governor of Nueva Vizcaya informing the latter of the transfer of the Masoc (Barobbob) Watershed supporting the water system of Bayombong and Solano pursuant to the MOA between DENR and the Provincial Government of Nueva Vizcaya date 9 September 1992.

identified as the Earthquake Rehabilitation Programme (ERP). Subsequently the agenda was expanded as CASCADE.

CASCADE is an integrated rural development project started in 1997. Its overall objective was to help mainly indigenous rural people of highland areas, in promoting an agro-based local economy. It has five major components, namely, Agricultural Production Systems Development, Micro-Enterprise Development, Social Development, Institutional Development and Rural Finance. Most investment expenditures were scheduled for years from 1999 to 2002. As of Year 2000, the project has completed 15 irrigation systems serving 340 ha of farms.

(10) Community Forestry Project – Quirino (CFP-Q)

The German Government has been supporting forestry projects in the country since 1988. The first phase of the CFP-Q with a clear community forestry focus commenced in 1994 and ended in 1997. The project was extended from 1997 to 2001 and further extended to 2003. The project is funded by the *Deutsche Gesellschaft fuer Technische Zusammenarbeit* (GTZ) and the *Kreditanstalt fuer Weideraufbau* (KfW) with contributions from the Philippine Government through DENR and the Provincial Government of Quirino. DENR and the Province of Quirino seconded personnel to the project.

Components of the project are designed to: i) support the capacity building of LGUs (Provincial and Municipal) in land use planning and natural resources management; ii) complement the capacity of DENR and LGU in the processing of land tenural instruments for issuance to organized communities; iii) support sustainable forest resource management and development by the local people; iv) promote sustainable farming systems as a support measure to community based forest management; v) promote rural finance schemes for forestry, agriculture and infrastructure; and vi) promote income-oriented infrastructure as a support measure to CBFM.

The project covers 10 sites in the upper Cagayan River basin. There are 19 community-based organizations participating in the project, of which, five are involved in projects under the CBFM umbrella.

(11) RP-German Debt-for-Nature-Swap Initiative Program (DFNSIP)

This is a debt-conversion program between the Federal Republic of Germany (FRG) through the KfW and the Government of the Philippines (GOP). It follows the program concept of the CBFMP but focused on biodiversity conservation. The FRG provides the funds while the GOP provides the required personnel. Pursuant to this the DENR seconded 18 regular employees from Quirino Province.

Components of the project are to support: i) community organizations; ii) participatory land-use planning; iii) forest management and bio-diversity conservation; and iv) sustainable agro-forestry/agriculture. Support components are: v) rural industry development/ livelihood; vi) marketing; vii) tree plantation and forest rehabilitation; and viii) community-implemented infrastructure.

The project was implemented from December 1998 to March 2002, in 10 *barangays* within the municipalities of Maddela, Aglipay, Diffun, and Nagtipunan in Quirino. Of those, one organization in Aglipay is under the CBFM umbrella

(12) Forestry Sector Project (FSP)

DENR launched the Forestry Sector Project with financial assistance from JBIC in August 1993. The main approach of the project is CBFM, and the objectives are as follows:

- i) Re-establishment of the vegetative and forest cover of currently denuded and degraded areas,
- ii) Improvement of the living standards of inhabitants residing in the areas,
- iii) Conservation of biodiversity, and
- iv) Control of soil erosion to protect downstream areas from natural calamities.

The project covers three components of watershed rehabilitation, Mangrove rehabilitation, and Community organization (CO).

The watershed rehabilitation component focuses on prioritized critical watersheds, and a total of 25 watershed sub-projects exist in 23 provinces currently. Three JBIC funded sub-projects, Lamut (1,032 ha), Mayoyao (2,317 ha) and Dumayop (2,246 ha) started in 1996 and are on-going within the Study area. The proportion of the area that has been accomplished at each site is Lamut (103%), Mayoyao (100%) and Dumayop (75%) as of March 2003.

(13) ITTO – CBFM Project

This project is known as “Developing Tropical Forest Resources through Community-Based Forest Management.” It is the second phase of the DENR-ITTO Plantation Establishment Research Project completed in 1997 with an ITTO grant. It started in July 1998 and was scheduled to end in 2001. It was extended for one year or up to year 2002 to complete scheduled activities.

The project includes 3,000 ha of Forestland in Buenavista, Bayombong, Nueva Viscaya. It has been managed by the federation of POs with CBFMA concerned. The area is within the watershed of the Matuno River, a major tributary of the Magat River.

The Project has: i) established 200 hectares of forest plantations using techniques developed during the first phase (plantation establishment research); ii) protected the entire CBFM area from illegal logging and other destructive agents; iii) monitored growth and yield of plantations; and iv) implemented effective fire protection, which has accelerated natural regeneration.

(14) Sierra Madre Biodiversity Corridor Project (SMBC)

The Sierra Madre Biodiversity Corridor (SMBC) Project of Conservation International (CI) lies over 9 Provinces, which includes part of the Study area in Nueva Vizcaya, Quirino and Isabela. The aim of the SMBC is to promote the conservation and protection of the Sierra Madre Ranges by reversing the progress in the fragmentation of natural ecosystems that hold rich biological diversity.

(15) Eco Governance Program

The Philippine Eco Governance Program is a technical assistance grant from the United States Agency for International Development (USAID) to the Philippine government with the DENR as the implementing agency.

Eco Governance will help address threats on over fishing, illegal fishing and coastal habitat destruction; illegal cutting and conversion of natural forests; and insufficient local capability to implement integrated solid waste management. Eco Governance in Northern Luzon has already signed a MOA with the Municipal LGUs of Diffun, Cabarroguis, Aglipay, Maddela, and Nagtipunan of Quirino province and of Quezon, Nueva Vizcaya. The MOA with Dupax del Norte, Nueva Vizcaya is on the Process. These MOAs concern the preparation of municipal Forest Land Use Planning

4.7.8 Structural Soil and Water Conservation Measures

Existing soil and water conservation structures in the Study area are very limited in number and in size as well. There are 43 check dams with dam volumes ranging from 10 to 325 m³. Construction of the dams is generally of rubble masonry. Other than the check dams, retaining walls, riprap protection, revetment and small impounding dams are the existing ones in the Study area. Present conditions of these structures are given in **Appendix 5**.

More than 80% of the structures installed within the Study area are located in the provinces of Nueva Vizcaya and Ifugao. This implies that these provinces are apt to suffer from soil erosion or other sedimentation caused mainly by the steep topography in combination with deterioration of vegetative cover.

In Nueva Vizcaya province, most of the structures constructed for soil conservation are located in: i) the Casignan River Watershed (upper watershed of the Cagayan River); ii) the Kasibu River Watershed (upper watershed of the Addalam River); and iii) along some sections of Route 5 from Aritao to Santa Fe (left tributaries of the Santa Fe River).

Apart from such civil structures, retaining walls and side ditches constructed by communities are occasionally observed on the provincial road between Banaue and Mayoyao in Ifugao. In addition, there are cases where the slopes of rice terrace are protected by stone masonry along this section.

4.8 Agroforestry

4.8.1 Overview

Agroforestry is aimed at optimizing production and income for small-scale farmers living on hilly terrain. This objective could be achieved by combining the growing of perennial

and annual crops with animal husbandry as elaborated in DENR's agroforestry technical guidelines²⁵.

These guidelines offer a range of options. Among others, the guidelines explain how slopes can be stabilized by planting vegetative hedgerows at intervals along the contours. This makes it feasible to plant food crops and trees in the strips between hedgerows while at the same time conserving soil and moisture. Additionally, the hedgerows provide a source of fuelwood, along with fodder for stall-feeding of animals. The guidelines further explain how stall-feeding facilitates the accumulation of animal manure to fertilize the crops.

The agroforestry concept has long been incorporated in major DENR programs starting with implementation of the Forest Occupancy Management (FOM) Program in the early 1970s. It was subsequently evolved in the ISFP, which promoted agroforestry to; i) reduce slash-and-burn forest destruction, ii) establish sustainable upland farming systems, iii) grant tenure security to occupants of forest lands, and iv) alleviate rural poverty. The multiple land use features of agroforestry are also included in the more recently formulated CBFM program.

Generally however, agroforestry in the Study area is characterized by a lack of systematic planning and implementation required for this symbiosis to be achieved. For example, farmers in Dupax, Nueva Vizcaya grow vegetables on steep land without soil and water conservation measures. Another apparent deficiency is the almost total disregard of stall-feeding and the concomitant accumulation of animal manure for compost production, nutrient cycling and maintenance of soil fertility.

4.8.2 Current Agroforestry Farming Practices

Planting of annual crops is the principal component of upland farming in the Study area. With a few exceptions, the prevailing farming/land use methods are adaptations of the centuries-old swidden system. The principal features of traditional swidden (i.e. slash/burn/rotation) are still widely applied in the Study area with the following significant changes:

- Rotation cycles are very short, often less than three years. This does not allow sufficient time for restoration of woody vegetation and recovery of soil fertility;
- Most of the slash/burn is implemented on grasslands and brush lands that are partially degraded and generally low in fertility;
- The land is intensively plowed or tilled using animal-drawn implements or hand tools; and
- Planting is often designed to respond to market demand (e.g. vegetables for sale) rather than, or in addition to, the traditional emphasis on crops grown for home consumption.

Another phenomenon is the clearing of dense forests, cultivating steep slopes, and planting high-value vegetables on rows running up and down the slope. These practices

²⁵ Agroforestry Information Technology Kit (ATIK); ISBN:0-942717-37-7 published jointly by DENR, International Institute for Rural Reconstruction and the Ford Foundation. Third printing, April 1998.

have negative environmental consequences and are evident in several areas. Small landslips are already apparent, even on recently cleared land.

In brief, most of the prevailing upland farming systems in the Study area is not sustainable, from either environmental or economic perspective.

Adoption of tree-based agroforestry was promoted aggressively in the 1970's when the government supported development of giant ipil-ipil (*Leucaena leucocephala*) tree farms. Results have ranged from outstanding success at Magsaysay Hill in Bambang, Nueva Vizcaya to total failure in other areas. Subsequently, the emphasis shifted to orchard species such as mango (*Mangifera indica*), jackfruit (*Artocarpus heterophylla*) and coffee (principally *Coffea robusta*) along with planting of premium hardwoods such as mahogany (*Sweitenia macrophylla*) and narra (*Pterocarpus indicus*). Concurrently, the introduction of *Gmelina arborea* has led to extensive planting of this fast-growing tree. Bamboo has also been planted but only on a limited scale due to the high cost of seedlings²⁶.

Food crop/tree inter-planting is rare on steep slopes. Combinations of trees and annuals are most frequently found in gentle to rolling terrain in the Study area. However, there are some exceptions. For example, farms on steep land at the former ISF project at Danghay, Ifugao combine coffee with ipil-ipil shade trees, avocados (*Persea americana*), jackfruit (*Artocarpus heterophylla*) and inter-planting of taro (*Colocasia esculentum*). But by-and-large, inter-planting is confined to gentle terrain near the highway such as in Diadi, Nueva Vizcaya and some sites in Quirino where pineapple is an important intercrop.

There is very little evidence of a deliberate plan to interplant trees and other crops. The prevailing planting designs do not provide adequate space to grow food crops between the trees. Recently, the former mayor of Nagtipunan, Quirino has introduced wide spacing (i.e. >8 meters) between tree rows thus making it feasible to grow food crops for several years before closure of the tree canopy. But at present, this is the only example of a deliberate inter-planting scheme noted in the Study area.

In 1987, the DENR introduced the SALT²⁷ farming approach. The SALT method follows several different designs, depending on objectives of the practitioner (food production, trees, forage, etc.). But common to all the designs is the establishment of contour hedgerows for soil and water conservation. Examples of SALT implementation can be seen in the Study area, principally at DENR demonstration sites and in donor-assisted projects. SALT hedgerows can also be found in vegetable farms on steep hillsides near the highway in Santa Fe, Nueva Vizcaya. Generally however, accomplishments have fallen below expectations. There are no reliable statistics available on the number of hectares covered by SALT technology. But observations of the Study Team indicate that the total area stabilized via hedgerow establishment is very small.

During the early years of SALT promotion, the principal hedgerow species was Napier (*Pennisetum purpureum*). At present, most of the existing SALT hedgerows are composed of ipil-ipil, kakauate (*Gliricidia sepium*), *Flamingia congesta* and *Desmodium renzonii*.

²⁶ Source of information: Provincial Agriculturist of Ifugao.

²⁷ SALT- The Sloping Agricultural Land Technology system developed and popularized by the Mindanao Baptist Rural Life Center, Kinuskusan, Bansalan, Davao del Sur.

4.8.3 Principal Agroforestry Crops

(1) Tree Crops

There are no comprehensive records showing the number of trees planted of each species by agroforestry projects in the Study area. The BAS has compiled data on the number and area of fruit trees planted in the four provinces but this data includes plantings outside the Study area. Mango, coffee, coconut and bananas are the most frequently planted species as shown below.

Major species of fruit trees planted in the four provinces²⁸

Province	Species	ha	Trees	Species	Ha	Trees	Species	ha	trees
Ifugao	Coffee	1,094	1,056,106	Banana	694	297,792	Mango	309	7,547
Isabela	Banana	6,075	4,202,723	Coconut	755	119,885	Mango	710	126,222
N. Vizcaya	Mango	3,893	238,557	Coffee	2,400	1,837,567	Banana	2,270	1,847,512
Quirino	Banana	11,057	11,117,203	Mango	717	143,883	Coffee	680	557,943

(2) Annual Crops

BAS data show the approximate area planted in various annual crops in Year 2000. It should be noted that the data below cover the entire area of the four provinces. There is no breakdown by municipality that would facilitate compiling information specific to the Study area.

Major annual crops grown in the four provinces

Crop	Approximate area (ha) by crop and by province				
	Ifugao	Isabela	N. Vizcaya	Quirino	Total
Rainfed rice	960	23,067	2,327	2,501	28,855
White corn	1,979	10,831	2,053	725	15,588
Yellow corn	7,560	185,850	13,658	23,728	230,796
Camote	1,756	764	1,504	55	4,079
Cassava	17	776	199	43	1,035
Peanut	120	1,444	65	1,650	3,279
Mango	-	6,525	97	155	6,777
Eggplant	31	662	85	42	820
Tomato	4	316	677	8	1,005
Cabbage	20	15	105	-	140
Onion	-	36	175	-	211

4.8.4 Financial Viability of Agroforestry

In addition to the types of crops grown, productivity and profitability are also highly relevant to watershed management. Increased profitability may reduce the risk of expanding agriculture/agroforestry lands in the Forestlands. Conversely, low or marginal profits may encourage accelerated clearing of forests for subsistence or market-driven demand.

²⁸ As the data by province within Study Area is not available, the data for whole province is used for reference.

Financial viability in agroforestry is subject to a broad range of variables: e.g. topography, soil fertility, access to markets, etc. The only available data are those that the Department of Agriculture (DA) has compiled on estimated profit/loss of selected crops at national average level (**Appendix 4**).

4.8.5 Existing Projects with Agroforestry Component

Major projects that have agroforestry components are: IFS projects, CBFM projects, the Central Cordilleras Agricultural Programme (CECAP), CASCADE, and RP-German project

The CECAP in Ifugao is a multi-sectoral rural development project financed by the European Union (EU) and implemented by the Department of Agriculture (DA). In addition to tree planting it also includes agroforestry support components such as community organization, training, and tenure security. The RP-German project has identical support components as CECAP, but has natural forest conservation as its principal component, and agroforestry is a minor component.

Two other cases in the Study area also include agroforestry activities. One is the Kalahan Foundation project in Imugan, Sta. Fe covering 13,000 ha and supported by the United Church of Christ. The other case is the traditional Muyong system in Ifugao.

4.9 Risk of Soil Erosion and Slope Failure

4.9.1 Overview of the Study Area

The Study Team conducted field reconnaissance surveys to have a better grasp of the existing condition of the Study area. Main findings are shown in **Appendix 5**, and the overviews of the Study area are as follows.

In the Study area, the Magat River system suffered more seriously from sedimentation than the Cagayan and Addalam River systems. Denuded or devastated areas exist in various places in the upper Magat River watershed, especially in the watersheds of the Santa Fe and Santa Cruz River systems. Possible sources of sediment discharge with high density were observed on the following areas/cases:

- Slope failures or landslides, and erosion of their terraces,
- Hill slope erosion developing on denuded lands, including gullies and rills,
- Debris or immature debris flow, and
- Bank erosion.

Among the above, most of the slope failures and landslides were reportedly triggered by the 1990 earthquake (Killer Earthquake).

As regards the Matuno River, which is one of the tributaries of the Magat River, the exact area of the principal source of sediment discharge was not identified during the field reconnaissance. However, the condition of the river sedimentation implies that the upper watershed is highly degraded.

Moderate sedimentation was observed during the reconnaissance in the watersheds of the Ibulao and Alimit Rivers flowing down in the left mountain range of the Magat reservoir. Per field reconnaissance, the source of sediment discharge to both rivers seems:

- Natural disasters in upper watersheds, due to steep topography, and
- Sheet and gully/rill erosion in middle – lower watersheds.

Likewise, the Addalam and Cagayan River systems have slight to moderate sedimentation as a whole. Vegetation in the mountainous areas extending over the right bank of the Cagayan River (Sierra Madre Mountains) is relatively rich. Since a few forests exist in the hill areas along the Addalam/Cagayan Rivers and their tributaries, soil erosion such as gullies and rills is limited. The principal sediment source of these watersheds seem to be: sheet erosion in hill areas covered by grass/grazing land or agricultural land, bank erosion of rivers and their tributaries, and degraded areas observed occasionally in the Abaca River and Casignan River Watersheds (uppermost watershed of the Cagayan River).

4.9.2 Soil Erosion

To assess relative erosion hazard in the Study area, potential soil erosion was provisionally estimated using the Universal Soil Loss Equation (**Appendix 5**). The resulting average annual erosion rate by sub-watershed is shown in **Figure 4.9.1**. The following table shows the estimated potential soil erosion and total areas of excessive erosion in each of the Magat, Addalam and Cagayan River Basins.

Estimated Potential Soil Erosion and Total Areas of Excessive Erosion in Each Basin

Basin	Basin Area (ha)	Potential Erosion		Area of Excessive Erosion (ha) (Classes 4 and 5)	Area of Excessive Erosion (%)
		Volume (m ³ /Year)	Thickness (mm/Year)		
Addalam R. B.	114,774	930,000	0.8	-	-
Cagayan R. B.	342,162	5,253,000	1.5	42,871	12.5
Magat R. B.	417,663	8,673,000	2.1	101,814	24.4

Based on the average annual erosion rate, the micro watersheds are classified into classes 1 to 6. The classes follow 1 mm increments of the average annual erosion rate. **Figure 4.9.1** shows that the micro-watersheds in the upper reaches of the Magat River basin (Basin M) such as the upstream reaches of the Ibulao, Matuno, Santa Cruz, Santa Fe and the Matana Rivers and their tributaries are particularly threatened by excessive soil loss requiring urgent soil conservation work. In the Cagayan River basin (Basin C) excessive soil erosion is seen in the basins of the Dibuluan, Dabubu and the Ngilinan Rivers. Soil erosion in the Addalam River basin (Basin A) is moderate.

The values of the factors influencing erosion on the areas of excessive erosion given by erosion classes 4, 5 and 6, indicate that the governing factors in the Magat River basin and in the Cagayan River basin are the slope factor and the rainfall erosivity factor suggesting that slope stability measures should be adopted in those areas. While in the Addalam River basin the slope factor is less and soil erosion potential is moderate.

4.9.3 Slope Failure

Figure 4.9.2 shows the distribution of collapsed land areas identified using SPOT satellite images of 1998 to 2000 covering the watershed. The procedure adopted in identifying and mapping these landslide areas was explained in **Appendix 5**.

As seen in **Figure 4.9.2**, the identified collapsed land areas are excessive in the Magat River basin and are concentrated in the upstream areas of the Ibulao, Matuno, Santa Cruz and Santa Fe River basins. It is expected that these areas would be a large source of sediment discharge requiring appropriate and urgent remedial measures.

The identified landslide areas in the Cagayan River basin are far less and could be found in the upper reaches of the Dibuluan and Ngilinan Rivers. The landslide areas in the Addalam River basin are few. They are mostly dispersed in the uppermost basins of the Addalam River.

4.9.4 Sediment Transportation

(1) Sedimentation in Magat Dam Reservoir

The sedimentation in the reservoir of the Magat dam is serious. The dead storage of the reservoir was originally 300 million m³. Due to increased sediment discharge from the upper basin, the dead storage of the reservoir has been significantly reduced to 116.4 million m³ in 17 years (from 1982 to 1998) according to a report on sedimentation survey in the Magat reservoir as shown below.

Sedimentation in the Reservoir of the Magat Dam²⁹

(Unit: million m³)

Year	Accumulated Sediment Volume	Annual Sediment Rate	Remarks
1982	7.4	-	Completion of dam
1984	22.0	7.3	
1989	49.0	5.4	Earthquake in 1990
1995	179.0	21.7	
2000	213.8	6.7	

A series of surveys revealed that:

- i) An annual sedimentation rate has drastically increased after the 1990 earthquake;
- ii) The annual sedimentation rate between 1982 and 1989 was 5.9 million m³, while that between 1989 and 1995 was 21.7 million m³;
- iii) The last survey in 2000 implies that the increased annual sedimentation rate due to the earthquake tends to have settled down to the previous level. This seems to be somehow arbitrary in its interpretation as to whether the upsurge of sediment load caused by the earthquake has really settled down or not, and as to whether a large volume of sediment deposited in the river system would be carried into the Magat Reservoir with flood discharge or not.
- iv) To be assured of the trend of sedimentation, further survey is required.

²⁹ The Feasibility Study on the Flood Control Project for the Lower Cagayan River (JICA)

(2) Sediment Transport in the River System

There is little data from continuous or periodic monitoring of the sediment discharge or the sedimentation in the river systems in the Study area. However, the following information suggestive of the status of river sedimentation and sediment transport has been obtained, especially in upper watershed of the Magat River.

Transition of Channel Cross Section of Magat River and its Tributaries

(Unit: ft (m))

River Name	Measured Point	1960 ^{*1}		1999 ^{*2}	
		Width	Depth	Width	Depth
Matuno river	San Leonald, Bambang	36 (10.8)	16 (4.8)	84 (25.2)	10 (3.0)
Marang river	Santa Clara, Aritao	20 (6.0)	11 (3.3)	29 (8.7)	5 (1.5)
Imugan river	Baan, Kayapa	20 (6.0)	18 (5.4)	30 (9.0)	6 (1.8)
Cabanglasan river	Cabanglasan, Kayapa	30 (9.0)	18 (5.4)	77 (23.1)	8 (2.4)
Magat river	Maddiangat, Quezon	92 (27.6)	22 (6.6)	128 (38.4)	14 (4.2)

Source: PENRO Nueva Vizcaya

Remark *1: Interview data to local people by PENRO

*2: Measurement data by PENRO

According to PENRO Nueva Vizcaya, the riverbeds of the Magat River and its tributaries have risen considerably since the 1990 earthquake as shown in the following table. The Cabanglasan Bridge was constructed in 1993 under the 1990's earthquake disaster restoration project, and the clearance of the bridge designed by the project was 6.1 m from the riverbed up to the bottom of the beam. The bridge has been choked up with sediment already.

4.10 Rural Infrastructures

4.10.1 Road and Transportation

(1) Road Networks

Roads in this country are classified into three categories from the functional viewpoint: i) national roads traversing inter-provinces ii) secondary-national or provincial roads running within a province; and iii) municipal or *barangay* roads connecting villages in local areas. On the basis of physical conditions, these are classified into asphalt roads, concrete roads, gravel roads, and earth roads.

Two national roads run in the Study area. One is Route 5 and the other is Route 4. Route 5 with concrete/asphalt pavement starts from Manila, and runs from southwest to northeast in Nueva Vizcaya province within the Study area. This route, being one of the trunk roads of the country, is in fairly good condition and is playing an important role in the country's economy.

Route 4, branching off from Route 5 at Bagabag town of Nueva Vizcaya province, runs northwest to Ifugao province towards Mountain province. Sections of the road between Bagabag and Lagawe have concrete surface in fair condition. Some sections between Lagawe and Banaue, however, have graveled or earthen surfaces. Due to steep topography, the alignment of these sections is winding and steep, and also slope failures/landslides or their traces are occasionally observed along the road.

The provincial roads in the Study area are generally surfaced with concrete or gravel, and asphalt-paved provincial roads are very limited. All-weather type provincial roads run along the towns of Bagabag, Solano, Bayombong, Bambang, Aritao, Dupax del Norte, Dupax del Sur, etc. in the province of Nueva Vizcaya; around Lamut and Lagawe in Ifugao province; Diffun to Nagtipunan in Quirino; and most of the provincial roads in Isabela province within the Study area. In the Cordillera Central Mountain areas such as Mayoyao in Ifugao, Santa Fe and Kayapa in Nueva Vizcaya, however, the condition of the provincial roads is rough because certain sections are unsealed, and are unlikely to be passable by vehicles during the wet season. In Quirino province, the provincial road traversing the Sierra Madre Mountains from Abbag in Quirino to Aurora province is disconnected at the Cagayan River, where a bridge is under construction.

The current service condition of *barangay* roads varies widely in each municipality and *barangay* within the Study area. In the case of Ifugao province, 91 *barangays* out of 149 within the Study area have all-weather roads, however about 30 % have deteriorated to the point.

In the Upper Cagayan river basin, particularly in the Casecan Watershed, the road is surfaced with either gravel or earth. This is maintained as an all-weather road and it provides accessibility from Carranglan, Nueva Ecija province to Casecan dams giving the local or indigenous people ease in transporting their products out of their area to the lowland.

(2) Public Transport

Between Metro Manila and Aparri town located at estuary of the Cagayan River, long- or middle-distance buses using Route 5 run some round trips a day including night trips. For inter-town or internal town transportation, jeepneys, mini-buses, and tricycles (motor cycle combination) are widely used in the Study area. There is no railway within the Study area.

An airport exists in the Study area and it is located at Lantap, Bagabag, Nueva Vizcaya. A private company serves a propeller airliner three round trips a week between Bagabag and Manila.

Water transportation is not significant in the Study area except in Abbag, Maddela, Quirino and in Jones, Isabela where a small barge is used to ferry people and vehicles crossing the Cagayan River.

4.10.2 River Structures

(1) Flood Control Structures

No systematic flood control structures were observed in the Study area except for some sporadic protection works. The bank protection works are occasionally observed in the main Magat, Cagayan, and Addalam rivers and in their tributaries to protect adjacent residential areas, trunk roads and bridges, and agricultural land. However, the areas protected with these facilities are very limited. Some spur dikes with revetments also exist in the upper Magat River near Bambang town and near Santa Fe Bridge on Route 5.

(2) Dams

In the Study area, there is one reservoir impounded by a dam and two diversion weirs. The reservoir is impounded by the Magat Dam, and the weirs are called the Pelaway and the Taan Weirs.

Magat Dam having a storage capacity of 1.08 billion m³, is located on the boundary of Ifugao and Isabela Provinces for dual purposes of irrigation (95,000 ha) and hydroelectric power generation (540 MW). It was completed and became functional in 1982, and has been operated since then by NIA and NAPOCOR for irrigation and hydroelectric power generation, respectively³⁰.

Under the Casecnan Project by BOT (Build, Operate and Transfer) system, Pelaway and Taan Weirs were constructed in 2001 on the Abaca and Taan Rivers, respectively, both of which are tributaries of the upper Cagayan River in Nueva Vizcaya Province. The weirs divert water through trans-basin tunnels from the Cagayan River basin in Region 2 to the Pantabangan river basin in Nueva Ecija Province for irrigation (35,000 ha) and for hydroelectric power generation (150 MW).

4.11 Present Conditions of PO and NGO

4.11.1 Existing Programs/Projects with a PO Development Component

A number of programs and projects, mostly initiated by government agencies and international donors, have a component of creating and/or strengthening POs (**Attachment 3.2.1 of Appendix 3**). In addition to the government-initiated programs, a numbers of NGOs organize POs within the Study area through various programs. Some NGO programs managed by local NGOs are funded by governmental agencies, including DENR. For the CBFM Program, a number of NGOs contracted by DENR executed the PO formation, training activities, legal assistance for tenure instrument application, environmental education, reforestation activities and livelihood projects.

In many villages, religious groups organize local population in a form of church groups. Their main activities concentrate on worship and other religious activities, and in some cases, activities extend to social welfare ones including natural resource management. Some religious groups have evolved to registered cooperatives.

4.11.2 Results of Evaluation on Management Capability

Using a PO/NGO inventory method (**Section 2.2 of Appendix 3**), detailed information with regards to POs with CBFMA, POs without CBFMA and NGO/research institutions was collected. Based on the information gathered, the management capabilities of those organizations were assessed (**Table 4.11.1**).

³⁰ The Feasibility Study on the Flood Control Project for the Lower Cagayan River (JICA)

(1) Summary of Management Capability Assessment

(N=137 POs, n=365)

Categories	Evaluation Items	PO with CBFMA	PO w/o CBFMA	NGO
Organizational Structure, Processes and Management Style	Structure	1.92	2.59	3.55
	Authority Relationship and Leadership	2.00	2.38	3.40
	Incentive System	1.46	2.01	3.00
	Communication and Work Environment	1.97	2.52	3.25
	Ability to Facilitate Participation	2.03	2.43	3.15
Human Resource Development	Training of Members	1.70	2.15	3.20
	Membership Recruitment	1.76	2.31	2.20
Resources and Institutional Environment	Monetary Resources	1.57	1.94	2.75
	Physical Resources	1.24	1.94	3.15
	Human Resources	1.86	2.43	3.25
	Legal Environment	2.43	2.68	3.65
Network of Organization and Interaction	Supporting Organization	2.03	2.38	3.60
	Access to Information	1.70	2.43	3.50
Action Environment	External Environment for Activities	2.08	2.15	3.05
	Total Average	1.84	2.29	3.16

Source: JICA Study Team

0: Not Applicable/Failed 1: Initiated/Inappropriate 2: Developing/Needs Improvement 3: Established/Satisfactory 4: Outstanding/Appropriate

The total average score of POs with CBFMA and POs without CBFMA failed to reach a score of 3 (“Established/Satisfactory”). Particularly, the score of POs with CBFMA is very low and failed to even reach a score of 2 (“Developing/Needs Improvement”). With the given score, an organization basically is unable to carry out any activities with reliability. The scores of the POs with CBFMA in all aspects are lower than those of the POs without CBFMA as shown in the table above. The poor evaluation is mainly derived from the fact that the Team surveyed all POs with CBFMA regardless its dormancy or not, while only active ones were selected for POs without CBFMA for the survey.

The POs without CBFMA, in average, have a longer history (average 9.59 years) and larger membership than the POs with CBFMA (6.37 years). However, no correlations between evaluation scores and organizational age or size were found.

(2) Qualitative Assessment of Management Capability of POs with CBFMA

(N=37 POs, n=115)

Items	General Findings
Organizational structure	In certain POs, a Board of Directors (BOD) executes managerial duties as a manager, bookkeeper or loan officer without a clear job description and legitimate designation. As a result, BOD members cannot inspect the operations. In some cases, the function and responsibility of the General Assembly is unpracticed. The organizational structure is not widely understood among the members and leaders due mainly to the lack of opportunities/projects to utilize the structure.
Authority, leadership, communication and participation	Because of the structural deficiency, an organization tends to exceedingly depend on the individual leadership. Without a functioning monitoring system, it becomes non-transparent and corrupt. 32.4% of surveyed POs have experienced abuse of authority and mismanagement of finance by leaders.
Incentive system	Only 10.8 % of surveyed POs expressed that land management rights and tenure instruments are significant incentives. Nearly all PO leaders work on a voluntary basis. Most POs fail to provide incentives to their members through the provision of savings and loans services, dividends, patronage refunds, market information, training and education, development of livelihood activities and buy and sell services of farm supplies and commodity goods and rental service of farm equipment/facilities.
Human resource development	The level of education of leaders and members is generally low, and their literal and numerical abilities, technical knowledge and generic competencies such as punctuality, analytical thinking and systematic performance tend to be inadequate. Their ability to design, plan, implement and monitor projects is limited.
Member recruitment	Most POs are stagnant in terms of the number of members. A strong notion exists among POs that members are limited to those who occupy and/or cultivate the defined CBFM area.
Resources and Institutional Environment	Many POs do not have the minimum capital requirement for operations. Also, physical facilities/equipment to generate revenue, hold meetings, communicate or produce documents are inadequate.
Network of Organization and Interactions	Most POs receive support from various governmental agencies, especially DENR. The support for the POs is insufficient for the organization, particularly until its organizational take-off. Some POs are located at remote areas, and this hinders access to the market.

Source: JICA Study Team

(3) Qualitative Assessment of Management Capability of POs without CBFMA

(N=80 POs, n=250)

Items	General Findings
Organizational structure	The distribution of tasks and duties, flow of information and reporting, allocation of responsibilities and accountability are clearer and better understood among the leaders and members than in the case of PO with CBFMA. This is attributed to the support of PCAO, OPA, MAO, DAR and NIA which applies a prototype organizational structure to new POs.
Authority, leadership, communication & participation	POs have more qualified leaders who facilitate communication and encourage participation of members than CBFM-POs.
Incentive system	Most POs failed to generate sufficient revenue for the provision of monetary or in-kind compensations to officers and executive staff members. Their work is purely voluntary, which makes the operation of PO irregular, unprofessional, unstable and thus inefficient.
Human resource development	The qualification level is significantly higher than POs with CBFMA. Although a portion of the members of most cooperatives undergo pre-membership training conducted by PCAO or DAR, training of members and leaders is not adequate or has only marginal impact on the operation of POs.
Member recruitment	A number of cooperatives limit their membership to those who reside in their village. Even so, their recruitment activities are relatively organized compared to POs with CBFMA. The rationale of limiting members is that the most POs do not have means to collect fees from geographically distant areas. Besides, their mentality tends to exclude outsiders.
Resources and Institutional Environment	Monetary and physical resources are remarkably inadequate, even though it is significantly better than POs with CBFMA. POs still struggle in obtaining sufficient funds, equipment and facilities necessary for their operations and projects.
Network of Organizations & Interactions	POs without CBFMA have more intensive external support than POs with CBFMA. They have better access to information and new technologies as a result.

Source: JICA Study Team

4.11.3 NGOs and Research Institutions

The table below shows the summary of their programs/activities related to environmental issues and their working areas.

Summary of NGO Activities Related to Environmental Issues and Working Area

Name of NGO	Major Activities and Programs	Area of Work
Plan International	Planning, Refo., Agro-Forestry	Region Wide
Noah's Ark House for Children	Envir. Ed. for Children	Banaue, Ifugao
OISCA	Tree for Legacy, Envir. Ed. for Students	Region Wide
PRRM Ifugao Branch	CBFMP, Planning, Refo., Agro-Forestry	Ifugao
PRRM NV Branch	CBFMP, Planning, Refo., Agro-Forestry	NV & Quirino
BOOST	Agro-Forestry, R&D, Extension & Training	Region Wide
PAFID	CBFMP, Legal Support	Region Wide
TRICORD	CBFMP, Refo., Agro-Forestry, Envir. Ed.	Ikalahan Tribal Comm.
KEF	CBFMP, Refo., Agro-Forestry, Envir. Ed.	Ikalahan Tribal Comm.
FORESTS	CBFMP, Planning, Refo., Agro-Forestry	NV
FRENDS	CFPQ, Refo., Agro-Forestry	Quirino
EDSA Environmental Multi Consultants	CFPQ, Survey, Planning, Forest Protection	Quirino
Cagayan Valley Partners in People Dev't	Policy Advocacy, Training	Region Wide
Apochan Development Program Inc.	Envir. Ed. for Children	Banaue, Ifugao
Kataguan Center	Envir. Ed. for Children	Lamut, Ifugao
Spiritwood Corporation	Nursery Dev., Refo.	Diffun, Quirino

Source: JICA Study Team

As the survey results show, the management capacity of those NGOs and research institutions in general is significantly higher than POs in all aspects. NGOs should have a mission to serve for public interests, though in reality, an organization becomes a means for professionals to generate their income. In fact, many NGO staff members in the Study area work as consultants in their spare time. For these, most NGOs in the area are no different than consulting companies. There are four research institutions that focus on environmental issues.

4.12 Capability of DENR Local Offices, ENRO-LGU and Personnel

4.12.1 Manpower

The existing personnel in Region 2 and the four provinces concerned are shown below.

Existing personnel of PENROs and CENROs in the Study Area

Office	No. of Regular Positions	No. of Filled Positions	Casuals and Contractors	Total Personnel
Regional Office, Region 2	533	501	89	590
PENRO N. Vizcaya	21	20	0	20
CENRO Aritao	59	55	4	59
CENRO Bayombong	48	44	0	44
CENRO Dupax del Norte	62	56	0	56
PENRO Isabela	29	25	3	28
CENRO Cauayan	48	46	2	48
CENRO San Isidro	69	68	2	70
PENRO QUIRINO	17	15	2	17
CENRO Diffun	55	54	4	58
CENRO Nagtipunan	75	67	0	67
PENRO IFUGAO	-	26	-	26
CENRO Lamut	-	54	-	54
CENRO Alfonso Lista	-	49	-	49

Source: ARED for Administration, RII (as of March 31, 2001)

The actual number of personnel assigned for implementing CBFM projects in the four provinces are given below.

Number of personnel in CBFM Units at the PENROs/CENROs in the Study area

Offices	CBFM Unit			Projects Supervised ¹
	Unit Chief	PMOs ³¹	Others	
PENRO N. Vizcaya	1	0	-	6
CENRO Aritao	1	3	-	4
CENRO Dupax d. N.	1	0	-	5
PENRO Quirino	1	0	-	3
CENRO Aglipay	1	2	-	4
CENRO Nagtipunan	1	1	-	1
PENRO Isabela	3	3	-	1
CENRO Cauayan	2	2	3	1 ³
CENRO San Isidro	1	2	1	4 ²
PENRO Ifugao	0 ³	0	0	-
CENRO Lamut	1	0	0	3
CENRO A. Lista	1	0	0	3

¹ Does not include CBFM projects with foreign funding

² CBFM projects within Master Plan Study area

³ Forest Management Specialist takes care of duties of CBFM Unit Chief

It can be observed that in the CENROs of both Dupax del Norte, Lamut and Alfonso Lista there is only one person in the CBFM Unit who is also the chief of the Unit. Some

³¹PMO = Project Management Officers

personnel of CBFM and other units in the FMS have been assigned to foreign funded projects. When necessary, the CBFM Unit chief arranges with other units for the temporary assignment of other Forest Management Section (FMS) staff, which include Tree Markers, Forest Rangers, Nursery Farm Foreman and Laborers.

4.12.2 Facility and Equipment

The following table summarizes present conditions of facility and equipment available at the CBFM unit of Region 2. It indicates a lack of vehicles and other facilities and equipment.

Present Conditions of Facilities and Equipment of CBFM Unit at the Region 2

Item	Unit		Total
	CBFM	Others	
1. Vehicle	0	1	1
2. Mobile Radio	0	2	2
3. Camera	0	0	0
4. Video Camera	0	2	2
5. Digital Camera	0	1	1
6. Computer	3	8	11
7. OHP	1	0	1
8. Typewriter	0	2	2
9. Air conditioner	0	2	2
10. TV	0	1	1
11. Binoculars	0	0	0

Source : JICA Study Team (Appendix 2)

Similarly to the above, present conditions of facilities and equipment of the watershed management unit at PENRO and CENRO is summarized in the following table. It was found that there are many offices without enough resources.

Present Conditions of Facilities and Equipment of the Watershed Management Unit at PENRO and CENRO

Item	PENRO	CENRO				Total
	Quirino	Aglipay	Nagtip.	Lamut	Cauyan	
1. Vehicle	1	0	1	0	1*	3
2. Mobile Radio	0	0	0	0	0	0
3. Camera	0	0	0	0	0	0
4. Video Camera	0	0	0	0	0	0
5. Digital Camera	0	0	0	0	0	0
6. Computer	0	0	0	2	0	2
7. OHP	0	0	0	0	0	0
8. Typewriter	0	0	0	4	0	4
9. Binoculars	0	0	0	0	0	0

Source : JICA Study Team (Appendix 3)

*: Motorcycle

Note: PRNROs/CENROs not indicated in the table do not have any of the items shown.

4.12.3 Budget of Regional Offices for Forestry Purposes

Table 4.12.1 shows the budgetary allocation of Region 2 over the last five years and the distribution of the allocation for the different sectors. It can be observed that based on the maintenance and operating expenses (MOE), which are the amounts used to undertake specific activities, the forest management sector consistently has the highest allocation. Over the last five years its share in the total MOE of the region averaged 40%. During 2001 its share was almost 50%.

Within the forest management sector, forest protection activities enjoy the highest share of the MOE, averaging about 30% during the last five years. However, in 2001 its share was only 22.8 %. Soil conservation and watershed management comes next followed by CBFMP (**Table 4.12.2**).

Budgets of PENROs and CENROs - The level of funding of the four provinces encompassed by the Study area is shown in **Table 4.12.3**. It can be observed that the forest management sector has the highest allocation among the sectors. The MOE for forest management of the four provinces was disaggregated according to expense classes (**Table 4.12.4**). The allocation for travel (02) and supplies and materials (07) are measures of how well the field officers can carry out their activities and accomplish their targets. The CBFM Unit of CENRO Dupax del Norte has a travel allocation of ₱ 29,000 for FY 2001 for the supervision of five regular CBFM Projects within its jurisdiction. However, the CBFM Units of CENROs Aglipay and Nagtipunan in Quirino have travel allocations for the year of only ₱ 3,000 each. Aglipay and Nagtipunan each supervise four regular CBFM Projects. The allocation can support only 30 travel days for the whole year. Given the amounts indicated in the budget allocation for these expense classes for CBFMP it can be deduced that field officers have to augment their allocation through better linkages with funding sources such as the better-funded foreign assisted projects or with LGUs.

4.12.4 Personnel Competency³²

Higher line agencies (regional offices and PENROs) seem to have more qualified officials than the lower offices (CENROs) from the perspective of their educational attainments and formal training. A number of respondents a Training Need Analysis (TNA) pointed out that inadequate competency brings negative effects on their services, especially at the CENRO level. A considerable number of respondents mentioned that inadequate competencies, as well as value orientations and work ethics, of employees are significant factors that hinder better performance and services.

However, a limited number of respondents at CENROs recognized the gap between their duties/responsibilities and their qualifications, implying that their duties/responsibilities require other qualifications than they possess. There is a need for DENR to match the qualifications of personnel to the duties and responsibilities of offices and positions. Training can then be designed on the basis of the qualifications and expertise required by the office or position. DENR has more officials with advanced College degrees than the ENRO-LGU.

³² See **Section 2.3** of **APPENDIX 3** for the explanation of Training Needs Analysis method, **Section 3.3** for the detailed descriptions of survey results and analysis.

In spite of the claimed problems of competencies of officials, many officials expressed that they are presently satisfied with their work performance. They state that the major constraints of their office, among the various other constraints, are inadequate financial and physical resources for their activities, including vehicles, survey equipment and updated computer units.

The most puzzling finding is that many respondents at DENR local offices and ENRO-LGU rated human resource development as the most important strategy for improved performance and services of their offices, yet they state that inadequate financial and physical resources are the most critical constraints at the office. This discrepancy between the problem and solution may be derived from the fact the respondents recognize the low/no possibility of improvement pertaining to financial and physical resources in their offices, allowing the other option for improved performance through development. Or they consider that the financial and physical constraints can be lessened, or at least alleviated significantly by the improvement of human resources. The rationale for their answer needs further examination.

Human resource development, despite its popularity, would not be an effective strategy to improve the quality of services when the most critical constraints are the inadequate financial and physical resources. In other words, a training program, which is an important part of human resource development, might not have a positive impact on the enhancement of outcome.

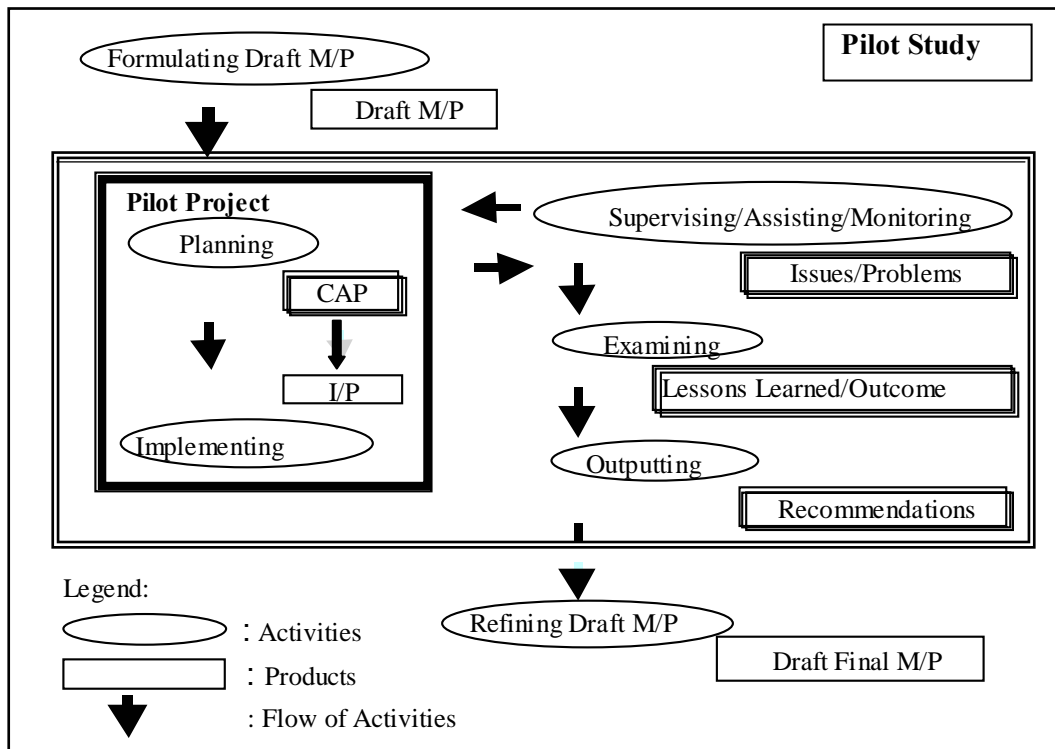
Officials who are in charge of CBFMP lack academic background in community organization, participatory development, organizational management, sociology and anthropology. All CBFM personnel at local DENR offices and LGUs have only an educational background in natural sciences. Even though many of them have undergone training on CBFMP and community organizing, it is rare that their mindset and perceptions as natural scientists are modified to that of an effective community organizer. DENR should employ more social scientists for CDO and CDA³³.

³³ Due to the educational system in the country, extremely few schools offer Rural Development, Sociology or Anthropology at a higher education level. The alternatives would be Management, Agricultural Economics and Education.

CHAPTER 5 PILOT STUDY¹

5.1 Background

The Pilot Study was carried out through monitoring and evaluation of the Pilot Project that was planned, designed and implemented at six pilot project sites for 19 months from January 2002 through August 2003. The Pilot Project consisted of three major components i.e., i) CBFMA area development and management; ii) PO capacity building; and iii) institutional strengthening of the Pilot Project Management Offices (PPMOs). The following illustration shows an image of the Pilot Study.



5.2 Objectives and Scope of Work of the Pilot Study

The objectives of the Pilot Study were: i) to obtain data/information that would allow the Study Team to formulate a more realistic Master Plan for implementation; and ii) to partly support the implementation for the CBFM program formulated in the Phase 1 Study.

The scope of the Pilot Study included: i) selection of target communities for the Pilot Project; ii) designing the Pilot Study and Pilot Project; iii) establishment of an institutional setup and operation mechanism for the Pilot Study and Pilot Project; iv) implementation and monitoring of the Pilot Project; v) evaluation of the Pilot Project; vi) analysis and synthesis of findings and lessons learned; and vii) recommendations for further refinement of the Master Plan.

¹ Details of Pilot Study are in **Volume 2 Report on Pilot Study**.

5.3 Target POs for the Pilot Project

A short list of 10 candidate POs for the implementation of the Pilot Project were proposed by the Study Team based on the following criteria

- 1) 3~4 CBFM POs and 2~3 non-CBFM POs
- 2) Competency and motivation of POs and working relationship with DENR
- 3) Access and demonstration effect
- 4) Diversity in tribal groups, culture, geography and history
- 5) Risk of soil erosion
- 6) Potential for development (wide open area for reforestation)

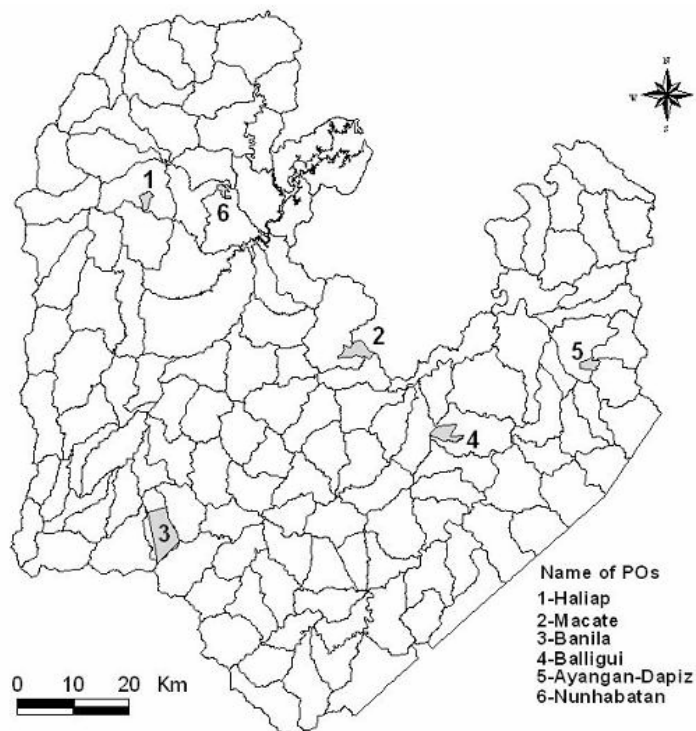
In the course of short-listing, POs with on-going foreign assisted projects or land conflicts were excluded

Among the 10 candidate POs, the Regional Steering Committee for the Study made final selection of the following six POs

Target Communities of Pilot Project

Location	Name of PO
Banila, Dupax del Sur, Nueva Vizcaya	Banila Community-Based Cooperative, Inc.
Balligui, Maddela, Quirino	Balligui Community Forestry & Development Cooperative, Inc.
Sitio Dapiz, San Augustin, Isabela	Ayangan Dapiz Agro-Forestry Development Association
Sitio Nunhabatan, Hapid, Lamut, Ifugao	Nunhabatan Greeners Livelihood Association
Haliap, Asipulo, Ifugao	Hojap Multipurpose Cooperative, Inc. (MPCI)
Macate, Diffun, Quirino	Macate Watershed Economic & Development MPCI.

Source: JICA Study Team



The first four communities were the POs with CBFM Agreements (CBFMA) subject to the area development and management, and the last two POs were non-CBFM ones subject to community organizing and CBFMA acquisition.

5.4 Methodologies

The Pilot Study was executed in accordance with the following procedure.

Flow of Pilot Study

Pilot Project	Pilot Study	Output
Preparatory work for implementation of the Pilot Project		Implementation Program (I/P)
1st year implementation	Setting study subjects	Mid-term evaluation of Pilot Project
	Evaluation of the Pilot Project	
	Analyzing and interpreting the performance	
Preparatory work for implementation of the second year Pilot Project		Updated I/P
2nd year implementation	Review and revision, if necessary, of the subjects based on analyzing and interpreting the performance	Terminal evaluation of Pilot Project
	Re-setting study subjects, if necessary	
	Evaluation of the Pilot Project	
	Examination of study subjects and factors	Report on Pilot Study
	Generalization of findings and lesson learned	

Source: JICA Study Team

The analysis of the Pilot Project results and factors affecting the results was completed through regular monitoring and evaluation, and the Study subjects were examined based on the results of the analysis.

5.5 Implementation Framework of the Pilot Study

The Study Team contracted out: i) the CBFMA area development and management to the POs concerned; and ii) the PO capacity building and strengthening of DENR/LGU to a local NGO.

DENR created four PPMOs within the CENROs concerned and dispatched counterpart personnel of the Study Team. Assuming the implementation framework of the M/P, the PPMO was expected to act as the representative of the owner of the Pilot Project. The counterpart personnel assisted the Study Team in managing the implementation of the Pilot Project.

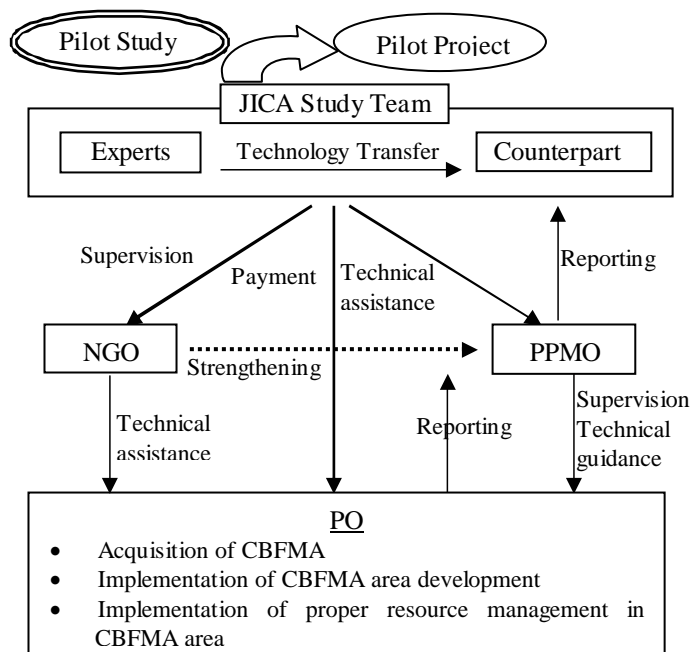
PPMOs consisted of following personnel components.

Units	Name of PPMO			
	Dupax	Diffun	S. Isidro	Lamut
PPM Officer	1	1	1	1
Community Organizing & Strengthening Unit (COSU)	0	2	0	2
Implementation Unit (IU)	3	4	3	3
Extension Unit (EU)	3	3	3	1
Administrative Support Unit (ASU)	3	3	3	3
Total	10	13	10	10

Source: JICA Study Team

The Study Team managed the Pilot Project and at the same time supervised the performance of the NGO and inspected the PO's activities, and transferred technology to the counterpart personnel. The major role of the Study Team was to evaluate the Pilot Project through examining, analyzing and generalizing its process and results, and to refine the draft M/P taking into account the results of evaluation.

For the institution above to operate for the execution of the Pilot Project and Study, a total of ₱13,933,000 was allocated as the financial inputs, not including the consulting services of the Study Team.



Financial Input for Pilot Project and Study

	Items	Amount (₱)
1	CBFMA Area development and management	3,590,000
2	Community based enterprise development	1,080,000
3	Rural infrastructure	550,000
4	PO capacity building	1,790,000
5	Institutional strengthening	1,470,000
6	Assisting organization (the NGO)	4,630,000
7	PPMO operation	403,000
8	Travel allowance for counterparts	420,000
	Total	13,933,000

Source: JICA Study Team

5.6 Results of the Pilot Project

5.6.1 Preparatory Work and Designing of the Pilot Project

The activities and outputs listed below show the results of preparatory work and designing of the Pilot Project.

Outcomes of Preparatory Work and Designing of Pilot Project

Activity	Outcome
1 Establishment of PPMO	- 4 PPMOs established and counterparts
	- 403,000 pesos and other equipment (office space, computer units, motorcycles, survey tools and GPS) allocated for PPMO operations
	- Operation manuals formulated and explained

2 Surveying	- CBFM areas delineated or reconfirmed
	- Soil survey of 4 target CBFMA areas
	- Forest resource inventory of Balligui CBFMA area
	- Preliminary study on community-based enterprise
	- Baseline survey of 6 target POs
	- Study on social development potential of 6 target POs
3 Participatory Diagnosis and Planning	- 2 PRA reports produced
	- 6 Community Resource Management Framework formulated/ revised
	- 4 Annual Work Plan formulated through community action planning (CAP)
	- Implementation Program (I/P) with technical specifications, work schedule and cost estimate for the Pilot Project formulated
4 Contracting	- 4 contractors (POs) procured for CBFMA area development
	- 1 local NGO (PRRM) procured for community organizing PO capacity building and strengthening of DENR/LGU

Source: JICA Study Team

5.6.2 Community Re-organizing and PO Formation/Reformation

Two multi purpose cooperatives in Macate and Haliap were re-organized into CBFM POs. In addition, four CBFM POs in Banila, Balligui, Nunhabatan and Dapiz were revitalized. For this, the following activities were executed:

- a) CBFM campaign and preliminary identification or reconfirmation of CBFM area
- b) Master listing of occupants and users in CBFM Agreement (CBFMA) area
- c) Re-vitalization and re-establishment of PO
- d) Recruitment of PO members
- e) Acquisition of CBFMA (Macate and Haliap areas only)

To the CBFM campaign, 566 participants joined the activities organized by the PPMOs and the NGO. During the campaign, information regarding the CBFM program was disseminated to LGUs and local people, and preliminary CBFMA areas in Macate and Haliap were identified with the consensus of stakeholders and local people. The CBFMA areas of the other four POs were confirmed.

As a result of master listing, a total of 915 households of occupants and users in the six CBFMA areas were identified, of which 299 households were organized into the CBFM POs as shown in the table below.

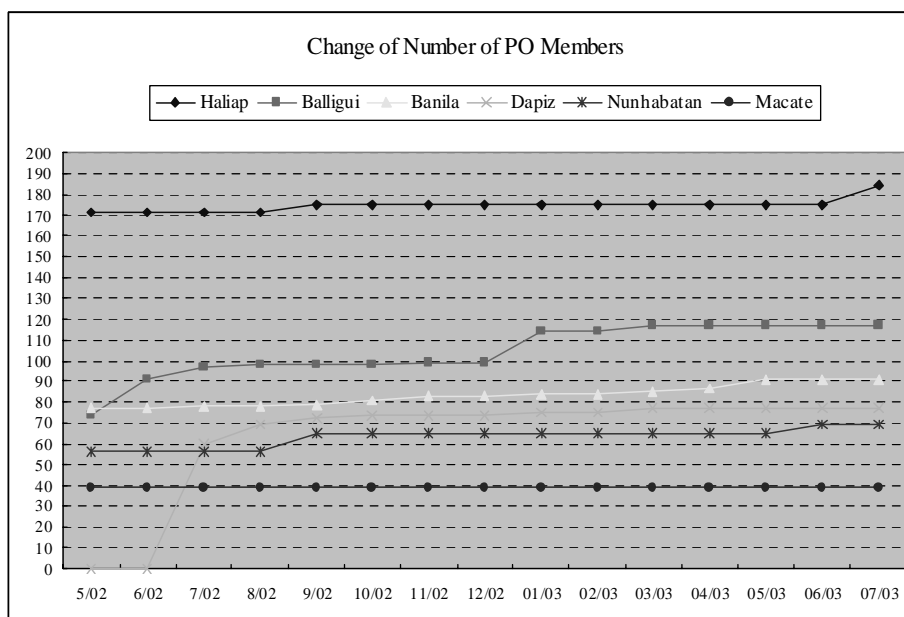
Organizing Ratio of CBFM Area Occupants and users

	Number of CBFM area occupants and users (household)	Number of PO members (household)	Organizing ratio
Banila	430*	58	13.5%
Balligui	59	40	67.8%
Dapiz	88*	42	47.2%
Nunhabatan	71	51	71.8%
Macate	83*	27	32.5%
Haliap	184*	81	44.0%
Total/Average	915*	299	32.7% (49.7% except Banila)

Source: JICA Study Team

* Not verified on the ground. More CBFM area occupants and users possibly exist.

The CBFM PO members increased gradually as a result of the CBFM campaign, master listing and recruitment activities by the POs assisted by the NGO, as shown below.



Source: JICA Study Team

Note: At the beginning of the Pilot Project, the PO in Dapiz had no membership list, and no one paid a membership fee. In this sense, the PO existed just on paper, and it is considered that there were no members upon the start of Pilot project, and the PO existed

5.6.3 Area Development

The following table shows the summary of area development results.

Accomplishment of Area Development

Component	Accomplishment of Pilot Project				
	Banila Area	Balligui Area	Dapiz Area	Nunhabatan Area	Total
1 Forest Tree Plantation Establishment	65 ha	25ha	14 ha		104 ha
2 Agroforestry Plantation Establishment	5ha	25 ha	38 ha	31 ha	99 ha
3 Demo Farm Establishment	-	1.0 ha	1.0 ha	1.0 ha	3.0 ha
4 Fire Control					
- Fire line establishment and maintenance	1 km	-	-	1.6 km	2.6 km
- Firebreak establishment and maintenance	1.5 km	-	-	3.0 km	4.5 km
- Lookout tower construction	2m x 2m	-	-	2m x 2m	2 units
- Patrol	Watchman	-	-	Watchman	-
5 PO Building construction	Renovation	6 m x 6m	6m x 6m, 6m x 6m	6m x 6m	5 units
6 Rehabilitation of Feeder Roads	3.5km	3.5 km			7.0 km
7 Community-Based Enterprise Development	2 net houses for cut flower production	Cattle breeding 11 head	Cattle breeding 15 head	Cattle breeding 13 head	2 net houses, 39 head of cattle

Source: JICA Study Team

A part of maintenance (weeding) and mortality replacement were not completed within the contract period. Road rehabilitation of Balligui was partially incomplete due to the weather condition.

The quality of work completed in comparison with the technical specification was satisfactory in general, except the maintenance of demonstration farms in Balligui and Dapiz areas.

Survival rate of forest trees and agro-forestry plantation was checked in July-August 2003. The result of the inventory is summarized below.

Species	Planted (nos.)	Survived (nos.)	Survival rate (%)
Banila			
1. Forest Tree Plantation (40 ha)			
- Gmelina	34,380	32,060	93.3
- Mahogany	8,720	8,020	92.0
Total	43,100	40,080	93.0
2. Agro-forestry Plantation (5 ha)			
- Citrus (Ponkan)	240	240	100.0
- Citrus (Pomelo)	720	480	66.7
- Guyabano	1,440	1,380	95.8
Total	2,400	2,100	87.5
Balligui			
1. Forest Tree Plantation (25 ha)			
- Gmelina	19,533	15,445	79.1
- Mahogany	7,050	5,883	83.4
Total	26,583	21,328	80.2
2. Agro-forestry Plantation			
- Citrus (Ponkan/Mandarin)	1,400	1,276	90.1
- Citrus (Pomelo/Dalanghita)	1,352	1,261	93.3
- Lanzones	1,410	1,124	79.7
- Rambutan	1,339	1,190	88.9
- Mango	462	461	99.8
Total	5,963	5,312	89.1
Dapiz			
1. Forest Tree Plantation (14 ha)			
- Gmelina	6,124	3,044	49.7
- Mahogany	2,071	1,351	65.2
Total	8,195	4,395	53.6
2. Agro-forestry Plantation (38 ha)			
- Mango	331	274	82.8
- Coconuts	1,277	632	49.5
- Other fruit trees	5,567	4,064	73.0
Total	7,175	4,970	69.3
Nunhabatan			
1. Agro-forestry Plantation (38 ha)			
- Gmelina	18,600	15,544	83.6
- Mango	837	814	97.3
Total	19,437	16,358	84.2

Source: Study Team

5.6.4 PO Capacity Building

PO capacity building (POCB) was contracted out to a local NGO. The NGO provided services in the preparatory work (some survey activities, participatory diagnosis and planning), community organizing, PO formation/reformation and organizational strengthening of POs during the area development activities. The NGO consisted of various specialist and community organizers who regularly visited and stayed in the target communities.

The services of the NGO were extended to six target communities/POs in providing technical assistance and facilitating 140 meetings, in which approximately 3,800 community people participated during the Pilot Project. With the assistance, community people executed the surveys, revised/formulated various plans, discussed environmental issues and tackled their organizational problems including PO policies, area conflicts, working group issues, financial reports, business plans, area development plans and monitoring and evaluation of their PO activities.

The NGO also conducted Training Needs Analysis (TNA) and provided 48 training sessions and 3 field trips to a total of some 1,400 participants for the 6 POs covering the following topics.

- 1) Training on Leadership, Duties and Responsibilities of Members & Officers I, II
- 2) Training on M&E
- 3) Financial Management Training I, II, III
- 4) PO Internal Audit Training
- 5) Cooperative Management Training
- 6) Training on Entrepreneurship
- 7) Training on Livelihood Project Management
- 8) Training on Project Proposal Writing
- 9) Training on Forest Protection
- 10) Training on IFS/SALT
- 11) Training on Cut Flower Production
- 12) Training on Handcraft (mat, hat and basket making)
- 13) Training on Silvo-pasture
- 14) Training on Soft Broom Making
- 15) Livestock Breeding Training
- 16) Field Trips to Baguio, Banila and Malabing Valley Cooperatives

The participants gained knowledge and skills through the training program. The following table shows the summary results of pre and post tests of training sessions.

Results of Pre/Post tests of PO Training

(Unit: point)

	Banila	Balligui	Dapiz	Nunhabatan
Pretest Total Score	720	451	417	489
Post test Total Score	1,123	939	864	763
Difference	403	488	447	274
Improvement per participant	4.7/15	5.5/15	5.1/15	4.0/15

Source: JICA Study Team

The NGO assisted the financial strengthening of the POs, and the POs increased their business capital as shown in the table below.

Result of Capital Build Up (Unit: Pesos)

Source	Banila	Balligui	Dapiz	Nunhabatan
Membership Fee	1,400	4,300	3,850	650
Other Fees & Dues	0	0	6,600	875
Capital Share	25,000*	21,474	N/A	N/A
Fund Raising	10,730	0	6,060	2,535
Subsidy	49,124	0	0	0
Savings from Pilot Project (year 1)	140,242	12,016	41,293	22,112
Savings from Pilot Project (year 2)	79,351	39,489	25,827	37,649
Direct Investment for PO Business (in kind)	236,544	217,600	287,840	270,176
TOTAL	515,991	294,879	371,470	333,997

Source: JICA Study Team *: The amount is approximate.

5.6.5 Strengthening of PPMOs

Selected personnel from DENR and LGUs were organized into the PPMOs and exposed to hands on experience and on-the-job training with regards to the expertise in preparatory work (various surveys and diagnosis of communities), community organizing and PO formation, participatory planning (AWP and CRMF), formulation of detailed technical specifications and work schedule, quality control, progress control and reporting. However, 22 out of 43 PPMO staff members actively participated to the Pilot Project, and the improvement of their expertise was limited to certain personnel.

The degree of improvement of those who actively took charge of the Pilot Project was also limited due to the short duration of Pilot Project. Upon the start of the Pilot Project, the TNA identified 149 key areas of expertise as weak for 16 samples of active PPMO personnel. At the end of the Pilot Project, it was found that 76 key areas were still weak, and 73 key areas of expertise were improved through their hands-on experiences during the Pilot Project.

The training program emphasizing the skills and knowledge of POCB, were organized through the NGO. A list and results of training provided for PPMOs is summarized below.

Number of Participants for PPMO Training*

Training Title	PPMO Dupax	PPMO Diffun	PPMO Lamut	PPMO S Isidro	Count-erpart	Others	Total
Public Sector Management Capacity Assessment	5	3	2	4	4	0	18
Community Organizing	4	6	6	5	4	0	25
Participatory Development	5	4	3	3	0	0	15
Training of Trainers	3	4	7	2	0	1	17
Organizational By-laws Formulation	7	9	7	5	2	9	39
Participatory Rural Appraisal	3	8	5	0	1	11	28
Cooperative Management	6	3	7	3	0	2	21
Entrepreneurship	1	3	5	0	0	3	12
Community Action Planning	6	7	5	4	0	21	43
TOTAL	40	47	47	26	11	47	218

* Participants who attended only one day of two-day training were not counted.

Source: JICA Study Team

In addition to those training sessions, the Study Team provided a tutorial for computer and GPS (Global Positioning System) operations to PPMO staff members directly.

The scores of tests at the beginning and end of training shows 43 PPMO staff members and 17 non-PPMO participants improved their understanding of the training topics, as shown in the table below.

Pre and Post test Results

Total Score of Pretests	Total Score of Post test	Score Increased*	Score Increased per Participant
473	1,740	701*	11.7

* A number of participants took only pre or posttest. Those scores were not included in the calculation of increased score.
Source: JICA Study Team

5.6.6 Consultation on the Establishment of a Watershed Management Council

Within the Upper Magat and Cagayan River Basin, there are areas that have conflicting uses. As a result, there is an overlap of jurisdiction among managing agencies. The above situation makes it difficult for any agencies, including DENR to manage in a sustainable manner the watersheds because of the divergent interests and objectives of various stakeholders. Such management requires a single organization that coordinates these varied and often conflicting interests and one that involves most if not all of the stakeholders.

The stakeholders must be willing to place themselves under a single entity, such as a watershed management council, and must be willing to abide by the collective decision of the entity.

The stakeholders must determine the needs, functions, structure, membership, rules, regulations, roles and responsibilities of the stakeholders, with which the entity operates. For this, the entity must be the result of consultation and consensus building among various stakeholders both inside and outside of the watershed.

Aware of the necessity for consultation and consensus building, DENR and the Study Team agreed to conduct, as part of the Pilot Project, the consultations among the stakeholders to examine the possibilities and process of such establishment. The table below shows the results of consultation meetings.

Results of Consultation Meetings for the Establishment of Watershed Management Council

Province	Date	Pax	Major Participants
Vizcaya	01/23/2003	27	Governor, ENRO, DENR, NIA, NAPOCOR, NGOs, POs
Ifugao	01/24/2003	20	Governor's office, Mayors, ENRO, DENR, OPA, NIA, NGOs
Isabela	03/ 5/2003	25	P. Administrator, DENR, Water District, NIA, NPC, Isabela State University
Quirino	05/15/2003	17	Mayors, DENR, PAENRO, Water District, NCIP, NGO, Quirino State College

Source: JICA Study Team

During those consultation meetings, the following issues and topics were discussed.

- 1) Conflicting policies on watershed management
- 2) Coverage and membership of the Council
- 3) Continuity of support to the Council
- 4) Sharing of cost and benefits in the watershed management
- 5) Information dissemination and education on watershed management

- 6) Population management
- 7) Human resource development
- 8) Preserving traditional/local resource management systems (i.e., *Muyon* and *Ala-a*)

5.7 Evaluation and Analysis of Pilot Project

To generate insights for the Master Plan, the following study subjects (research questions) were identified.

(1) Basic approach, overall process, time frame, institutional setup and input for CBFM implementation

- 1) What are the approaches, processes, time frame, institutional setups and inputs for a model CBFM program?

(2) Institutional Strengthening

- 1) What settings and conditions required for DENR and other stakeholders to execute field operations of CBFMP properly?

(3) Community organizing and PO formation

- 1) What are the conditions under which potential CBFM areas could be searched and preliminarily identified properly? What conditions facilitate the concerned LGUs and local leaders in building consensus for participating in CBFMP?
- 2) What are the conditions needed for the proper delineation of the CBFM area?
- 3) Under what conditions could the CBFM area users, occupants and claimants (i.e., potential PO members) be identified and listed adequately?
- 4) What conditions facilitate the consensus building and final selection of CBFM area among community people?
- 5) What are the conditions required for the community people to properly establish /re-establish PO (organizing of originators, formulation of by laws and PO policies, establishment of organizational structure, recruitment of members, collection of fees, election of directors and officers, official registration, etc.)?
- 6) Under what conditions could the proper processes for CBFMA acquisition take place?

(4) Community appraisal and participatory planning

- 1) What conditions are required to prepare the CRMF, AWP and Implementation Program (I/P) of the AWP through participatory plan formulation appropriately and accurately enough?
- 2) What conditions are required to apply a participatory approach properly in preparation?

(5) Implementation of CBFM by PO on contract basis (managerial aspect)

- 1) What conditions are required to appropriately pursue procurement procedures for the CBFMA area development and management with the POs?
- 2) What are the conditions required to manage and supervise the POs so that the POs comply with the scope of works and technical specifications in the agreed contract documents if it is impractical for the POs to apply clauses related to

penalties for non-observance of the agreement because, generally speaking, the POs are financially weak and have no marginal capacity to pay?

- 3) What are the required conditions in order that progress of the work could be properly evaluated and verified, and that progress payments could be appropriately pursued based on the verified progress?

(6) Implementation of CBFM by PO on contract basis (technical aspect)

- 1) What conditions are required to estimate the work period required for completing a scope of work agreed to in the contract documents?
- 2) What conditions are required to have the POs understand and implement the agreed scope of work and technical specifications?
- 3) What conditions are required for the PO to properly manage the CBFMA area after completing the contracted work?

(7) Roles/Impact of demonstration farms in CBFMA area

- 1) Did the demo farm provide expected impact to the PO members?
- 2) What conditions are required to exert the effect of the demo farm?

(8) Community-based enterprise development

- 1) What are the conditions needed for and facilitating/hindering factors affecting the effective and efficient establishment of PO business under the CBFMP?

(9) PO capacity building

- 1) What are the conditions under which the assisting organizations (e.g., NGO) appropriately provide services for the capability building of POs under the CBFMP?
- 2) What are the conditions under which the assisting organizations (e.g., NGO) properly assist the achievement of PO capability building under the CBFMP?

(10) Social development potential of the community for CBFM

- 1) What are the factors and activities that affect the enhancement of social development potential?

(11) Institutional framework for implementation of the CBFM program

- 1) Does DENR have the capability to establish and manage the CBFM Unit (at CENRO) as well as allocate personnel for the CBFMP?
- 2) Is DENR allocating its resources to fully support the CBFMP?
- 3) What are the conditions and key points of establishment and management of a mechanism through which all stakeholders for watershed management make decisions and work collectively?
- 4) What are the conditions for the establishment and management of a mechanism (such as a cost sharing mechanism) through which the government generates resources needed for CBFM program?

The Pilot Project was executed, monitored regularly and evaluated to derive the answers to the above questions so as to generate the recommendations for the Master Plan. Monitoring and evaluation were carried out at three levels. The first level of evaluation was conducted on a daily basis by the NGO and the PPMOs. The second level was the

monthly and quarterly monitoring and reporting by the Study Team, NGO and PPMOs. The third and final level of monitoring and evaluation was executed by the Study Team with the NGO, PPMOs and a local consultant at mid-term and the end of the Pilot Project in March and August 2003 respectively.

The physical outputs were monitored and evaluated comparing the planned quantities/qualities with actual outcomes validated through field inspections, and the process, manners and methods of activities were monitored through the review of documentations and field observations using the following analytical framework.

Analytical Framework

Area	Situation before Pilot Project	Activities and inputs	Present status	Factors affected changes		Lessons learned	Recommendation
				Facilitating	Hindering		

The result summary of analysis is summarized in **Chapter 6**.