

(5) Kaingin

The Philippine Government put in effect the Forestry Reform Code (PD No. 389, Revised May 1975, No. 705) in February 1974 for the purpose of nurturing the forest resources in an effort to prevent further deterioration, conserve the nation's land, and to promote the forestry industry so as to have forestry benefit the national interests over years to come. With respect to kaingin, the Code bans kaingineros from illegally occupying the state-owned land and encourages their settlement through transfer and zoning of settlement districts.

What kaingin does to land in the Philippines is, forests are burned down and root-crops, hill rice, corn, bananas, are grown. After two or three years, the land is deserted because the soils have become lean by that time allowing the growth of cogon (*Imperata cylindricum*) and other graminaceae plants making the regeneration of forest trees impossible. According to a World Bank estimate, there are some 7 million hectares (approx. 23% of the country's total land area) of such non-productive land deserted after felling useful trees and making them unrecoverable. Destruction of forests in this manner causes flooding and water shortage thus making agricultural highly unstable.

1. Institutional Programs and Systems

In view of the prevailing situation, the Philippine Government has instituted various programs and systems to promote settlement of kaingineros, creation of job opportunities, and agricultural activities to ensure increased incomes from multiple sources by encouraging them to raise a combination of plants like fast growing trees, fruits, flowers, etc.

Following are some of such programs.

① Forest Occupancy Management (FOM)

- This is intended to manage forest land occupants.
- Its major concern is kaingineros and afforestation is secondary in emphasis. Forestry as a component of agro-forestry concerns supply of firewood for household use, tree leaves for feeds, plants for fertilizers (including fruits), among others.
- It allows existing occupants (occupancy dating back to May 19, 1975, or before) to engage in agro-forestry on the land they have occupied provided that the land is no less than 7 ha. per family.
- It is applicable only to the existing occupants and it is

not permitted for outside residents to move into the state-owned forests to benefit from this program.

- The lease is good for only one generation of the family and not for inheritance.
- The Certificate of Stewardship is issued for a term of 25 years and renewable for another 25 years if so desired.
- Benefits to FOM participants to be provided by the government (Bureau of Forest Development) include security of land tenure, free supply of seeds and seedlings, technical assistance, marketing and cooperative management, construction of infrastructures and welfare facilities, loan-credits.
- Procedure for implementation of this program is as follows.
publicity -- census for FOM implementation to be taken on the basis of district offices -- planning for implementation -- surveying of occupancies -- issuance of permit (2 years) to program participants -- undertaking of agro-forestry by program participants -- providing assistances.
- The procedure for participants to follow is as follows.
- Report to district office for program participation and permission for land tenure -- file BFD Form No.4 -- pay fees for handling (5 pesos) and for affidavit (1 peso), no charge for lease.
- Above procedure is standard for FOM participants. When occupied land occurs in a national park or protective forest,

the occupants need to be moved to other state land for re-settlement where they can participate in the program. In this case, land is provided in the amount of no less than 3 ha. for farming and no more than 400 m² for residency.

② Communal Tree Farming (CTF)

- This is intended to promote communal afforestation.
- With respect to lands which urgently need afforestation, existing occupants and outside residents (including municipalities) as well are allowed to undertake agro-forestry in land lots as assigned to the extent of 3 ha. per family.
- A farmer is granted a 25-year term lease (Stewardship Agreement) renewable for another term.
- There is no charge for lease for the first 5 years and no more than 10 pesos/ha. for the 6th year and afterwards.
- The government provides seeds and seedlings, and guidance on marketing of products. Loans are also available for afforestation.
- CTF not only assists kaingineros but also promotes afforestation, which is undertaken by involving landowners and tree planters on equal terms. Types of trees encouraged for planting are, for fuels, fertilizers, and feeds, *Leucaena leucocephala*, and, for fast growing types, *Gmelina arborea*,

Albizzia falcataria, Eucalyptus deglupta, Endospermum peltatum. Participants are supplied with free seeds which they plant and grow on their land.

- The following procedure is followed. Secure land for CTF
 - have participants file application with appropriate district offices
 - land surveying by district offices
 - conclude agreement between BFD director and chief of municipality representing participants
 - allocate land to participating farmers.
 - issue permit to participants for use of land.
- CTF like FOM is based on PD No. 705 (Revised No. 1559) and governed by the Letter of Instruction No. 1260 and Ministry Administration Order No. 11. The funds for the program are covered by the government's budget for afforestation.

③ Family Approach Reforestation (FAR)

- This is to encourage settlement for reforestation.
- Existing occupants and outside residents are allowed to engage in reforestation in the land lot of 5 ha. per family of the state forests. They are also allowed to raise crops in between for a period of three years. They move to another lot after four years of afforestation.
- Participants are supplied with seedlings by the government and get paid on the incentive basis.

Unlike FOM and CTF, this is not based on a lease contract. Participants are basically government employees hired for agro-forestry. Its primary concern is promotion of afforestation and assistance to occupants is secondary.

- Legally, like CTF, FAR is based on MAO No. 11 which provides for details for implementation. Its fund is listed in the government's afforestation budget.

④ Similar Programs

- Tree Farm Lease (TFL): Participants, individuals or corporations, are granted a 25-year renewable lease to engage in agro-forestry in the state owned forest lands which are assigned in lots, one lot per family ranging 10 - 100 ha. More fruits and herbs are grown than trees.
- Industry Tree Planting (ITP): It allows corporations to lease national forest land for the purpose of timber production and not necessarily for agro-forestry. Participants are assigned 100 ha. or more of such land each.

2 Present Conditions of Kaingineros

"An Integrated Project for Kaingin Control in the Philippines"

was conducted over the period of December 1980 to February 1981 to investigate the actual conditions of kaingineros. It surveyed 444 kaingineros from the following five locations.

1. Diadi : Located in Nueva Vizcaya Province at Magat Reforestation site. 97 persons surveyed.
2. Atok : Along Halsema Highway leading from Baguio, Mountain Province, to Bontoc. 67 persons surveyed.
3. Balatan: Balatan Reforestation Project Site, Camarines Sur Province, along the sea coast. 110 persons surveyed.
4. Buhisan: Upstream of Buhisan Dam, Cebu. The area was deserted bare for long. 65 persons surveyed.
5. Malabog: Davao city. 105 persons surveyed.

There are regional differences among these five areas in natural environmental conditions and living conditions. Introduced here are the actual conditions of kaingineros in Didai and Atok of Luzon Island as seen from the results of the survey. A total of 444 persons were polled but there were not all of them responding to the survey so that some totals do not add to 100%.

Table 4-19. Present Conditions of Kaingineros

() = Respondents

	Diadi	Atok
1. Distribution based on birthplace	(97)	(67)
◦ Native to site	7%	99%
◦ Born in other place	93	1
2. Born in other place	(88)	(1)
◦ Birth place	51%	100%
◦ Not coming from birth place	49	0
3. Length of stay of responded-cooperators in their latest previous address prior to their transfer	(72)	(24)
◦ 1 - 5 years	32%	8%
◦ 6 - 10	34	13
◦ 11 - 15	1	4
◦ 16 - 20	15	8
◦ 21 - 25	6	8
◦ 26 - 30	1	21
◦ 31 - 35	6	4
◦ 36 - 40	4	17
◦ 41 -	1	17
4. Family sources of living before transferring to present residence	(79)	(67)
◦ Lowland farming	43%	1%
◦ Kaingin-making	32	96
◦ Others	25	3
5. Reasons why responded-cooperators transferred	(88)	(4)
◦ To own a parcel of land for farming	14%	
◦ Find a better living	25	50%
◦ To seek peace and security	19	
◦ To get employed	18	
◦ Parents brought them to the place.	14	
◦ Others	10	50
6. What former Kaingineros did?	(25)	(18)
◦ Abandoned	76%	78%
◦ Give it to care of others.	24	0
◦ Sold.	0	22
7. Mode of acquiring present kaingin	(97)	(67)
◦ Cleared it myself.	89%	79%
◦ Bought it.	9	0
◦ Inherited it.	0	21
◦ Others	2	0
8. What cooperators plan to do with their present kaingin.	(95)	(65)
◦ Develop and stay permanently.	95%	98%
◦ Develop it and sell it later.	5	2

		Diadi	Atok
9. Progress of planting with permanent crops		(97)	(56)
	◦ Fully planted.	55%	77%
	◦ Not fully planted.	45	23
10. What cooperate intend to do with permanent crops.		(53)	(21)
	◦ Continue carrying the crops.	92%	76%
	◦ Sell it for an amount.	6	10
	◦ Enlarge it.	2	14
11. How many years before they could fully plant?		(35)	(21)
	◦ 1 year	23%	0
	◦ 2 years	49	0
	◦ 3 years	17	10
	◦ 4 – 7 years	11	90
12. What the cooperators intended to do after fully planted?		(103)	(1)
	◦ Continue carrying for crops	43%	100%
	◦ Work for release	21	0
	◦ Construct terraces	10	0
	◦ Use as collateral	10	0
	◦ Give to children.	8	0
	◦ Enlarge it.	8	0
13. Number of cooperators who have kaingins in other places.		(97)	(32)
	◦ Having	4%	91%
	◦ Non	96	9
14. Numbers of cooperators who having problems about their kaingins.		(90)	(32)
	◦ Having	44%	92%
	◦ Non	56	9
15. Number of children		(92)	(31)
	◦ Minimum	1	0
	◦ Maximum	9	12
	◦ Average	4.5	5.8
16. Spouse		(91)	(37)
	◦ Yes	98%	92%
	◦ No	2	8
17. Other source of family income.		(36)	(54)
	◦ Business	33%	0%
	◦ Daily labor	28	48
	◦ Logging	22	—
	◦ Monthly employment	11	37
	◦ Others	6	15
18. Income-producing activities.		(287)	(183)
	◦ Fruit tree growing	31%	32%
	◦ Intercropping	32	6
	◦ Fire wood production	32	8
	◦ Terracing	5	32
	◦ Livestock production	0	7

		Diaki	Atok
	o Sericulture	0	11
	o Christmas tree growing	0	4
19. Fruit tree planting or cropping place.		(97)	(56)
	o Kainginous	100%	86%
	o Lowland farm	0	14
20. Tree growing		(97)	(67)
	o Planting	77%	94%
	o Not planting	23	6
21. Tree planting utilization purpose		(75)	(63)
	o Mainly for lumber	100%	0%
	o For firewood	0	100
22. Number of selling firewood		(75)	(63)
	o Selling	0%	6%
	o Not selling	100%	94
23. Members or not members of the cooperative		(91)	(25)
	o Yes	23%	56%
	o No	77	44
24. Benefiting from their cooperative		(22)	(13)
	o Yes	95%	69%
	o No	5	31
25. Expectation of their cooperatives in future		(18)	(14)
	o Coop with give benefit	94%	93%
	o Coop could not give benefit.	6	7
26. Raising livestocks or not.		(97)	(47)
	o Yes	100%	79%
	o No	0	21
27. Kind of livestocks want to raise.		(75)	(30)
	o Cattle	18%	17%
	o Goat	0	3
	o Pig	0	13
	o Carabao	27	7
	o Chicken	0	60
	o Work animal	55	0

Table 4-20. List of Agricultural Crops,
Fruit Trees, Trees and Livestocks

Kindr	Diadi	Atok	Kinds	Diadi	Atok
Agricultural crops			Guayabano	○	—
Rice	○	—	Juckruit	○	○
Corn	○	○	Mango	○	○
Ginger	○	—	Orange	—	○
Camato	○	○	Santol	○	—
Cassava	○	○	Star apple	○	—
Gabi	○	○	Pomelo	—	○
Beans	○	○	Tamarind	○	—
Squash	○	○	Chesa	○	—
Tomatoes	○	○	American plum	—	○
Ubi	○	—	Pakak	○	—
Peas	○	○	Maboio	○	—
Tuguc	○	—	Total	15	11
Eggplant	○	—	Trees		
Sayote	—	○	Ipil - Ipil	○	○
Potatoes	—	○	Benguet pine	—	○
Cabbages	—	○	Alnus	—	○
Pepper	—	○	Gmelia	○	—
Mongboc	—	○	Eucalyptus	—	○
Pechay	—	○	Total	2	4
Total	13	14	Livestock		
Fruit trees			Chicken	○	○
Coffee	○	○	Goat	○	○
Cacao	○	○	Pig	○	○
Avocado	○	○	Carabao	○	○
Bananas	○	○	Duck	○	○
Coconuts	○	—	Cattle	○	○
Citrus	○	○	Total	6	6
Guava	—	○			

Table 4-21. Problems on the Development of Kainginous

Study Content	Problems and Wanted
1. Problems on Kaingin	<ul style="list-style-type: none"> ○ Lack of money for buying feritizers ○ Plant pests and disease ○ Destroyed by typhoons ○ Passers by crops ○ Lack of water
2. Reason why not planting trees for lumber or firewood and coffee cacao growing .	<ul style="list-style-type: none"> ○ No seedling ○ Shadow making ○ Usualy firing for camate growings ○ No places for planting ○ Shortage firm area ○ Time shortage
3. Problems for growings	<ul style="list-style-type: none"> ○ Lack of capital ○ Do not know where to buy. ○ To small pasture land
4. Sericulture	<ul style="list-style-type: none"> ○ The materials for the sericulture house such as wood, bamboos, cogon and others which are locally available and not expensive. The cost of silk worm eggs is high and if PTRI no help only few Kaingineros could afford to buy them.
5. Anticipating future benefits from their co-operative projects.	<ul style="list-style-type: none"> ○ Become owner of the forest. ○ Free seedlings ○ Road maintenance ○ Proved loans to finance ○ Help more livestocks ○ Free from water shortage
6. Anticipating future benefits from cooperatives	<ul style="list-style-type: none"> ○ Become owners of land. ○ Acquire forest occupancy permit ○ Get higher income from their cooperatives ○ Get better prices for their product.
7. Suggestions to fully protect forest of the government	<ul style="list-style-type: none"> ○ Planting for Kaingineros control. ○ Planting permanent crops ○ Protection of the forest fire. ○ Follow forest rules and regulations.

Kaingineros desert their land once it loses fertility and move on to another part. They tend to move from lowland to higher mountains in search of foods under pressures of population increases. Thus kaingin has eroded forest lands.

The government has taken a series of measures to cope with this problem by encouraging the settlement of kaingineros and promoting the protection of forest resources for erosion control, for example.. But the ramifications of the problem are wide-ranging as seen in Table 4-21, to the extent that they seem to be more than can be controlled by individual measures. What is required is not only such specific measures dealing with ownership, funds, infrastructures, but a comprehensive approach including technical aspects.

3 Destruction of Forests by Kaingin

The Philippine Forestry Statistics defines kaingin as, in effect, such parts of forest land, occupied or deserted, where trees were felled and burned for good for the purpose of cultivation of small portion thereof without erosion control.

Table 4-22~25 tabulates the causes of forest destructions

during the five years of 1980 - 1984. The table shows kaingin and forest fires as two major causes with about 20% and 50% respectively, while tree cutting which accounted for 25% in 1982 dropped sharply thereafter.

According to the FAO/UNEP study (1981) on north and north-central of Luzon, there are several types of kaingin and their impacts on forests are varied. Those indigenous tribal people who live deep inside the forests are decreasing in number with little impact on forests though constantly on the move. The types of kaingineros that pose problems are those local people who without land of their own move into cut-over forest lands right after the trees were felled in search of food.

The number of such people is on the increase seriously affecting the forests. There is a close relationship between timber cutting and shifting cultivation. That is, there is an easy access to the cut-over area because it has a road built for timber transportation, and with trees removed, it is easier for cultivation. Also trees are usually cut first on slopes where the work is easier for both felling and cultivation.

In the river basin of this study, there are some 21,000 fami-

lies of kaingineros living who cut forests of about 6,000 ha. annually. (Table 4-26) Of these kaingin families, some 10,000 are more settled moving only temporarily for cultivation. This type of kaingineros cut an average of 0.05 ha/year per family of forest land.

There is another type that is settled but more on the move. This type is concentrated in the mountains. There are some 5,000 families of this type cutting an average of 0.2 ha/year per family.

Semi-nomadic kaingineros fell an average of 1 ha/year per family for moving types and 0.4 ha./year for settled types. There are differences between settled types and moving types in the extent of their impacts on forest land but both are destroying forests anyway, and there is the urgent need for measures to stop it.

Table 4-22. Forest Destruction

Year	Total		Kaingin		Forest Fire		Logging		Pest & Diseases		Others	
	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%
1980	32,640	100.0	6,320	19.3	18,324	56.1	7,348	22.5	112	0.3	554	2.0
81	24,605	100.0	5,826	23.7	12,471	50.7	6,108	24.8	200	0.8	--	--
82	16,654	100.0	3,286	19.7	8,063	48.4	4,954	29.8	351	2.1	--	--
83	121,326	100.0	2,241	1.9	117,951	97.2	1,015	0.8	119	0.1	--	--
84	4,895	100.0	1,137	23.2	3,177	64.9	4,780	9.8	6	0.1	97	1.8

Source: Philippine Forestry Statistics

Table 4-23. Forest Destruction by Region (1981)

Region	Total		Kaingin		Forest Fire		Logging		Pest / Diseases		Others	
	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%
Total	24,605	100.0	5,826	23.7	12,471	50.7	6,108	24.8	200	0.8	--	--
REGION I	6,994	100.0	6	0.1	6,896	98.6	92	1.3	--	--	--	--
II	2,876	100.0	816	28.4	686	23.9	1,174	40.8	200	6.9	--	--
III	2,343	100.0	400	17.1	1,897	80.9	46	2.0	--	--	--	--
IV	1,742	100.0	1,039	59.6	320	18.4	383	22.0	--	--	--	--
V	418	100.0	145	34.7	188	45.0	85	20.3	--	--	--	--
VI	2,307	100.0	393	17.0	1,639	71.1	275	11.9	--	--	--	--
VII	343	100.0	231	67.3	112	32.7	--	--	--	--	--	--
VIII	427	100.0	2	0.5	1	0.2	424	99.3	--	--	--	--
IX	636	100.0	99	15.6	--	--	537	84.4	--	--	--	--
X	4,068	100.0	2,403	58.8	577	14.1	1,108	27.1	--	--	--	--
XI	1,563	100.0	188	12.0	--	--	1,375	88.0	--	--	--	--
XII	868	100.0	104	12.0	155	17.9	609	70.1	--	--	--	--

Table 4-24. Forest Destruction by Region (1982)

Region	Total		Kaingin		Forest Fire		Logging		Pest & Diseases		Others	
	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%
Total	16,654	100.0	3,286	19.7	8,063	48.4	4,954	29.8	351	2.1	--	--
REGION I	2,776	100.0	24	0.9	2,680	96.5	72	2.6	--	--	--	--
II	2,590	100.0	760	29.4	977	37.7	853	32.9	--	--	--	--
III	1,451	100.0	--	--	1,075	74.1	30	2.1	346	23.8	--	--
IV	1,155	100.0	465	40.3	399	34.5	291	25.2	--	--	--	--
V	173	100.0	32	18.5	105	60.7	36	20.8	--	--	--	--
VI	1,952	100.0	155	7.9	1,674	85.8	123	6.3	--	--	--	--
VII	749	100.0	309	41.3	174	23.2	261	34.8	5	0.7	--	--
VIII	572	100.0	14	2.5	320	55.9	238	41.6	--	--	--	--
IX	939	100.0	299	31.8	2	0.2	638	68.0	--	--	--	--
X	2,204	100.0	81	40.0	396	18.0	927	42.0	--	--	--	--
XI	1,454	100.0	300	20.6	155	10.7	999	68.7	--	--	--	--
XII	639	100.0	47	7.3	106	16.6	486	76.1	--	--	--	--

Table 4-25. Forest Destruction by Region (1984)

Region	Total		Kaingin		Forest Fire		Logging		Pest & Diseases		Others	
	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%
Total	4,895	100.0	1,137	23.2	3,177	64.9	478	9.8	6	0.1	97	2.0
REGION I	1,749	100.0	-	-	1,741	99.5	8	0.5	-	-	-	-
II	141	100.0	25	17.7	116	82.3	-	-	-	-	-	-
III	678	100.0	9	1.3	669	98.7	-	-	-	-	-	-
IV	159	100.0	117	69.2	38	22.5	14	8.3	-	-	-	-
V	35	100.0	31	88.6	1	2.8	3	8.6	-	-	-	-
VI	234	100.0	47	20.1	187	79.9	-	-	-	-	-	-
VII	225	100.0	209	92.9	10	4.4	-	-	6	2.7	97	80.2
VIII	121	100.0	-	-	24	19.8	-	-	-	-	-	-
IX	518	100.0	65	12.5	-	-	453	87.5	-	-	-	-
X	909	100.0	528	58.1	381	41.9	-	-	-	-	-	-
XI	89	100.0	83	93.3	6	6.7	-	-	-	-	-	-
XII	27	100.0	23	85.2	4	14.8	-	-	-	-	-	-

Table 4-26. Moving Tayypes of Kaingineros

Type	Vegetation Types	Cultivation (years)	Cutting Times	Rest Term (year)	Cutting Area Planting	Destruction		Families	Cutting Area (ha/year)
						Tree	Soil		
A. Settled									
1. Temporary	Open grass, Bush.	3 ~ 5	2 ~ 3	3 ~ 5	Generally	Slight	Very Hard	10,000	500
2. Continuous	Grass, Bush, Part of Forest.	2 ~ 4	2 ~ 3	4 ~ 6	Generally	Middle	Very hard	5,000	1,000
B. Semi-nomadic									
1. Lowland Peoples	Neighbouring Cutting Area of Alienation	2 ~ 3	1 ~ 2	5 ~ 10	Usually	Big	Hard	1,000	1,000
2. Native Peoples	Cut Over Forest	1 ~ 2	1 or 2	10 ~ 20	Seldom	Big	中	2,500	2,500
3. Settled Natives	Virgin Forest	1 less	1	Permanent	Seldom	Severe,	Slight	2,500	1,000
							Total	21,000	6,000

Source: FAO/UNEP, Project Report of Tropical Forest Resources Evaluation, 1981

(6) Forest Development

1. Forestry of Natural Forests

Forestry in the tropical rain forest zone has so far depended on felling of natural forests and natural regeneration of secondary forests. But as the regional development proceeds, the forest land is decreasing in area. Moreover, since natural recovery is not satisfactory and hence the deterioration of quality of forest resources.

As a result, natural regeneration as a means of forest development tends to be ignored in favor of reforestation. But in such areas where regeneration is needed but made difficult by topography and vegetation, natural regeneration should be given renewed attention and encouragement as an effective means of forest development.

Forests in the Philippines are classified into six types (Forest Types), by tree types, i.e., Dipterocarp Forest, Pine Forest, Mangrove Forest, Coastal Forest, Mossy Forest, and Monsoon Forest. The study area has Dipterocarp forests, pine forests, and mossy forests, which are described respectively below.

a. Forestry of Dipterocarp Forests

This type of forests is distributed in areas ranging in elevation from lowland up to 1,200 meters and having a short spell of raining season or rainfalls evenly distributed throughout a year. By tree types, major species include: *Shorea negrosensis* (red lauan), *Shorea Ploysperma* (tangile), *Shorea squamata* (Mayapis), *Pentacme contrata* (white lauan), *Dipterocarps grandiflorus* (apitong).

Selective logging is standard for this type of forests but in exceptional cases, total logging is allowed for fast growing afforested trees for pulp production. By selective logging, matured and overmatured trees, and defective trees are selectively cut leaving an adequate number of healthy succeeding trees to ensure regeneration and conservation of forest resources. It consists of three stages of work: tree marking, residual inventory taking, and timber stand improvement.

b. Forestry of Pine Forests

This type occurs as *Pinus Kesiya* in northern mountains of Luzon. the seed-tree silvicultural system is practised for this type of forests. Seed trees are chosen based on their locations

being suitable for seed production and natural seeding, and usually 40 cm or more in diameter at breast height. 16 to 20 such trees are left per hectare.

c. Forestry of Mossy Forests

This type occurs in areas of higher elevations than those of Dipterocarp forests. Low in commercial value, they are important for watershed preservation and protection from soil erosion. Usually treated as Unproductive Forest.

2. Forestry of Afforested Forests

As mentioned previously, natural regeneration has failed resulting in deterioration of forest resources. It is partly due to the highly complex composition of tropical rain forests being comprised by hundreds of kinds of trees per hectare. And succeeding trees can hardly be expected to follow in the same manner as the previous growth. In such areas, afforestation should be conducted as part of a useful forest resource production system.

a. Site classification

Effective afforestation requires planting of the right trees at the right locations and site classification accordingly using topography, vegetation, soils, as important factors. The classification system of four categories applied in the Pantabangan Project is considered appropriate. In specific application, there might be areas where this system of classification is not appropriate but from the macro standpoint, it should serve as a useful tool for determination of suitable tree types and sites.

Table 4-27. Comparison of Candidate Sites

	Suitable Tree Species
I	<i>L. leucocephala</i> , <i>G. arborea</i> , <i>G. sepium</i> , <i>Samanea saman</i>
II	<i>A. auriculformis</i> , <i>Pinus</i> spp., <i>G. arborea</i> , <i>V. parviflora</i>
III	<i>Pinus</i> spp., <i>G. arborea</i> , <i>Pterocar put</i> spp, <i>V. parviflora</i>
IV	<i>T. grandis</i> , <i>S. macrophylla</i> , <i>Pterocarpus</i> spp., <i>S. saman</i>
V	<i>C. equisetifolia</i> , <i>T. grandis</i> , <i>S. macrophylla</i> <i>Pinus</i> spp., <i>S. saman</i> , <i>C. equisetifolia</i> , <i>A. auriculformis</i>
VI	<i>C. equisetifolia</i> , <i>A. auriculformis</i> , <i>P. malabaricum</i>

Source: Pantabangan Forestry Development Cooperation Plan,
3rd Term Specialist Report, 1984. 2.

b. Tree species

There are more than 20 species that have been planted for afforestation in the past in the study area, and depending on their growths, they have since been screened out. The important criteria for selection of species are survival rates and growth volumes, which, however, vary significantly depending on the conditions of a site, method of planting, maintenance, etc. Therefore, by reviewing the records carefully the selection should be finalized in stages.

The following species are considered promising for future planting according to the above report.

Gmelina arborea	Pinus caribaea	Casuaria equisetifolia
Acacia auriculiformis	Pinus oocarpa	Pterocarpus spp.
Eucalyptus camaldulensis	Leucaena leucocephala	Swietenia macrophylla
Pinus kesiya	Tectona grandis	

Table 4-28. Planting Species Study

Species	Suitability by Site Class						Pantabangan Test								
	I	II	III	IV	V	VI	Survival	Hight	Diameter	Synthesis	Mix	Bleeding	Fast growth	Long term hardwood	Judge
Pinus kesiya		○	○		○			○	○	⊙		○		○	⊙
Pinus caribaea		○	○		○									○	○
Pinus oocarpa		○	○		○				○					○	○
Pinus slash		○	○		○										×
Leucaena leucocephala	○						○	○	○	○		○			○
Tectona grandis				○	○		○			○				○	○
Acacia auriculiformis					○	○	○	○	○	⊙	A, C	○	⊙		⊙
Gmelia arborea	○	○	○				○			⊙	B	○	⊙		⊙
Casuaria equisetifolia					○	○		○		○					○
Pterocarpus spp.		○	○	○						○	B, C			⊙	⊙
Swietenia macrophylla				○	○						A			○	○
Eucalyptus camaldulensis										○			○		○
Glicida sepium	○														×
Vitex parviflora		○	○												×
Samanea samon	○			○	○										×
P. malabaricum						○									×

c. Afforestation

Each process starting with land preparation must be followed with utmost care, and this is most important to raise the survival rate and growth volume.

(a) Land preparation:

Timing - April to June

Since planting takes place from mid-June to early September, land preparation needs to be done by early June. It coincides with the time for rice planting making it difficult to secure labor. Use of machinery also is restricted by the demand for the same by forest road construction and repairs which usually take place in the first half of the dry season. Tree planting during the rainy season is not desirable since it affects the physical properties of soils adversely.

Method - Machinery planting

The use of a bulldozer is effective for large tracts of land by economy of scale and also for improving physical properties of soils and restraining the growth of grass.

For reference, a procedure of land preparation by manpower is described below.

- (i) Planting locations are staked individually.
- (ii) Area surrounding the planned planting location is weeded.
- (iii) A hole of 30 cm in length, width, and depth is dug. 20 such holes are made per person per day.
(Soils are assumed to be hard.)

(b) Planting

There are pot seedling and bare seedling. Care should be taken so that roots be not dried. They should be wrapped up by banana leaves in Transit. Transplanting must be done using flowing water so as to prevent roots from rotting. Direct sunlight should be shunned. It is important to fix root collars at the ground surface, not too deep because it would retard growth and not too shallow because it would dry up. Seedlings as planted could be protected from drying by stepping over the roots. Planting should be complete 2 to 3 weeks before the dry season sets in. For bare seedlings, at least three weeks are required to ensure growth of new roots.

There are two types of planting intervals:

2m. X 3m. (1,667 seedlings/ha.)

3m. X 3m. (1,111 seedlings/ha.)

Biennial *Acacia auriculiformis* is recommended for more use because its better survival rate.

Fertilizers. Soils in the study area are lean being high in pH value. Administration of about 30 grams of chemical fertilizers per hole is deemed useful. Necessary amounts of fertilizers can be calculated for each species for good growth.

(c) Nursing

Weeding is a main thing to do during this process. And this should continue until seedlings grow larger than grass. Major species are *Imperata cylindrica* and *Themeda fraindra*. No need of nursing for *Acacia auriculiformis* after two years depending on locations whereas *Pterocarpus* spp. *Tectona grandis* needs care for three years because of its slower growth.

Weeding is to be done in a radius of 1.5 meters from each seedling. Sometimes the leaves of seedlings may turn

yellow in two years time after planting. It is an indication of shortage of water and fertilizers and, therefore, additional fertilizers might need to be administered to the land where afforestation has been made for one to two years.

(d) Family Approach Afforestation

This is a scheme instituted in 1981 in which land lots of certain sizes are supplied to local residents for management and afforestation. They get paid for what they have accomplished in afforestation to be done in a set period of time. Each family is responsible for all the processes from seedling production to planting for their assigned land lot ranging from 2 to 4 hectares.

Purpose:

- To raise interest of citizens in forests and forestry.
- To prevent forest fires.
- To raise living standards by increased household income which is expected to amount to 7,000 - 8,000 pesos per annum.

Terms of contract:

- Residents must produce seedlings for themselves.

- Incomes can vary from year to year depending on achievements.

Results:

There has been no forest fire within the project area. Fruits and cattle are allowed to raise but there has been no case of actually doing either of them. Fruits suitable for raising in the project area are as follows.

- *Artocarpus heterophylla*
- *Naugitera india*
- *Anacardium occidentale*

Future tasks:

- Allowable range of fruit growing should be defined.
- Ownership of orchards after expiration of 3-year contract should be defined.

Understanding and cooperation of local citizens are essential for forest development and, therefore, should be further promoted.

(e) Seedling production

This is essential for afforestation and there have been some accomplishments in this regard in parts of the study area.

But it can hardly be said to be in wide practice since afforestation is yet to become common. It then involves a number of technical and financial problems. For the time being, it is suggested that the initial stages from seed acquisition to seedling production be undertaken by the government. As afforestation projects are established in the future, preparations of land and manpower will be made more properly. There are, however, many problems to resolve in order to ensure enough supply of seedlings strong enough to withstand the unfavorable land and climatic conditions of this area. The initial efforts should be focused onto such specific problems before enlarging the scope of application. Technically, seedling production has been articulated by experts for the Pantabangan Project.

Table 4-29. Seeding Produced by the Government & Private Sectors
(Classified by Region) (in Thousand Pieces)

	1982年	1983	1984
Total	27,637	16,368	
I Government Sector	14,445	8,546	
1. BFD/MNR	13,055	6,900	
a. Regular Priority Project District Protem Nursery	10,480	464	
b. District Project	—	—	
c. Foreign-Assisted Projects	285	563	
d. National Special Projects	557	—	
e. Family Approach	55	—	
f. CTF (PD 209)	557	514	
g. CTF (National)	1,121	—	
2. Other Government Agencies	1,390	105	
II Private Sector	13,192	7,822	
1. Timber Licenses	11,440	7,761	
2. Cooperative Reforestation	806	61	
3. ITF/TF/APP	—	—	
4. Citizenry (PD 1153)	946	—	

Table 4-30. Seedling Produced in BFD Forest Nurseries: (Region II)
(in thousand pieces)

Species	1982年	1983	1984
Total	12,480		5,319
African Tulip (<i>Spathodea campanulata</i>)	1		
Agoho (<i>Casuarina equisetifolia</i>)	20		
Akleng-parang (<i>Albizzia procera</i>)	4		
Antsoan-dilaw (<i>Cassia spectabilis</i>)	19		2
Ayangili (<i>Acacia confusa</i>)	20		49
Banaba (<i>Lagerstroemia speciosa</i>)	9		
Benguet Pine (<i>Pinus kesiya</i>)	534		510
Bitag (<i>Calophyllum inophyllum</i>)	2		24
Fire tree (<i>Delonix regia</i>)	10		
Fringon (<i>Bauhinia monandra</i>)	26		3
Fruit trees			a
Giant Ipil-Ipil (<i>Leucaena leucocephala</i>)	6,680		1,470
Hanga (<i>Euphorbia philippinensis</i>)	6		
Hlang-hlang (<i>Cananga odorata</i>)	11		
Ipil (<i>Intsia bijuga</i>)			43
Japanese Alder (<i>Alnus japonica</i>)	684		553
Mahogany (<i>Swietenia</i> sp.)	653		535
Molave (<i>Vitex parviflora</i>)	1		1
Miscellaneous	41		25
Narra (<i>Pterocarpus indicus</i>)	188		126
Ornamental/medicinal	14		3
Palawan Cherry (<i>Prunus junghuhnianus</i>)	28		
Palo-santo (<i>Triplaris cumingiana</i>)	1		
Palosapis (<i>Anisoptera thurifera</i>)	38		
Rain tree (<i>Samanea saman</i>)	14		
Talisai (<i>Terminalia catappa</i>)	1		55
Teak (<i>Tectona grandis</i>)	532		546
Tindalo (<i>Azelia rhomboidea</i>)			40
Tuai (<i>Bischofia javanica</i>)			6
Yakal (<i>Shorea astylosa</i>)	4		
Yemane (<i>Cmelina arboria</i>)	2,930		1,328

Table 4-31. Area Reforested by the Government and Private Sectors by Region II

(in Hectares)

	1982	1983	1984
Total	11,827	22,889	5,949
I Government Sector	4,227	17,848	1,492
1. BFD/MNR	4,116	3,212	1,490
a. Regular or Priority Projects	2,300	1,884	1,177
b. District Project	—	—	99
c. Foreign Assisted Projects	526	4	143
d. National Special Projects	286	—	—
e. Family Approach	26	—	—
f. Communal Tree Farm (PD 209)	403	125	80
g. Communal Tree Farm (National)	575	1,199	—
2. Other Government Agencies	111	14,636	—
II Private Sector	7,600	5,041	4,457
1. Timber Licenses	6,562	4,591	4,083
2. Coop. Ref. Project of Tbr. Li.	641	43	—
3. ITP/TF/AFF	—	298	—
4. Citizenry (Pursuant to PD 1153)	397	109	374

4 - 6 Selection of Model Area

In selection of the Model Area, the following have been considered.

(1) Conditions of forest and land use:

- Presence of tree stands,
- Presence of burned-down or deserted kaingin sites,
- Feasibility of forestry serving the local interests,
- Possibility of the area becoming designated for forest development district,
- Problems involved in land use (ownership) in connection with a forestry project,
- Access to timber market place,
- Possibility of incorporating "Integrated Social Forestry" in the Forestry Project,
- Feasibility of forestry helping to prevent downstream sedimentary outflow, preserve watershed, and serve other public needs,
- Conflicts with other projects,
- Others.

(2) Social factors:

- Security for field work,
- Availability of cooperation from agencies concerned,
- Availability of cooperation from local citizens,

- Availability of access roads,
- Conflicts with other projects,
- Others.

At the time of Reconnaissance Map compilation, Bayombong, Lagawe, Bontoc, and Tabuk were tentatively selected as candidate sites on the basis of preliminary interpretations of forests and land use. And they were further investigated on site in consultation with the Philippine side. The table below summarizes the study results.

Table 4-32. Comparison of Expected Model Areas

Location Condition	BAYOM- BONG	LAGAWE	BONTOC	TABUK
Vegetation & Landuse	○	○	×	○
Accesibility	○	○	○	×
Security	○	×	×	×

○ Suitable × Non-suitable

Namely:

- Bayombong area meets all the requirements.
- Langawe area meets many requirements but land is being occupied and utilized by local residents.
- Bontoc area has highland coniferous forests in the main which

are not suitable as a model for our purpose. And access is difficult.

- Tabuk area is mostly inaccessible for field survey due to the lack of roads and other social constraints.

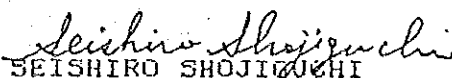
At a consultative meeting held at Bayombong, Nueva Vizcaya, on May 17, represented by the Philippine side, the survey team, and the supervising commission, it was concluded that the area (approx. 50,000 ha.) located 50 kilometers southeast of Bayombong was appropriate for a model area. (See Attachment.)

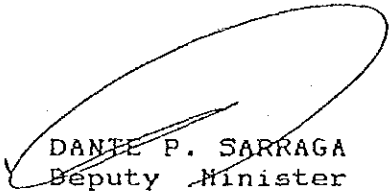
Based on that conclusion, the above site was formally approved as the model area on May 20 at the Ministry of Natural Resources. (See Minutes.)

References

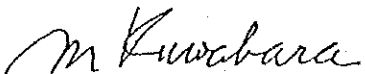
Minutes	149
Model Area Location Map	155
List of Collected Information & Bibliography ..	157

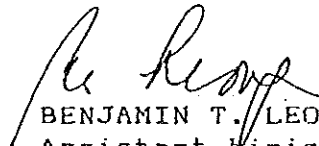
MINUTES OF DISCUSSIONS OF PREPARATION
OF FOREST INFORMATION IN WIDE AREA
AND FOREST MANAGEMENT PLANNING IN THE
REPUBLIC OF THE PHILIPPINES
20 MAY 1986


SEISHIRO SHOJIUCHI
Vice-Leader
Survey Team of
JAPAN INTERNATIONAL CORPORATION
AGENCY (JICA)


DANTE P. SARRAGA
Deputy Minister
MINISTRY OF NATURAL RESOURCES

W I T N E S S E S :


MASAAKI KUWABARA
Leader of the Advisory
Team of JICA


BENJAMIN T. LEONG
Assistant Minister for Planning
and Project Management
Ministry of Natural Resources

Japan International Cooperation Agency (JICA) dispatched to the Republic of the Philippines the Survey Team headed by Mr. Iwao Nakajima, Leader, from March 31 to May 29, 1986 and the Advisory Team headed by Mr. Masaaki Kuwabara, Leader, from May 12 to 21, 1986 in order to respectively implement and supervise the study for the preparation of information in wide area and forest management planning (hereinafter referred to as "the Study").

During their stay, the Survey Team and the Advisory Team had a series of discussions with Philippine officials responsible for the Study headed by Hon. Dante P. Sarraga, Deputy Minister of Ministry of Natural Resources and agreed to the items below.

A list of attendance in the meeting is attached in Annex 1.

1. Selection of Model Area

The Model Area has been identified in the field, located at South-East of Bayombong, Nueva Vizcaya (approximately 50,000 has.) as per attached map.

2. Field Survey of Model Area

If security problems should occur before or during the implementation of field survey in the Model Area, JICA and Philippine side shall discuss about the modification of the survey methodology.

A T T E N D A N C E

PHILIPPINE SIDE

1. Dante P. Sarraga - Deputy Minister, MNR
2. Benjamin T. Leong - Assistant Minister for Planning & Project Management, MNR
3. Briccio Tamparong - Executive Assistant to DM Sarraga, MNR
4. Alan G. Salvador - FAPMO, OMIN
5. Virgilio Basa - OIG, Land Classification, BFD
6. Jose Cabanayan - Land Classification, BFD
7. Mariano Farales - Land Classification, BFD
8. Rodrigo Fuentes - PMS, BFD
9. Teodora H. Salvador - FAPMO, OMIN
10. Cirilo B. Serna - Assistant Director, BFD

JAPANESE SIDE

Survey Team

1. Seishiro Shojiguchi - Vice-Leader
2. Toru Kawasaki
3. Tetsuya Otsuki
4. Makoto Yoshida
5. Masahiko Hara
6. Katsuyasu Yamaguchi

Advisory Team

1. Masaki Kuwabara - Leader
2. Itsuhito Onuki - Information Analyst
3. Katsuro Saito - Coordinator

I. FIELD SURVEY

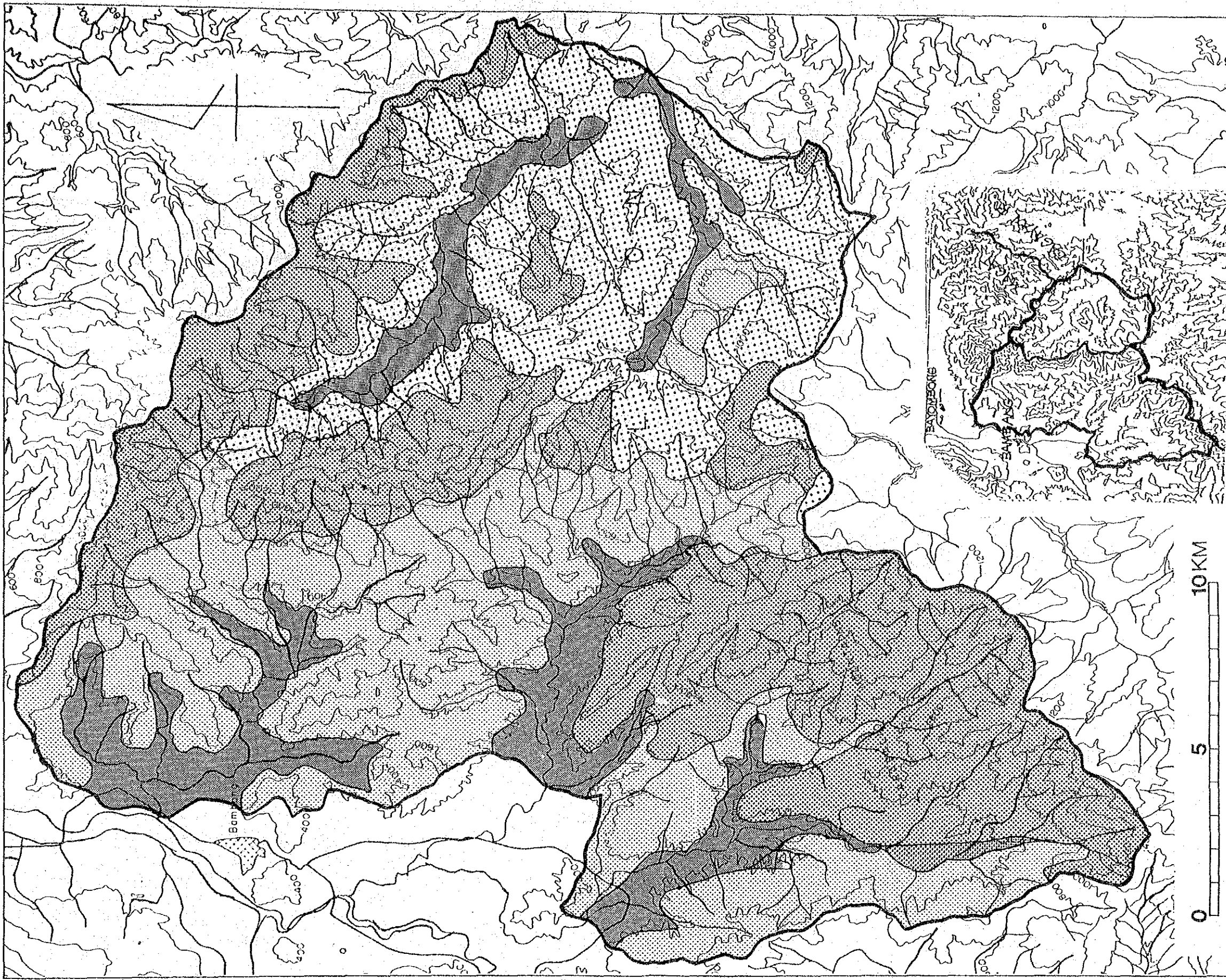
1. 7, April - 16, May (40days)
2. Flight Inspection: 8, April
3. Contents of Survey
 - Checking of Reconnaissance Maps
 - Interview Survey
 - New Data Collection

II. COMPARISON OF EXPECTED MODEL AREA

Area Factor	BAYOMBONG	LAGAWE	BONTOC	TABUK
Vegetation & Landuse	O	O	X	O
Accesibility	O	O	O	X
Security	O	X	X	X

III. LATER SCHEDULE OF THIS YEAR

- Reinterpretation of Aerial Photos (Manila)
- Landsat Data Analysis (Tokyo)



Model Area Location Map

List of Collected Information and Bibliography

1. The BFD Annual Report for 1983
2. " 1984
3. Philippine Forestry Statistics 1981
4. " 1982
5. " 1984
6. Forest Protection and Law Enforcement Division Profile

7. Presidential Decree-705
Revised Forestry code of Philippines
8. Presidential Decree-1559
Further Amending Presidential Decree No.705
9. Ministry Order No.1 (1978)
Creation of a Special Forest Law
10. Ministry Order No.50 (1982)
Regulations Governing the Administration,
Management and Disposition of Grazing Land
11. Ministry Order No.48 (1982)
Regulations and Guidelines implementing LOI 1260,
Which launched the Integrated Social Forestry Program
12. Ministry Order No.54 (1982)
Creation of Organizational Units in the Central,
Regional and District Offices of the Bureau of
Forest Development to Implement the Integrated
Social Forestry Program
13. Industrial Tree Plantation Lease Agreement
14. Tree Farm Lease Agreement
15. The Integrated Social Forestry Program of The
Ministry of Natural Resources

16. A Better Deal for Forest Occupants
A Primer on the Integrated Social Forestry Program
17. Letter of Instruction No.1260
18. Letter of Instruction No.1312
19. First Asean Forestry Congress
20. Vintar River Watershed Reforestation Project.
21. Demonstration and Training in Forest, Forest Range
and Watershed Management-FAO 1971
 - Δ Land-Use Economics
 - Δ Range Management
 - Δ Watershed Management
 - Δ Logging and transport
22. Philippine Forestry Development Project
Final Report 1982
23. Appraisal of the Forestry Development Project
in the Republic of the Philippines
Asian Development Bank 1983
24. Integrated Management System for Palawan
25. Smallholder tree farming in the Philippines, A
Comparison of two credit Programmes 1983
26. Guidelines for Watershed Management FAO 1977
27. Proceedings of the Joint FAO/U.S.S.R International
Symposium on Forest Influences and Watershed Management
FAO 1970
28. An Integrated Project for Kaingin Control
in the Philippines-Fourth Annual Report 1980
29. A study of two Pilot Agro-Forestry Projects
in the Philippines 1981
30. Case Study of Forest Occupancy Management
Program in Dona Remedios, Trinidad, Bulacan

31. Loan Financing of smallholder tree Farming in the Ilocos Norte and Ilocos Sur, the Philippines 1983
32. Agro-Forestry Farm Lease Agreement
33. Energy from the Forest FAO 1982
34. How to grow Bamboo
35. Abstracts of References on Mangroves
36. Communal Tree Farming
37. International Consultation on IPIL-IPIL Research
38. TOPOMAP (1/250,000)
39. " (1/50,000)
40. GEOLOGICAL MAP (1/250,000)
41. REGION II STATISTICS
42. Applications of Remote Sensing to Resources and Agricultural Development 1983
43. Assessment of Forestry Management Problems and Issues
44. ESCAP/NRMC Regional Training on Digital Image (Report) Interpretation for Forestry Application 1984
45. ESCAP/NRMC Regional Training on Digital Image (Proceeding of the Conference) Interpretation for Forestry Application 1984
46. Geology and Mineral Resources of the Philippines
47. Analysis of the Process of Implementing Remote Sensing Technology for Economic Development
48. Cagayan Valley (Upper Cagayan River Basin)
49. " (Lower Cagayan River Basin)
50. " (Chico River Basin)

51. Cagayan (Magat River Basin)
52. " (Ilagan River Basin)
53. Philippines Water Resources
54. Water Availability in Philippine
55. Philippine Water Code 1982
56. Philippines Flood Control 1977
57. Irrigation Inventory 1977
58. Integrated Census of the Population and its
Economic Activities (Phase II)
59. Accomplishment Reports of BFD R-2. Tuguegarao
Cagayan for the month of June, Second Quarter
and Mid-Year 1985
60. Social, Economic and Demographic Factors
Relating to Interregional Migration Streams
in the Philippines : 1960-1970
61. Handbook on Land and Other Physical Resources
62. Project Development Manual
63. Five-Year Philippine Development Plan 1983-1987
64. Updated Philippine Development Plan 1984-1987
65. Integrated Survey of Households Bulletin
66. MPWH Infrastructure MPWH 1983
67. Photo Index Map (1/250,000)
68. Soil Survey of Cagayan Province 1967
69. Soil Survey of Isabela Province 1969

70. Soil Survey of Nueva Vizcaya Province 1963
71. Land-Use Opportunity Map Philippine in support
to the Implementation of E.O. 803, 1983
Land-Use (NE-51-5, -6, -9, -10, -13, -14, ND-51-02)
Present Land-Use (")
Land Capability Classes & Subclasses (")
72. Soil Map (Cagayan, Ifugao, Kalinga-Apayao
Mountain, Qurino, Nueva Vizcaya
1/150,000, 1/250,000)
- 73.. Regional Development
74. 1984 Philippine Forestry Statistics
75. Municipal Land-Use Inventory Map 1/40,000
76. Land-Use Map 1/1,000,000
77. Guidelines in the Preparation of Land-Use Control
Map and Land-Use Inventory of Natural Resources
78. Annual Climatological Review of 1971
79. " 1972
80. " 1973
81. " 1974
82. " 1975
83. Climatological data Region I, II, III, IV 1982
84. The climates of the Philippines
85. Tropical Cyclone Summaries from 1948 to 1978
86. The Philippines Recommends for Citrus
87. " Beef Cattle Production 1976
88. " Rubber 1977

89. " Cacao 1979
90. " Integrated Farming Systems 1976
91. " Soybean 1976
92. " Pineapple 1977
93. " Vegetable Crops 1975
94. Philippines Land Vertebrates (A College Textbook)
95. Region I ... Ilocos Norte, Abra, Ilocos Sur, Mountain Province
Benguet, La Union and Pangasinan
96. Medicinal Plants of the Cordillera Region ... Baguio City 1984
97. Websters Dictionary (English-Philippino)
98. Summary And Conclusion ... Casecan Transbasin Diversion Project
99. Airo Fotograf ... Cagayan River Watershed (1/60,000, 1/30,000)

