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MANAGEMENT AND COST OF WATERSHED REFORESTATION THE PANTALANGAN AND MACAT

by

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MANAGEMENT AND COST OF WATERSHED REFORESTATION: THE PANTABANGAN AND MAGAT[1/]

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INTRODUCTION

Philippine watersheds are generally confronted by major problems that contribute to their rapid degradation. Man-related activities such as uncontrolled logging followed by slash-and-burn cultivators, poorly managed pasture and the general indiscriminate cutting of trees for fuelwood by inhabitants within the watersheds are causes of accelerated soil erosion and conversion of once forest areas to grassland areas. Within the period 1972 to 1931, for instance, close to one million hectares (MNR Annual Report 1981) were deforested. Within the same period, however, the area reforested is reported to be about 400,000 hectares only. Historically, the area annually deforested exceeds the reforested area. For the first time in 1978, this trend was reversed with reforestation area exceeding the deforestation area by about 12,400 hectares.

It is reported that about 5.0 million hectares of Philippine lands are grasslands with about 1.4million

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hectares located in critical watersheds (Philippine Environment 1972-82) which need immediate attention to prevent further degradation

Almost all forestation projects in the Philippines are located in grasslands with generally very adverse site conditions The soils are highly acidic, seriously eroded and degenerated with very low fertility The area is exposed to adverse environmental factors which lead to fast evapotranspiration rates resulting to poor survival of young seedlings outplants due to water stress The grasses which predominate the area such as cogon (Imperata cylindrica), themeda (Themeda triandra), and talahib (Saccharum spontaneum) dry up during the dry season and readily become fire hazards Under these conditions, extremely poor survival and growth rates of reforestation species are not uncommon

This paper presents the experiences in the reforestation effort of the NIA in Pantabangan and Magat watersheds An attempt to establish the basic requirements of a successful reforestation program for the denuded areas is also made

THE PANTABANGAN WATERSHED

The Pantabangan Watershed covers an area of about 82,900 hectares excluding the Pantabangan reservoir area

of about 8,000 hectares. It is situated within the province of Nueva Ecija, Nueva Vizcaya and Aurora in Luzon Island which consists of flat areas and rolling to rugged and steep mountainous landscape. The watershed is dissected by narrow flat-bottomed valleys and drained by the Carranglan and Pantabangan Rivers. The Pantabangan Dam was constructed at the confluence of these two major river systems which is the headwaters of the Pampanga River system draining a substantial portion of the Central Luzon plains.

The various land uses in the watershed (Table 1) is composed of 36,915 hectares forest areas; 35,665 hectares grassland; 9,545 hectares cropland; and 775 hectares for other uses like residential and riverwash areas. Grassland and kaingin areas represent about 46 per cent of the watershed area.

The climate in the watershed is dry from December through April, and wet the rest of the year with average annual rainfall of about 2,800 mm. which varies from 2,000 mm. in the lower elevation to 3,000 mm. in the mountains east of the reservoir. The heaviest rainfall occurs in the months of June through August as influenced by the southwest monsoon. The monthly temperature does not vary appreciably with an average high of 35.5°C in

Table 1. Land Use in Pantabangan Watershed

Land Use or Cover	Area	
	Ha.	%
Forest	36,915	44
Primary	23,740	29
Secondary	13,175	15
Grassland	35,665	43
Open Grassland	33,490	40
Savannah	2,175	3
Cropland	9,545	12
Rice	6,600	8
Diversified	620	1
Kaingin	2,325	3
Other	775	1
Residential	600	1
Riverwash	175	-
T O T A L	82,900	100

May and a low of 20.0°C in February. Strong winds is experienced from the east and northeast during the months of December through April and light and variable winds during the rest of the year. The mean monthly wind speed measured 10 m. above ground, varies from 3 to 11 km. per hr. The watershed lies within the tropical typhoon belt and average about three typhoons per year.

The topography in the watershed is varied and complex. The upper reaches are rugged highlands with skyline elevation of 1,100 m. above sea level and interpersed with V-shaped drainage valleys. The lower relief are characterized by broad ridges with wider drainage valleys. The alluvial valleys of main rivers composed the agricultural lands within the watershed.

The soils in the watershed are the Annam and Guimbalaon series in the higher reaches, the Mahipon series in the intermediate slopes, and the Bunga series in the plains. The Annam and Gumbalaon series are clayey in texture, well drained, acidic (ph 5.5), moderately high in organic matter and low in potash and phosphate. The Mahipon series are moderately deep, clayey in texture, well drained on the surface but with restricted internal drainage, are slightly acidic (ph 5.8) and moderate in potash and phosphate. The Bunga series are deep, moderately drained externally but poorly drained internally, acidic (ph 5.5), relatively low in organic matter and deficient in potash and phosphate. The area covered by the reforestation project is mostly, the Annam, Guimbalaon and Mahipon series.

One of the serious problems in the watershed is soil erosion although how much erosion is taking place and how much sediment is being deposited in the reservoir is pre-

sently unknown. All areas with steeply rolling and very hilly terrain where the soil cover is grass, about 46% of the watershed area, have severe erosion.

The population in the watershed is about 23,200 or about 3,830 households as reported in the survey conducted by NIA in 1979. According to the same survey results, about 44% of the household obtain their income primarily from farming and fishing, about 35% from employment with Government agencies mainly on NIA and BFD, and the rest from seasonal work, cottage industry and service jobs.

Several forestation projects, aside from the NIA's, are presently implemented within the Pantabangan watershed. The largest of these is the RP-Japan Technical Cooperation Project which was started in 1977 with a total target area of more than 8,000 hectares. The project has planted about 4,500 hectares from 1977 to 1982 and is due for completion in 1986. Two forest districts of BFD are also engaged in reforestation activities. The Carranglan District has planted some 2,200 hectares within the watershed since 1973. The Pantabangan District on the other hand, has planted some 6,800 hectares in various parts of the district under its regular reforestation project.

THE MAGAT WATERSHED

The Magat watershed is much bigger and more complex than Pantabangan's. It has an area of about 414,300 hectares, excluding the Magat Dam reservoir of about 4,900 hectares. The watershed which occupies parts of the provinces of Nueva Viscaya, Ifugao and Isabela encompasses three principal mountain systems of Northern Luzon namely the Mamparang mountains on the east, the Caraballo mountain on the south and the Cordillera mountains on the west.

The various land uses in the watershed (Table 2) is composed of 173,600 ha. forest areas; 150,900 ha. grassland; 87,000 ha. cropland; and 2,800 ha. for other uses. Grassland and kaingin represent about 41 per cent of the watershed area.

The climate of the Magat watershed is somewhat different from that of Pantabangan's as dry period is slight in the area which last only from one to three months. Average annual precipitation is estimated to be about 2,500 mm. which varies from about 2,000mm. in the lower elevations of the watershed to more than 4,000 mm. in the central Cordillera mountains. About 70% of the average annual rainfall is concentrated in the months of June through November. Monthly variations in temperature are small,

Table 2. Land Use in Magat Watershed

Land Use or Cover	Area -- Ha.	Area %
Forest	173,600	42
Primary	50,600	12
Secondary	123,000	30
Open Grassland	150,900	36
Cropland	87,000	21
Kaingin	19,700	5
Diversified Crop	3,300	1
Rainfed Rice	12,900	3
Irrigated riceterraces	20,100	5
Irrigated rice	31,000	7
Other		
Riverwash	2,800	1
T O T A L	414,300	100

with the average high in May of 36.4°C and the average low in January of 19.4°C. The watershed is visited on the average by three typhoon per annum.

The topography of the watershed is varied and complex and range from flat to undulating lowlands to moderate relief and extremely rugged highlands with skyline elevations ranging from 700 to 1,400 m. Soils in the watershed are diverse and highly weathered with 17 identified soil series. Erosion is severe to excessive in about 83% of

the watershed. The sediment yield from the watershed at the Magat damsite was estimated at 8.5 million tons/year during the planning studies of the Magat dam.

Reforestation projects within the watershed are implemented by the Bureau of Forest Development through the regular reforestation projects of forest districts. Species that has been planted include Benguet pine, teak, yemane, narra, mahogany, giant ipil-ipil and albizzia, The planted areas of these projects cover some 11,000 ha. scattered throughout the watershed but the effective hectarage is much lower because of fire damage.

THE REFORESTATION PROJECT OF NIA

Project Description

The reforestation project of the National Irrigation Administration (NIA) is embodied as a major component of the Watershed Management and Erosion Control Project which was started in June 1980. This reforestation effort sought to minimize sedimentation of the Pantabangan and Magat reservoir through improvement of the vegetative covers of the watershed areas.

The Watershed Management and Erosion Control Project which is partially financed by a World Bank loan has three major components namely: a) the Magat Watershed Feasibility

Study; b) the Forest Protection Pilot Program; and c) the reforestation component.

The Magat Watershed Feasibility Study aims to formulate an integrated development plan for the various critical sub-catchments of the watershed. The study include basic data gathering on hydrology and sedimentation, range management studies and land use development to stabilize kaingineros. The Forest Protection Pilot Component on the other hand, deals with the detailed planning and implementation of a three-year pilot operation in which forest occupancy management, forest guarding, forest fire control and watershed rehabilitation will be considered in an integrated effort. This will be done in two trial areas of the Magat and Angat watersheds.

The reforestation component which is the biggest of the three components aims to rehabilitate the Pantabangan watershed and portion of Magat watershed by reforesting some 32,200 ha. open grasslands with a variety of agro-forest and timber species. The area coverage include about 23,600 ha. in Pantabangan and some 8,600 ha. in Magat. The reforestation effort is complemented by construction and maintenance of some 480 km. of forest access roads, construction and operation of charcoal ovens for the conversion of fuelwood to charcoal, forest nurseries, watch

towers and field storage sheds and provision of equipment and vehicles for forest protection and fire prevention.

The species considered for establishment and development are mango, 3,400 ha.; cashew 6,100 ha.; Benguet Pine, 7,200 ha.; Yemane. 5,900 ha.; giant ipil-ipil, for leafmeal, 900 ha.; narra, 1,300 ha.; and mahogany, 1,200 ha., Table 3. The different plantations are expected to yield leafmeal, charcoal, fruits, nuts, pulpwood and timber.

The usual operations in reforestation consist of nursery operations, plantation establishment and plantation development. Nursery operation starts in September with repairs of facilities, hauling and preparation of soil media and seed sowing continuing through October, potting of soil media and seedlings, seedling care and maintenance including fertilizer application, weeding and culling through March. Transportation of seedlings to seedling depots starts in April and continue through August when plantation establishment ends. Outplanting of seedlings starts in late May or early June and ends in August to allow enough time for the seedlings to get established before the onset of the dry season. The use of fertilizer is very important in plantation establishment and development due to the low nutrient status of soils in the project area. Fertilizer is applied during outplanting,

during the first weeding operation and during the early and late parts of the rainy season in the following year.

Table 3. Physical Targets, Reforestation Component 1980 - 1987

Particular	Pantabangan	Magat	Overall
Plantation Establishment, Ha.			
Leafmeal	900	-	900
Charcoal	3,900	2,000	5,900
Yemane	5,300	600	5,900
Cashew	4,600	1,500	6,100
Mango	2,500	900	3,400
Benguet Pine	5,700	1,500	7,200
Narra	700	600	1,300
Mahogany	(4,800) 1/	1,200	1,200
Mixed	(1,260) 2/		
T O T A L	23,600	8,600	32,200
Road Construction, Km.			
Primary	190	54	244
Secondary	177	60	237
T O T A L	367	114	481

1/ To be interplanted on charcoal and leafmeal plantation stand between 1988 to 1993.

2/ Project plantation schedule, March 1983.

Source: Project Plantation Schedule, March 1983.

Project Benefits

Benefits from the project among others, include the following

a Employment Generation Due to labor-intensive project activities such as nursery operations, plantation establishment and development and forest protection and fire prevention, the project has employed some 4,200 people in Pantabangan and 1,100 people in Magat as of September 1983 This requirement will continue to increase as the project plantations expand and will provide sustained full-time work for about 4,700 people in Pantabangan and 2,300 people in Magat by 1985 This will also continue to increase as harvesting and processing activities in the different plantations pick-up in the production of leafmeal, charcoal, mango and cashew

b Production At full development, the project would provide an average annual production of about 10,000 tons of leafmeal, 30,000 tons of charcoal, 48,000 tons of mango fruits, 12,000 tons of cashew nuts, 27,000 tons of short-fiber pulpwood and about 24,000 tons of long-fiber pulpwood In addition the project would produce about 20,000 cu m of timber annually from yemane and pine and at the end of 40 years, the hardwood species of narra and mahogany would yield about 2 0 million cu m Of course these products would come at various stages of the project

with leafmeal, charcoal, and fruits within the first 6 years while the other products in a long term but sustained basis starting in the 10th-12th year of the project

c Benefits to the Residents of the Watersheds

Aside from employment opportunities, the project will also provide revenue and profit share to the communities in the watershed This will come in the form of community facilities urgently needed such as domestic water supply, school building, barangay hall, playground and barangay road improvements

Project Costs

The total cost of the reforestation component is estimated to be about ₱558 M for both Pantabangan and Magat for the perio' between 1980 through 1987 Breakdown of the cost estimates is presented in Table 4 Pantabangan watershed has an allocation of about ₱428 M and agat about ₱130 M

Table 4. Estimated Project Cost in '000 Pesos

Particular	Pantabangan	Magat	Overall	%
Nursery Operation	18,710	19,811	28,521	5.1
Plantation Establishment	33,945	10,760	44,705	8.0
Plantation Development	110,775	38,123	148,898	26.7
Harvesting & Processing	36,405	1,615	38,020	6.8
Forest Road Construction	58,272	18,376	76,648	13.7
Project Facilities	11,654	4,010	15,664	2.8
Equipment & Vehicle	42,263	8,888	51,151	9.2
Consulting & C.O. Services	23,765	5,744	29,509	5.3
Eng'g, Supervision & Adm.	46,659	15,238	61,897	11.1
Contingencies	45,518	17,473	62,991	11.3
T O T A L	427,966	130,038	558,004	100.0

THE PROJECT IMPLEMENTATION AND STATUS

Organization

Due to the various components of the project, the implementation was divided into three major responsibilities for each major component. Thus the Magat Watershed Feasibility Study is undertaken through the umbrella of the National Economic Development Authority (NEDA) with NIA playing the major active role. The forest protection pilot program on the other hand, is implemented by the Bureau of Forest Development (BFD) through their Forest District Offices in Angat and Magat watersheds. The reforestation component which is the biggest is handled by NIA through a project organization developed for its implementation. Figure 1 presents the organizational set-up of the project reforestation component.

The implementation of a massive reforestation project requires two distinct components namely, the plantation establishment and development and the road and project facilities construction. These are reflected in the organization chart as the Agro-Industrial Operations group and the Engineering and Construction group. In addition, support staff that will handle technical problems in Agro-Industrial operations such as pests and diseases control, soils problems, plantation establishment and development

schemes, etc, have to be provided. Furthermore, due to the presence of community centers within the watershed a group that will handle the information dissemination and community affairs is also a very important component. The rest of the organization is the usual set-up of any project organization except for the marketing group which will become active when the production and marketing starts.

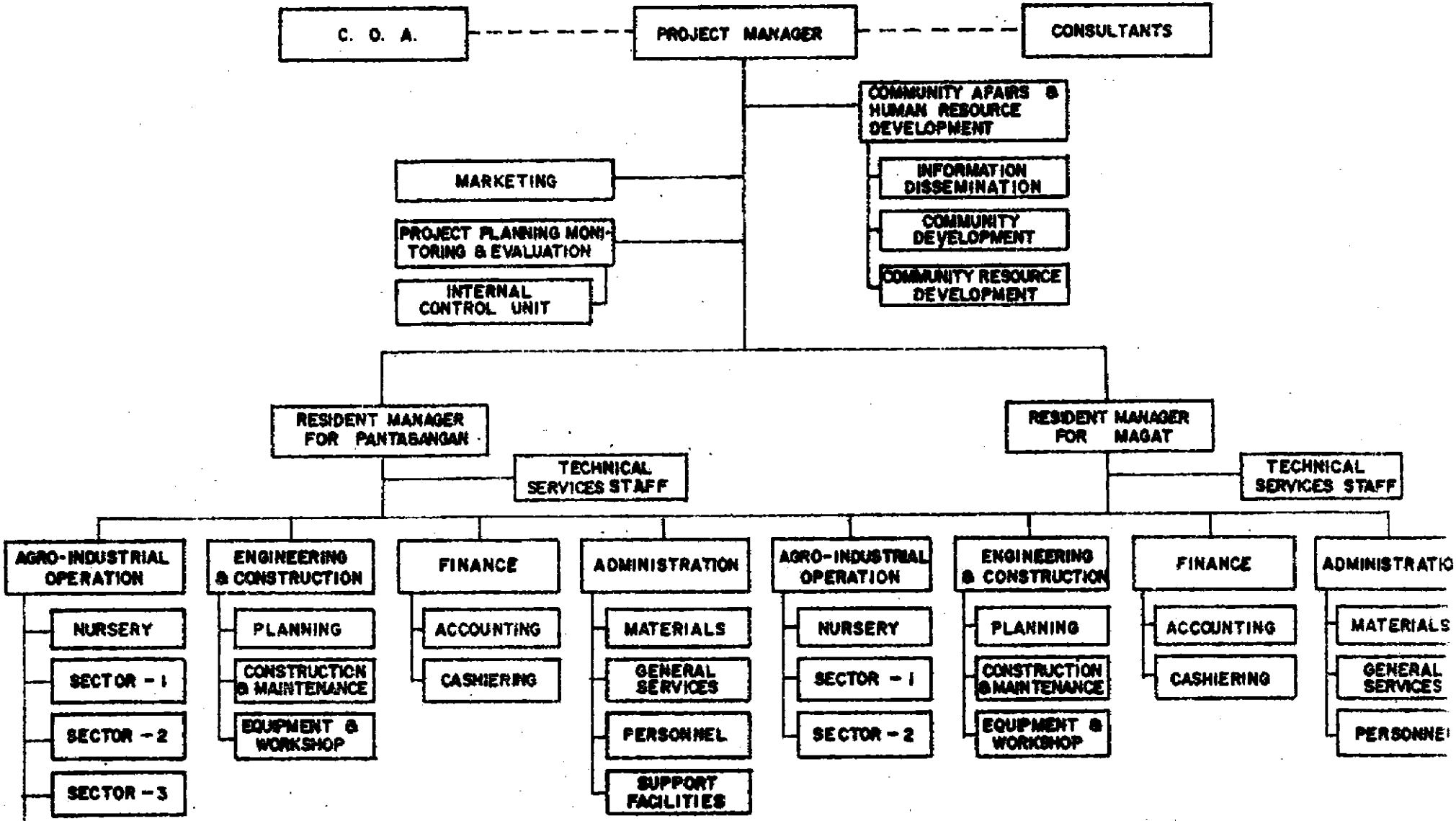
With the set-up presented in Figure 1, the project was started in June 1980.

By the end of September 1983 the project has produced more than 28 million seedlings with more than 18 million in Pantabangan and about 10 million in Magat.

On plantation establishment and development, the project has covered some 14,500 ha. or 45 per cent of the total plantation hectarage. This is composed of 10,700 ha. in Pantabangan and 3,800 ha. in Magat. The project status as of September 1983 is given in Table 5.

On road construction, the project has opened some 320 km. of forest access roads in both watersheds composed of some 250 km. in Pantabangan and 70 km. in Magat. Of these opened roads about 242 km. is already completed with the needed road structures and about 210 km. is already provided with gravel surfacing. The project has constructed

WMECP- REFORESTATION COMPONENT
ORGANIZATIONAL CHART



NOTE :

A SECTOR COVERS AN AREA OF ABOUT 500 HECTARES AND HEADED BY A SUPERINTENDENT WHO HANDLE PLANTATION

Table 5. Project Status as of September 1983

Particular	Target, 1980-87			Accomplishment as of Sept., 1983			
	Pantabangan	Magat	Total	Pantabangan	Magat	Total	%
Nursery, '000 Seedlings	4,800	17,100	65,100	18,370	9,700	28,070	43
Plantation Establishment, ha.							
Leafmeal	900	-	900	786	-	786	87
Charcoal	3,900	2,000	5,900	3,085	1,954	5,039	85
Yemane	5,300	600	5,900	1,633	481	2,114	36
Cashew	4,600	1,500	6,100	2,807	535	3,342	55
Mango	2,500	900	3,400	1,584	408	1,992	58
Benguet Pine	5,700	1,500	7,200	831	40	871	12
Narra	700	600	1,300	-	63	63	5
Mahogany	-	1,200	1,200	-	90	90	7
Mixed	-	300	300	-	252	252	84
T O T A L	23,600	8,600	32,200	10,726	3,823	14,549	45
Road Construction, km.							
Primary	190	54	244	117	25	142	58
Secondary	177	60	237	133	45	178	75
T O T A L	367	114	481	250	70	320	66

one central forest nursery and fourteen subsidiary nurseries to supplement the existing three central nurseries and two subsidiary nurseries There are now three central nurseries and ten subsidiary nurseries in Pantabangan and one central nursery and six subsidiary nurseries in Magat

Trial harvesting of ipil-ipil leaves for leafmeal started in October 1982 This was made in some portions of the plantation established in 1981 Experimental charcoal making have been undertaken to finalize the oven design that will be constructed in the charcoal plantations By the end of September 1983, the Pantabangan Sub-project has produced and marketed some 76 tons of leafmeal and 46 tons tons of charcoa

By September 1983 the project has accomplished about 45 per cent of the total area to be reforested and opened about 66 per cent of the total roads to be constructed

Implementation Problems

With the big task of managing the watershed, various problems come in different dimensions and intensity In the case of the WMECP which uses the reforestation strategy as an erosion control measure, the following problems were encountered

1 Seed availability and propagation of planting materials

The project has repeatedly experienced difficulty in procuring seeds at the time seeds are needed for sowing To solve this problem, procurement of seeds has been scheduled to coincide with the time when the seeds are harvested This strategy, however, posed another problem which is the poor germination rate of seeds caused by prolonged storage period In order to offset this situation, several methods have been resorted to for best results For yemane, (Gmelina arborea) bare root planting materials are used which enable the project to sow the seeds in the nursery in October or November when the seeds still retain their viability Cashew, (Anacardium occidentale) on the other hand, are directly seeded in some of the plantation areas which makes it possible to use newly procured seeds in April or May This scheme allows the project to produce seeds during harvesting period yet get reasonably good germination rates when these are sown

2 Weeds

Excessive growth of weeds especially during the rainy months is another ptoblem that confronts the project Aside from suppressing the growth of

planted seedlings weeds serve as harboring place of pests and ready fueld during the dry months. Considering the vastness of the project areas, massive manual weeding have become impractical considering its labor requirement and costs involved. Chemical weeding on the other hand, is too dnagerous since most weedicides are non-selective and kill both weeds and plants. This remains a big problem of reforestation in tropical countries. At present, the project uses a combination of mechanical and manual weeding.

3. Pest and disease infestation

Application of chemicals somehow reduce incidence of infestation. The problem remains on identifying the appropriate chemical for the different pests and disease both in the nursery and plantations. Appropriate applications timing is another problem which would probably require a continuous monitoring system.

One particular insect that must be given closer attention and serious consideration is the shoot moth on Benguet Pine. Although the project plantations at the moment are not yet seriously affected, the past experiences on this species are discouraging.

It was observed, for instance, that the ASEAN-NEW ZEALAND project in Tarlac which planted Carribean and Benguet pines three years ago is nor suffering from a very serious attack of shoot moth. The Benguet Pine plantation in Abra is also reported to have been severely infected.

4. Forest Fires

Like in any other reforestation projects, destruction due to forest fires is one of the major problems that threatens the project. Forest fires may be accidental or intentional. Based on the project experience, forest fires within the plantation area have been caused by any or a combination of the following:

a) Careless workers (cooking, cigarettes, etc.)

b) Hunters and fisherman (cooking, cigarettes, clearing, etc.)

c) Pasture areas which are burned for new grass growth

d) Kaingin and lowland farms during clearing operations

e) Charcoal makers who carelessly do their activities near the plantations.

One of the major cost involved in the plantation development activities is plantation protection and

fire prevention. In fact, about 50 per cent of the plantation development cost is allocated to protection and fire prevention.

5. Uncontrolled Exploitation of Watershed Resources.

There are some activities which are prohibited within the watershed area such as cutting of trees, pastures, destructive hillside farming and the like. NIA has no police power, hence, the project is put in a very difficult situation when confronting illegal activities within the watershed.

A unified effort of both government and community should be motivated to eliminate this problem. Reforestation or watershed rehabilitation should be emphasized as a concern not only of government but also of private sector. In fact, it is everybody's concern.

RECOMMENDATIONS

Rehabilitation of watersheds through reforestation and afforestation is a very difficult and expensive work. When planning for the reforestation and afforestation of important watersheds one must play closer attention to several factors to maximize likelihood of success.

Based on the experience of this project and observation of areas covered by reforestation projects in the past, the following significantly affect the success or failure of the project:

Access roads. Reforestation projects are usually done on areas far from existing roads. The absence of this facility affects detrimentally the progress of plantation establishment because of difficulties in the delivery of seedlings and plantation inputs. This is also a major reason for low efficiency of workers because of low number of effective hours per day as time is used in walking to and from the plantation sites. Non-availability of access roads, furthermore, results to lower quality of workers' output due to lack or difficulty if supervision.

This component of a reforestation project is important not only during establishment activities but also during the plantation development activities especially in the protection against forest fires. Readily accessible plantations can be reached by firefighters and firefighting equipment and tools within short periods after fires are spotted. This, most of the time, determine whether the plantation can be saved from fire damage or not. In addition, the access roads will be important in harvesting and transporting plantation products.

Transport facilities. In areas where the climatic conditions are similar to those prevailing in this project sites, plantation establishment and development activities are concentrated within the months of June, July and August when the soil moisture is plentiful. This is constrained so that ample time is provided to outplanted seedlings to recover and establish their root systems before the on-set of the dry season which starts in November or sometimes in October. Although this assures a good survival rate, it provides a very tight planting schedule especially when establishment is programmed for large tracts of land, say 3,000 ha. yearly.

With this situation, mobilization of seedlings, plantation inputs and workers, requires substantial number of vehicles. In 1983 planting season in Pantabangan, for instance, some 7.0 million seedlings and more than 10,000 bags of fertilizers were mobilized within May to August. One can just imagine the importance of transport facilities, if a massive reforestation effort is to meet the tight schedule of planting activities.

The transport facilities referred to here are not only the access roads and vehicles but also other forms of transportation which will ease up the work of transporting seedlings and inputs from road sides to the plantation area.

Portable cable system run manually is being experimented in Pantabangan. Initial results of trials reveal that output of one man-day is 3 to 4 times more than the output of completely manual hauling from road side.

Selection of Species. Reforestation projects are usually undertaken in areas that have seriously degraded soils and adverse environment for normal plant growth. In addition, soil conditions vary considerably within short distances in upland areas where projects are implemented. This is partly due to varied terrains which characterize watershed areas.

In view of this conditions, species considered for reforestation must include a wide selection. Project implementors must be provided with a variety of alternative species and the flexibility of changing the combinations must be left open. Only during the implementation stage when one would find out which species can successfully thrive on the project areas.

A fixed plan on the hectarage of a given species will only magnify the already difficult task of implementing a reforestation project. Of course, area estimates for a given plantation purpose should be established at the planning stage of the project to provide reasonably accurate estimates

of costs and benefits. This should not however, tie the hands of the implementors when some of the species later on, are found to be unsuitable or display unsatisfactory performances in the field.

Species that has the capability to improve the physical and chemical properties of the soils must be considered in combination with prime forest species. Leguminous plants must be given priority as pioneer species. Caution, in species selection, however, must be practiced to ensure the adaptability of selected species on the prevailing conditions of the soils and climate.

Fire prevention and protection. The single most devastating cause of failure of reforestation projects is FIRE. It is not uncommon that whole plantations are razed to the ground by a single incidence. Trees that recover after being damaged by fire are usually vulnerable to pests and diseases attacks which results to poor or non-economic forest stand.

An efficient and effective fire prevention and protection program must be a basic component of any reforestation project. It has been said that allocation of this aspect must be equal or greater than the allocation of plantation establishment.

The fire prevention and protection program must not neglect the vital role of the community within the project area. They must be considered partner in the pursuit to rehabilitate the grassland and renew the forest.

Timing of outplanting. The importance of appropriate timing in implementation of reforestation activities cannot be over emphasized. This is specially true in areas where climate is defined by distinct dry season and wet season.

Low survival rate of outplanted seedlings were observed to occur on plantations established in late September through October. This connotes that outplanting operations must be completed not later than August to provide enough vigor and resistance to young outplants prior to their first dry season on the field.

Past experiences in reforestation projects cannot fulfil this appropriate timing due to various reasons. Among the most important items that affect the timing of outplanting are:

1. Late releases of budget. This delays all operations in preparation for the outplanting activities.
2. Non-availability of seeds. Note that nursery operation often start in February for species like ipil-ipil, yemane, acacia aurecoliformis, acacia manguim and other fuelwood species. More often

than not, seeds of these species are harvested in April through May, hence, seed availability becomes a problem during the time they are needed.

3. Non-Availability of labor. To attain appropriate outplanting timing, the project must compete for labor with the usual farming operation in the agricultural lands within the project site. For a project which require several thousands of workers, this is not an easy job. This problem still impose considerable constraints in increasing the area to be planted annually. The expansion of the area coverage that require equally important attention for plantation development activities compete with the plantation establishment activities.

A reforestation project may be considered several steps ahead towards success if all the negative implications of these factors are minimized and/or eliminated through sound planning and proper plan execution. "PLAN THE WORK AND WORK THE PLAN", is a very applicable guideline.