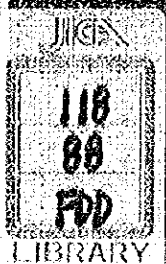


# RP-JAPAN FORESTRY DEVELOPMENT PROJECT

REPUBLIC OF THE PHILIPPINES  
MINISTRY OF NATURAL RESOURCES  
BUREAU OF FOREST DEVELOPMENT

JAPAN INTERNATIONAL COOPERATION AGENCY



国際協力事業団	
受入 月日 '86.9.24	118
登録No. 15429	88
	FDD

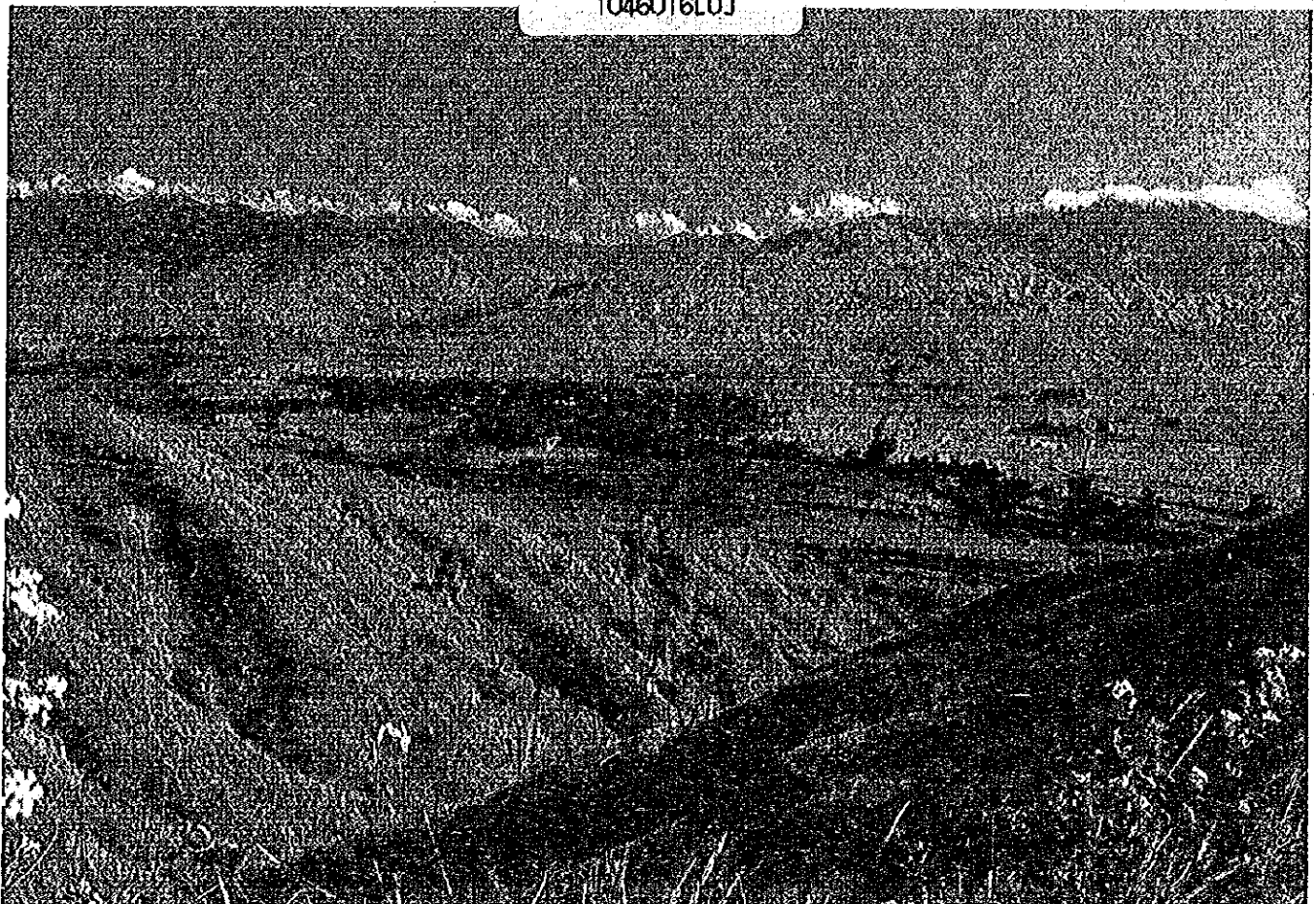
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## Background of the Project

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**T**he RP-Japan Forestry Development Project (hereinafter referred to as "the Project") was established in view of the pressing problems existing around the area of the Pantabangan Dam.

The Pantabangan Dam is a project of the Philippine government which is intended to minimize the occurrence of flood as well as to intensify irrigation and generation of electricity in the surrounding towns. The critical condition of the watershed supporting the dam, which is mostly open and denuded, however, threatens its siltation — a situation which is aggravated by the difficulty of reforestation due to infertile and acidic soil, adverse climate and long dry season in the area; thus, requiring more inputs and modern afforestation techniques to ensure survival of trees planted.

Realizing the urgency of reforesting the watershed and considering the condition prevailing in the locality, the idea of drawing technical support from the Japanese government was conceived. Negotiations started in 1973 and ended with the signing of Record of Discussions in 1976. The Japanese government provides the necessary technical assistance through the Japanese International Cooperation Agency (JICA), while the Philippine government takes charge of the administration and implementation of afforestation activities.

*Open and denuded land in the Pantabangan Watershed*



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## Objective of the Project

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**T**he Project is the first technical co-operation project in forestry entered into by the Philippine and the Japanese governments. Both governments co-operate to develop and provide appropriate afforestation and forest conservation techniques through the establishment of an afforestation technical center and a training center for forest conservation.

The Project aims to develop and improve afforestation, forest conservation, and forest management

techniques through afforestation and reforestation of open and denuded lands in the Pantabangan area, the catchment and watershed of the Upper Pampanga River in Nueva Ecija. Actual implementation of the Project activities is executed according to management policies and annual plans which are decided by a joint committee composed of representatives of the Philippines and the Japanese.

*Pantabangan Dam and Lake*



# The Project Site

## The Natural Environment

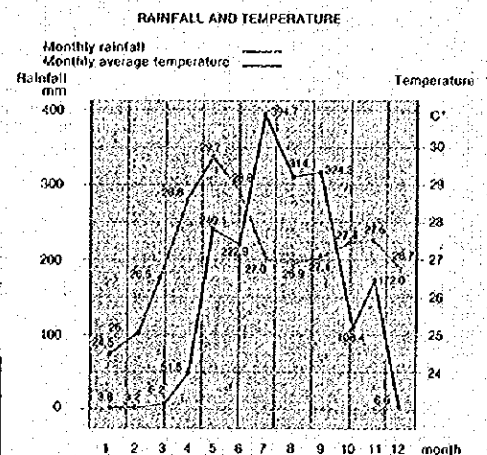
The Project is situated within the Pantabangan Watershed in Nueva Ecija (ca. 16 NB ca. 121 B), approximately 183 kms. north of Manila. Its area covers the northeastern part of Province and adjoins the Cagayan River watershed along the Sierra Madre Mountainside. The Pantabangan River, taking its source from this Divide, flows to the south through the Central Plains of Luzon into the Manila Bay.

The area has an average annual temperature of

27°C, an annual rainfall of about 1,850 mm, and a severe dry season from November to May. Its topography ranges from flat, plateau and rolling hills to steep mountain with elevation ranging from 220 to 950 meters above sea level. Its soil is red podsolic characterized by high acidity and infertility with very poor physical properties. Vegetation in the area consists predominantly of cogon (*Imperata cylindrica*), samon (*Themeda triandra*) and talahib (*Saccharum spontaneum*) with strips of natural forests occurring occasionally.

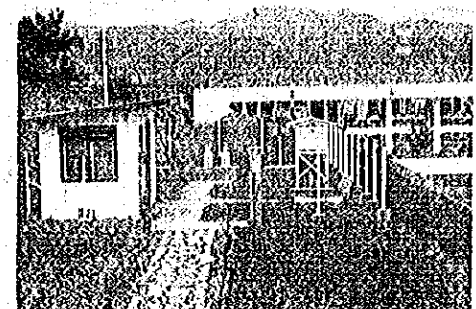


Grass land dominated by Cogon, Samon and Talahib



- N.B.: 1) Rainfall is 1979-1982 average  
 2) Temperature figures were obtained in 1982  
 3) The locality measured is at Carranglan project site.

(FIG. 1)



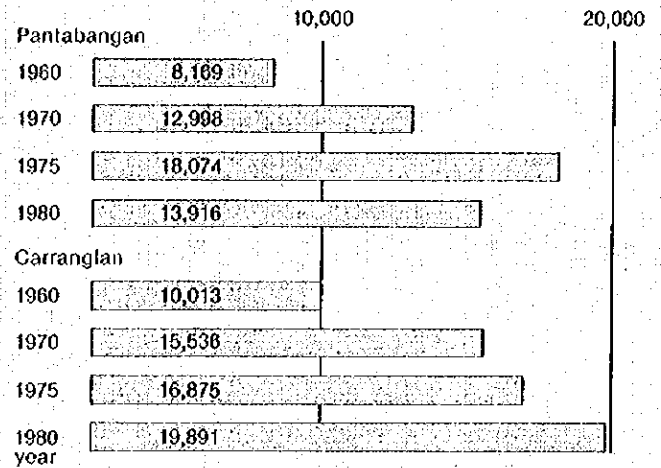
Meteorological observation station in the Training Center

## The Social Environment

The watershed covers two municipalities, namely: Pantabangan and Carranglan. In 1980, these two towns had an aggregate total population of 33,807, majority of whom are dependent on farm income for their livelihood. Being predominantly agricultural with rice as their primary product, the two towns were expected to have been greatly affected by the construction of the Pantabangan Dam in 1974.

The Dam is located in the southern part of Carranglan. Its reservoir was built on the old site of the Pantabangan town. For this reason, a new townsite was opened about 4 kilometers east of the damsite to accommodate the displaced population.

POPULATION OF PANTABANGAN AND CARRANGLAN



(FIG. 2)

*Carranglan Municipality*

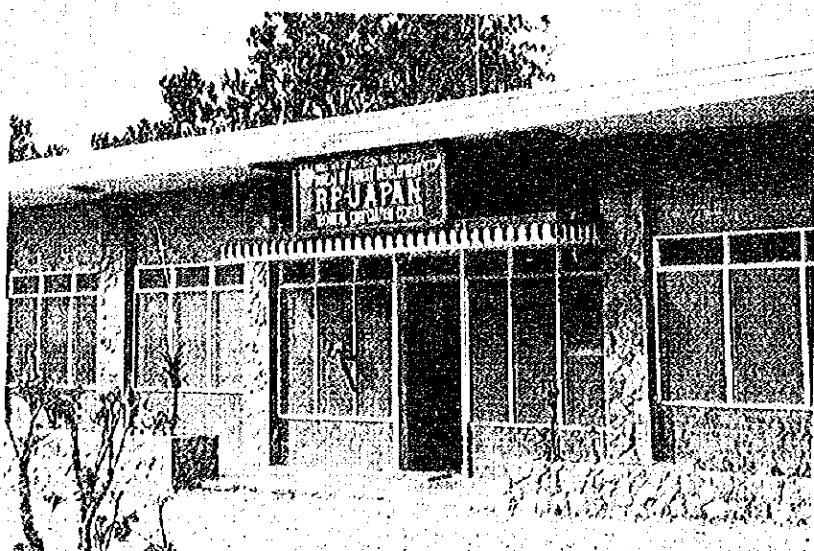


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## The RP-Japan Afforestation Technical Center

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**T**he RP-Japan Afforestation Technical Center aims to develop and improve afforestation techniques and to train the Philippine Technical Staff on said techniques through the establishment of a Pilot Man-made forest plantation and nurseries in Pantabangan. This pilot plantation was to be established in two phases: the first phase consisting of 1,300 hectares of trial plantation while the second phase covers 6,800 hectares of test plantations. Major activities to be undertaken under this component are nursery operations, plantation establishment, protection, and forest road construction.



*The RP-Japan Afforestation Technical Center  
in Carranglan, Nueva Ecija*



*Kick-off plantation of Narra  
(Pterocarpus spp.) in 1977*



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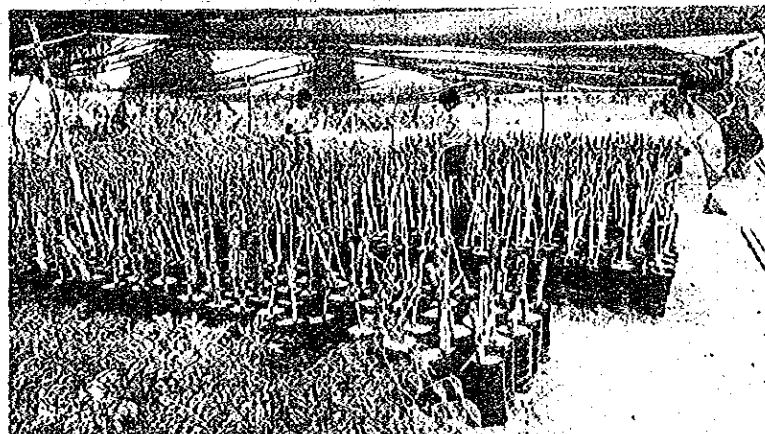
## Nursery

**N**ursery Operations aim in developing techniques for raising vigorous seedlings that will survive the harsh environment similar to that in the project area. These operations are all undertaken during the dry season. Under this operation two methods are being tried: one is direct sowing in beds for bareroot seedlings while the other is sowing in polyethelane pots. For both methods top soil collected from natural forests and compost are used to improve the soil condition in the nursery while watering of seedlings is done twice a day due to the relatively high temperature in the area. A seed orchard was established to supply the seeds needed by the Project and other BFD (Bureau of Forest Development) reforestation projects.

*Raising of Yemane (Gmelina arborea) bareroot seedlings in nursery*



*Raising of Acacia auriculiformis potted seedlings in nursery*



*Raising of Narra (Pterocarpus spp.) cuttings in nursery for experimental Seed Orchard*

## Plantation

Since the Project started in 1977, 5,876 hectares of plantation have already been established (see Figure 4). More than thirty species have been tried of which *Acacia auriculiformis*, Agoho (*Casuarina equisetifolia*), and Yemane (*Gmelina arborea*) show comparatively good initial growth.

The soils of the Project site have generally deteriorated due to fire occurrence making it extremely acidic, infertile and poor in physical properties.

The poor quality of the soil in the planting area coupled with the long dry season from November to May, renders it difficult to attain high survival rate in the plantation. To counter this problem,

several strategies are adopted. First is digging of big holes to improve the soil physical property and to supply organic and chemical fertilizers. Digging holes is a difficult work, and to resolve this problem heavy equipment such as bulldozer, back-hoe and other machines have been used to cultivate especially flat and gently sloping areas since 1981. The use of heavy equipment results in high survival and good initial growth. Second is by selecting species suitable to the site. And third is by mixed planting leguminous species such as *Acacia auriculiformis* or *Narra* spp. with Mahogany (*Swietenia macrophylla*) and/or Yemane (*Gmelina arborea*), to improve soil quality as well as to reduce the occurrence of insects and pests. Mixed planting of fast growing species with long rotation species also ensures continuous production of timber in the area.

Yemane (*Gmelina arborea*) planted in 1978



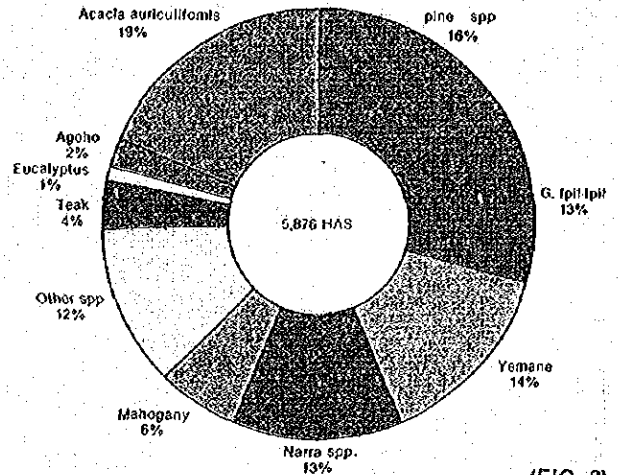
Benguet Pine (*Pinus keslya*) planted in 1977



The Project site is always endangered by fire occurrence because of the long dry season. Thus, it is also important to improve the initial growth of seedlings, that is, it is necessary to step up the height of seedlings as much as possible above the grasses to minimize the damage by fire.

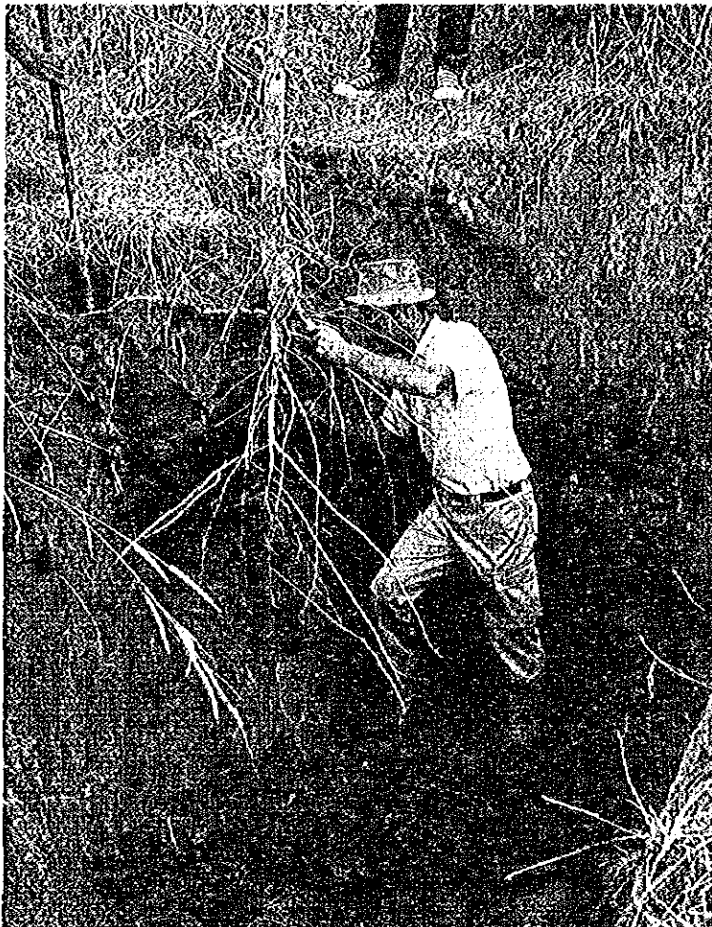
As the planting activities are done only three months in the rainy season, it is difficult to plant the seedlings about 1,000 hectares every year. Therefore, to balance the activities the site preparations are done before the start of rainy season so as not to concentrate the activities at the same time.

PLANTATION ESTABLISHED BY SPECIES  
NEW & REPLANTING (1977-1983)

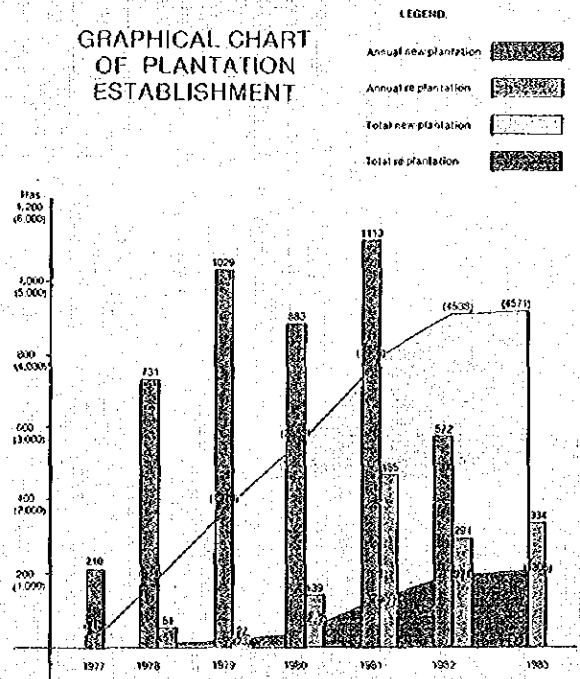


(FIG. 3)

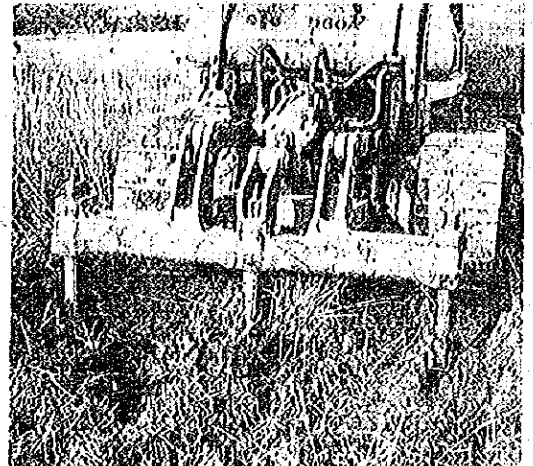
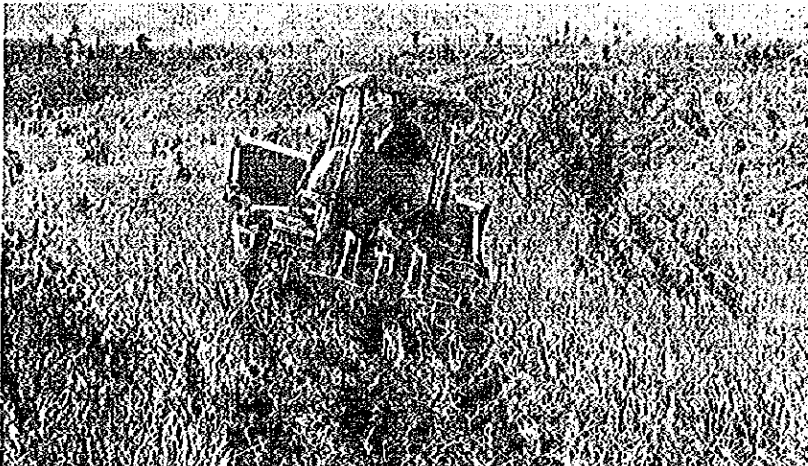
Investigation of roots formation in the soil



GRAPHICAL CHART  
OF PLANTATION  
ESTABLISHMENT



(FIG. 4)



*Mechanical site preparation by bulldozer D-60A*

*Site preparation by manpower*





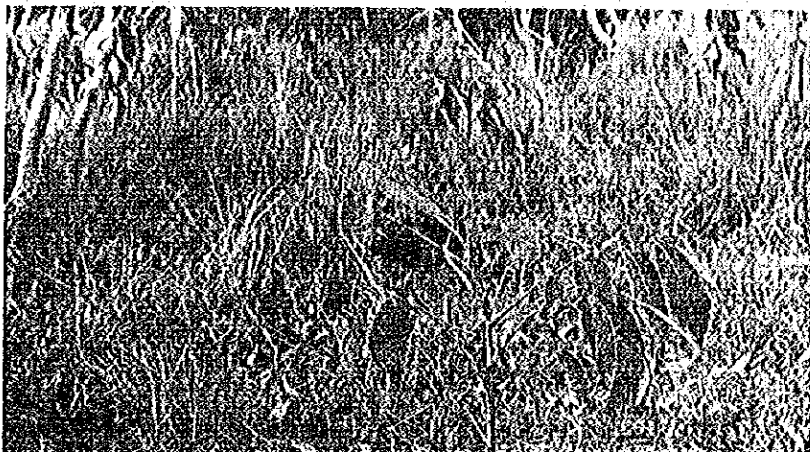
*Eucalyptus camaldulensis* planted in 1977



Mabogany (*Swietenia macrophylla*) planted in 1977



Agobo (*Casuarina equisetifolia*) planted in 1977



Mabogany (*Swietenia macrophylla*) seedlings planted in 1983 under *Acacia auriculiformis* planted in 1980

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## Forest Road

**F**orest roads are essential for plantation establishment protection and maintenance. Forest roads are therefore constructed extensively in the Project.

The construction of forest roads aims to provide techniques on the proper arrangement, construction, and repair/maintenance of roads for the efficient operation during plantation establishment.

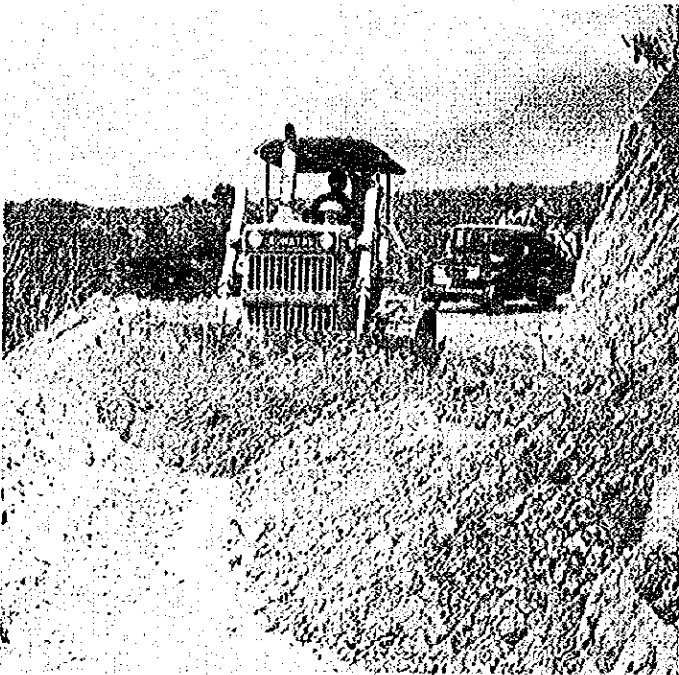
There are two kinds of forest roads: Main roads are constructed to be more or less permanent and are passable even in adverse weather conditions. They are built primarily to connect communities and transport seedlings, machineries, laborers and other materials. Consequently, main roads also serve as public roads. Operational roads are constructed for the use during plantation establishment and maintenance. Compared to main roads opera-

tional roads are less permanent in nature and are maintained for shorter period of time.

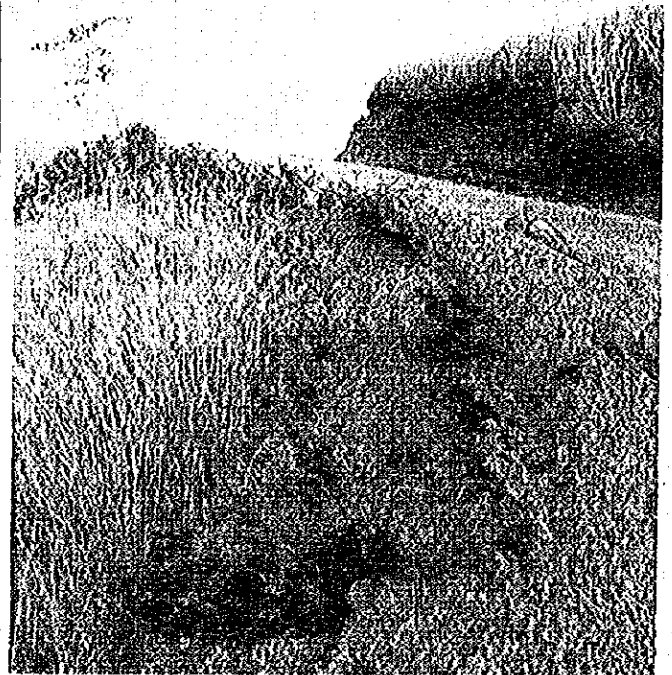
The arrangement of forest roads has vast influence on the efficiency of plantation operation and on road maintenance/repair. Forest roads are constructed on ridges, because this makes hauling of planting materials, and the control of forest fires easier. Moreover, the construction cost is lessened owing to lesser soil volume involved and lesser supporting structures, such as drainage pipes.

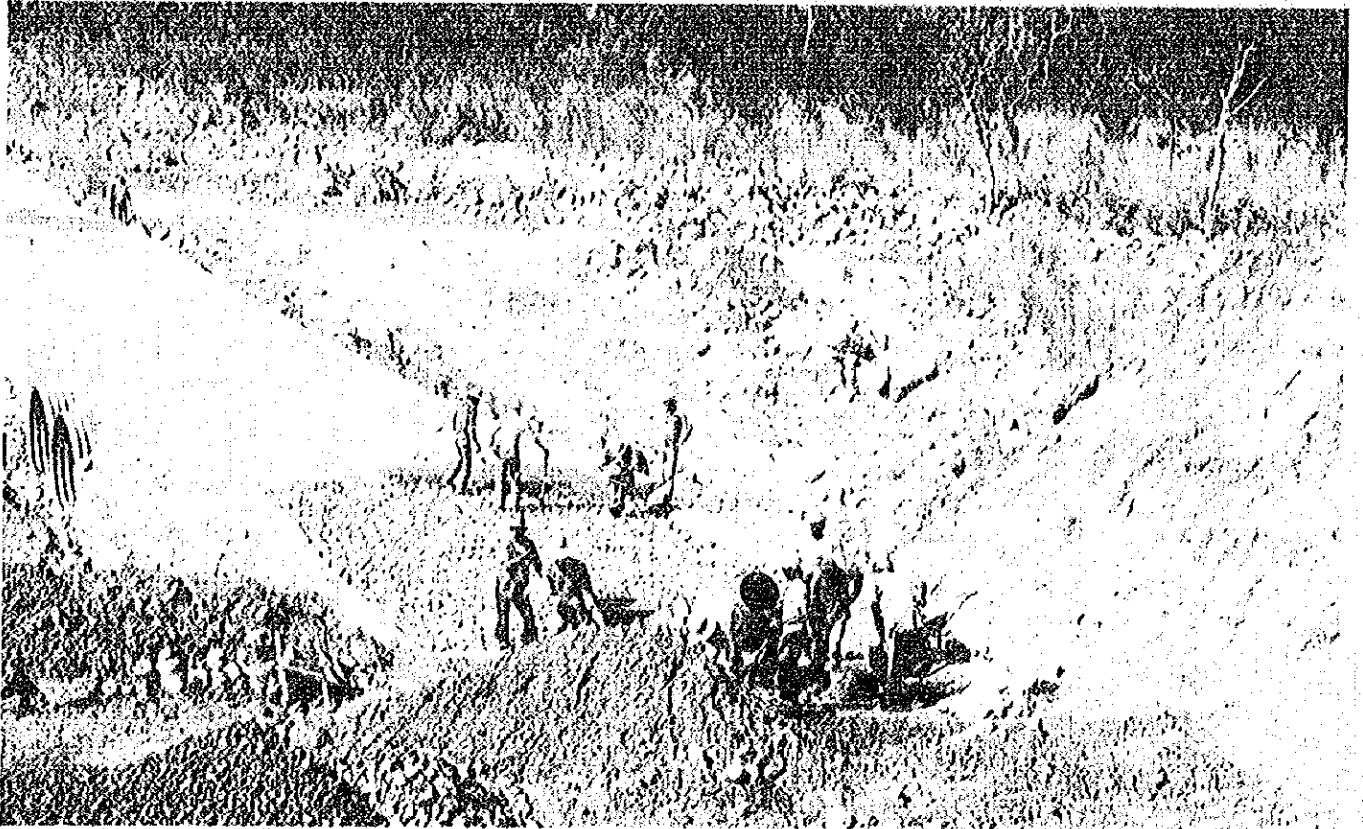
Constructed forest roads are maintained to be in passable condition all the time. In the Project, direct seeding of Kakawate (*Gliricida septium*) and Giant Ipil-ipil (*leucaena leucocophala*) have been used to stabilize the roadside.

*Construction of forest road by bulldozer*



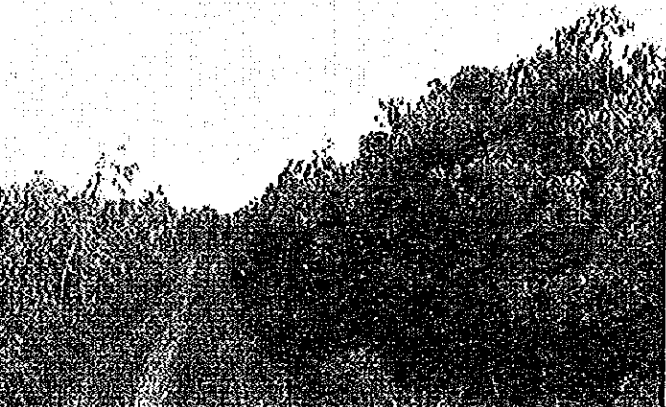
*Roadside stabilization by direct seeding of Kakawate (*Gliricida septium*)*



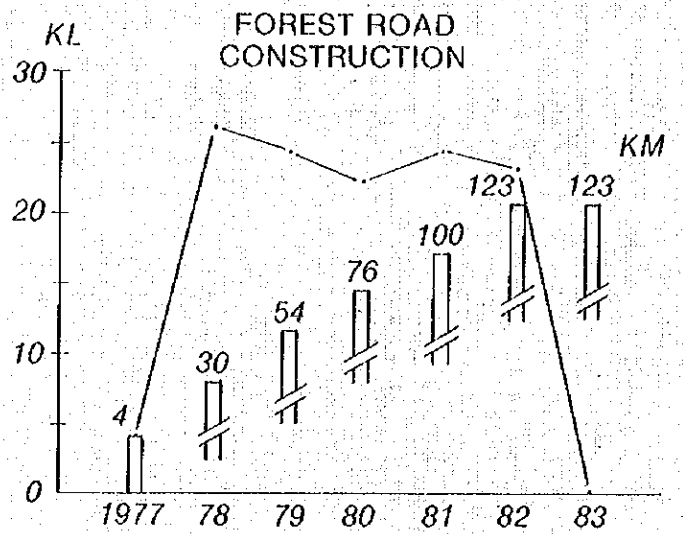


*Overflow construction in the Diaman River*

*Main forest road constructed for all weather.*



*Operational road used for plantation establishment and maintenance*



(FIG. 5)

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## Protection

### A. Pests and Diseases

**I**n the Project some damages by insects-pests and diseases are observed. Studies are being conducted to determine the extent of damages caused by these destructive agents.

*Preliminary findings reveal the following:*

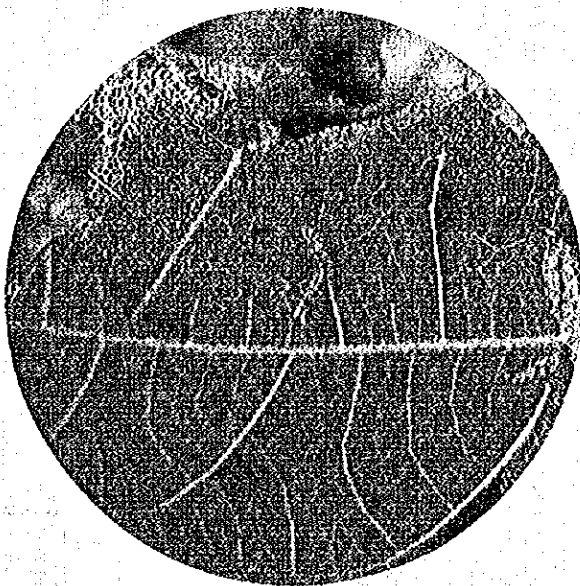
a. Damping-off is the most serious disease observed in nurseries. Affected seedlings, however, may recover with the timely applica-

tion of hydroxyisoxazol (Tachigaren) solution.

b. Roller moths have caused the browsing of leaves of Yemane (*Gmelina arborea*), Narra spp. and teak (*Tectona grandis*) in the plantation although this has caused minor damages.

c. Shoot moth attack has greatly affected the growth in all pine plantations; and

d. Die-back occurs in young teak trees but not on older ones. It has also been observed on *Acacia auriculliformis*, though the cause has not yet been identified.



*Larvae of roller moth at Teak (*Tectona grandis*)*

*Benguet Pine (*Pinus Kesiya*) shoot attacked by shoot moth*





## B. Fire

**T**he dry season is long in this area of the country. During the dry season grasses are very easy to burn. Once a fire is hit, it spreads with great rapidity in the area.

Forest protection activities consist of patrolling, detection of fire, fire suppression, fire break construction, fire-fighters training and education.

Look-out towers equipped with compasses for confirmation of the location of fire occurrence and radio transceivers for communication, were con-

structed for detection of fire and are manned 24 hours a day. All the planted areas are patrolled to detect early occurrence of fire. Permanent and collapsible water tanks are also installed in strategic locations.

Fire breaks, 20-30 meters wide, are established on plantations by man power and bulldozers. The use of Kakawate (*gliricida septum*) and banana plants as greenbelts are also lately being tried. To invite the cooperation of forest occupants for the protection of the project plantations, fruit bearing are planted along boundaries.

Look-out tower equipped with compass and radio transceiver



Fire fighting  
Firefighters training



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## Family Approach

**T**he Family Approach Program was started through the support of JICA in 1981 for the purpose of uplifting the socio-economic condition of the local people at the same time increasing their awareness on the need to afforest the watershed. The program is being carried out through a contract between the government and the people living around the project area, requiring the latter to establish forest plantation by themselves under the supervision of project personnel. In return, the participants are paid based on sur-

vival rate and growth progress in the plantation. Aside from the monetary benefits derived from forest plantations, the participants are also allowed to cultivate their own crops in between trees, giving them added source of income for their family. No less than 98 families have already participated in the Program since its inception in 1981.

The family approach is an effective program towards fire prevention.

*Acacia auriculiformis* planted by participants



*Pre-planting instruction for Family Approach Program participants by the Project personnel.*



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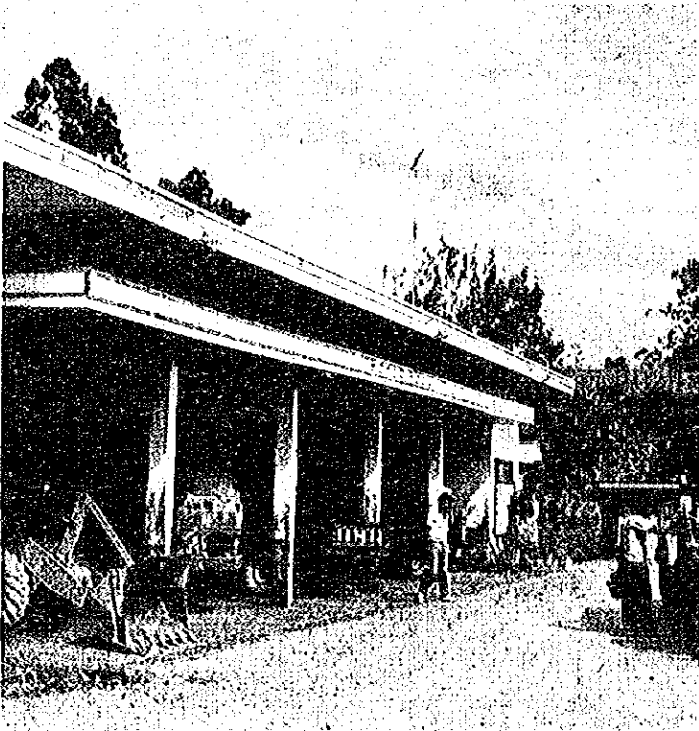
## Motorpool

To implement afforestation on a large scale smoothly various machineries, including vehicles, such as bulldozer, shovel, motor grader, dump truck, cargo truck and pick-up are essential.

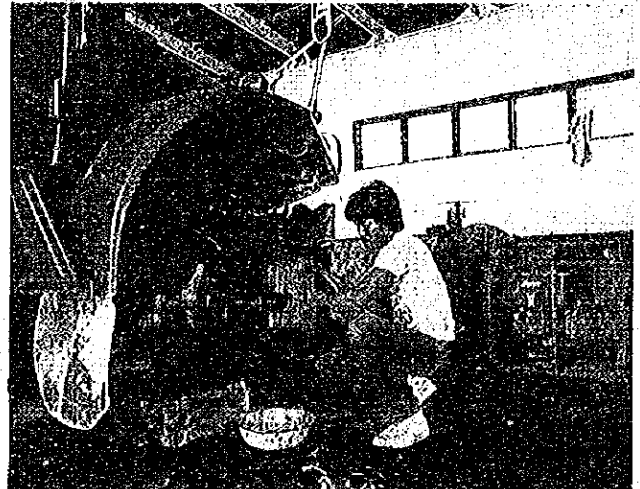
To keep these machineries always in top working condition, the motorpool with necessary tools and facilities was established for proper care and maintenance activities.

The mechanical staffs are being trained in big notable motor and heavy equipment companies to accelerate the proper maintenance of the various vehicles and equipment.

*Motorpool with necessary equipments*



*Servicing a vehicle by the mechanical staff*



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## RP-Japan Training Center for Forest Conservation

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**T**he Training Center was designed to develop and improve the techniques on forest conservation, and to develop human resources to disseminate them.

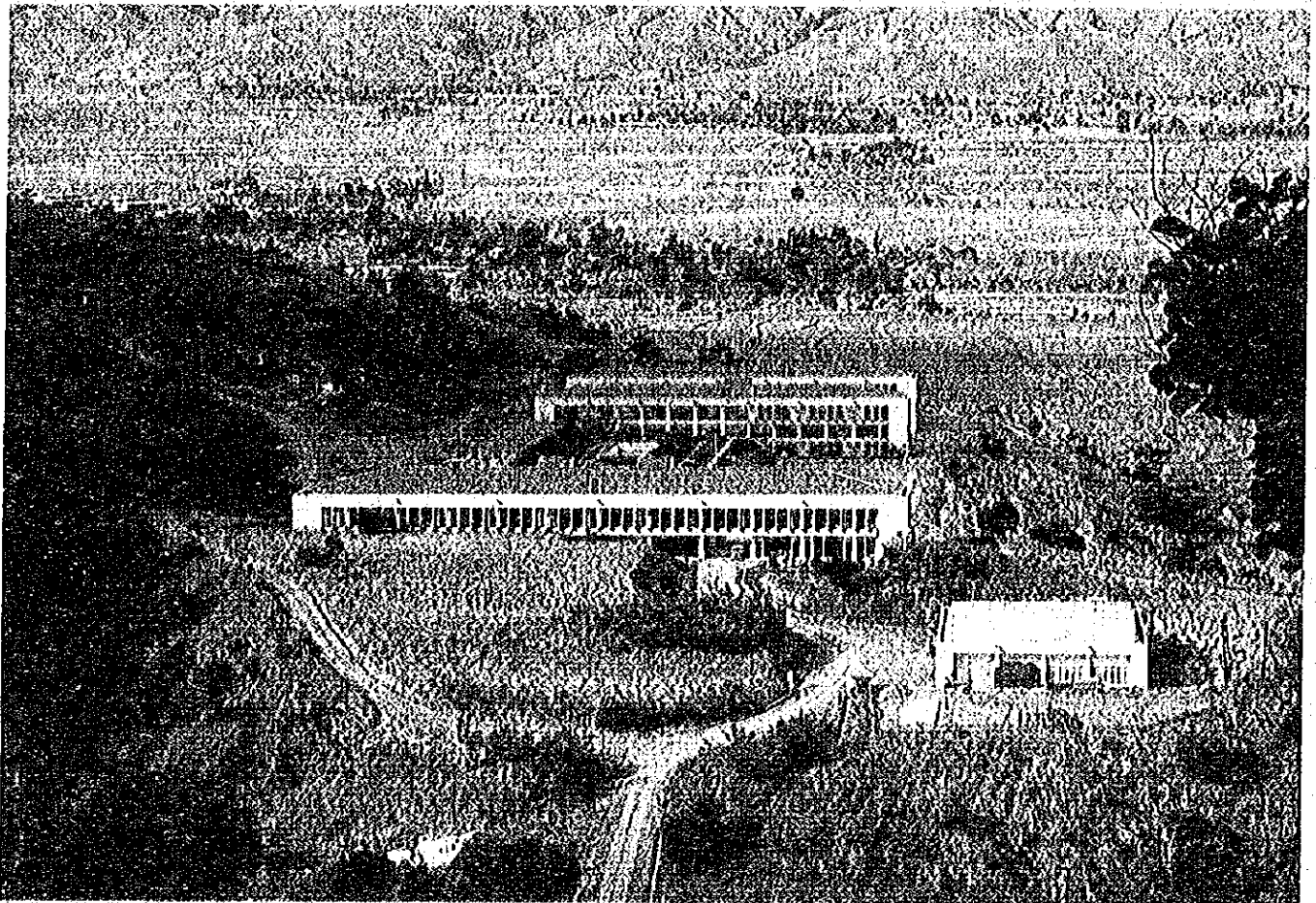
Before its construction, there were serious problems encountered in the Pantabangan Watershed. Solving said problems would require the rehabilitation of many scattered and small devastated areas into green lands through structural methods within a short period time. The said problems actually confronted are how to check the soil erosion from landslide areas, how to select effective vegetations to prevent the soil loss and how to do them with speedy and economical way. The development of techniques to undertake these

activities is the main concern of the Training Center.

The Training Center was established to solve the said problems and to spread the forest conservation techniques not only on the Pantabangan but nationwide area as well.

The Training Center is involved in all aspects of training work as well as in the development and improvement of techniques on forest conservation. To promote these activities various kinds of facilities, including soil and concrete test laboratory, Model erosion Control facilities and others, are being used in the Center.

*Panoramic view of the RP-Japan Training Center for Forest Conservation*



ROGELIO B. BAGGAYAN  
AS GUEST SPEAKER

23 JULY 1988



*Closing ceremony with the guest from BFD  
central office*



*Inauguration at the Training Center*

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## Training

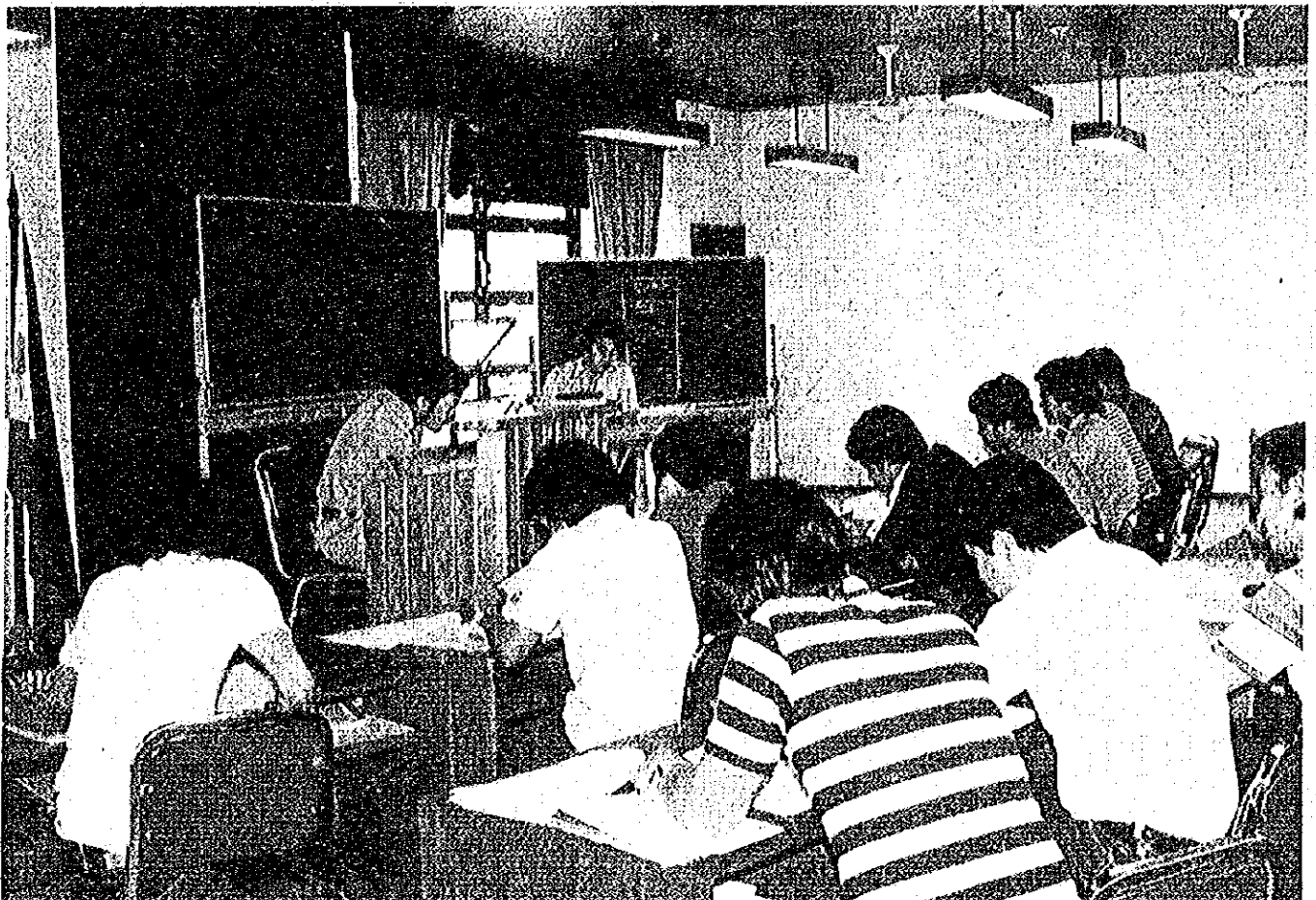
**T**raining programs conducted in the center aim to develop effective and efficient technical managers to implement forest conservation projects. The Training Center offers theoretical and practical courses to foresters and forestry technicians on the field of water and soil conservation, silviculture and forest protection. These training courses are carried out according to the Basic Plan as follows:

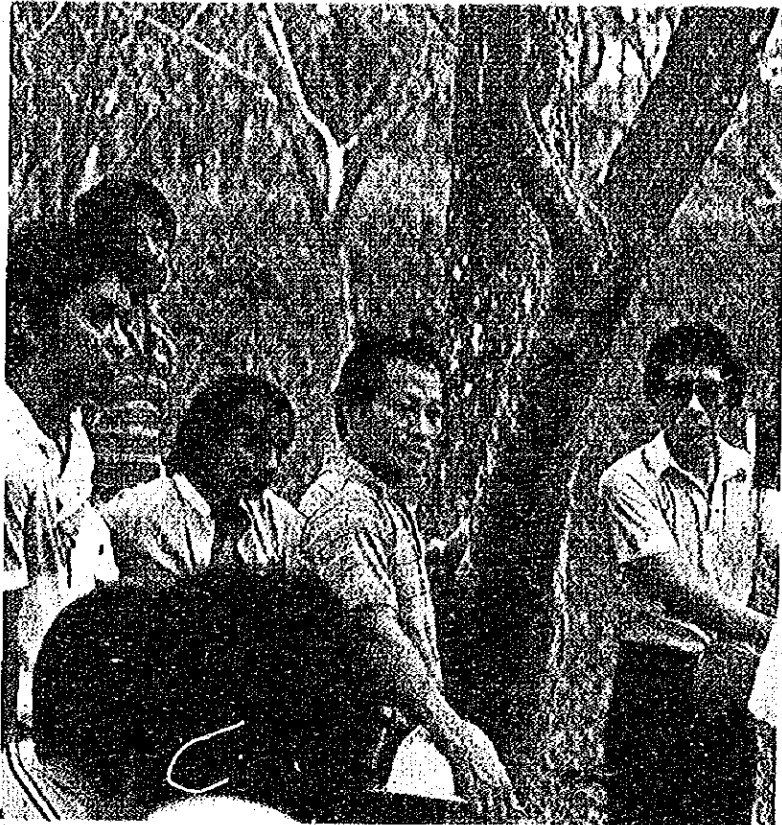
1. Ordinary course
  - a. Middle Level Forestry Technician Training Course;
  - b. Equipment Operation Course

2. Senior Course
  - a. Senior Course on Forest Conservation
  - b. General Senior Course.

The Middle Level Forestry Technician Training is conducted through a fund assistance from the Japanese government. It aims to provide foresters and forestry technicians with technical skills and knowledge on the field of forest conservation and/or silviculture. Under this training program, 250 forestry technicians will be trained within a period of five years since 1982. So far 150 technicians have already graduated from the course (as of March 1984).

*Lecture at the Training Center "Forest Road Construction" at the Forest Conservation Course on the Middle Level Forestry Technician Training*





*Practice at the University of the Philippines,  
Los Baños.  
"Tree Stand Improvement" at the  
Silviculture Course.*



*Practice at the Training Center.  
"Surveying (Theodolite)" on the Forest  
Conservation Course.*



*Practice at the Training Center.  
"Concrete Work" on Forest Conservation  
Course.*

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## Model Erosion Control Facilities and Model Infrastructure

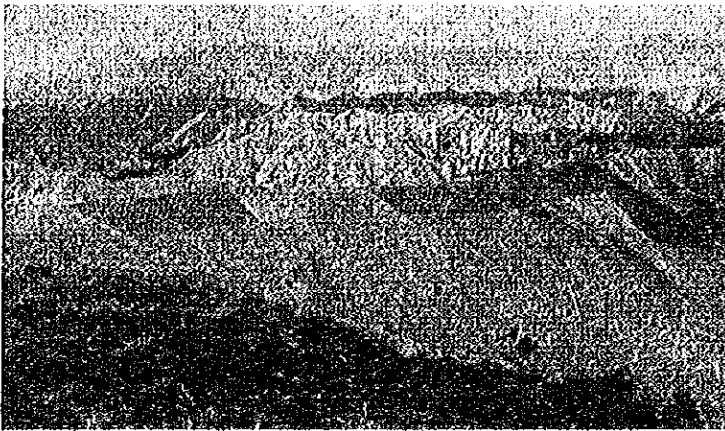
**M**odel Erosion Control Facilities were constructed in 1980, about 8 kilometers away from the Training Center, to make it effective to disseminate the technique on erosion control works. They have a role for the field on the trainings.

In the preceding year, the landslide area was subjected to long heavy rainfall resulting in excessive landslides. Sizeable amount of soil on these areas were eroded to the downstreams. As an immediate measure, over 10 spot check dams including a steel dam were constructed along the mainstream, some of which will serve for research relative to the study of forest conditions and water cycle. Various kinds of hillside works and planting works were also established as Model facilities.

Model Infrastructures were built in December 1983, as one of the show cases for erosions control. They were constructed for the purpose of restoring landslide areas and stream ruined by typhoon in 1978. Since the Model work arrangements and methods were applied, these infrastructures, consisting of the simple hillside works and stream works, are being used as permanent teaching materials for forest conservation techniques.

These infrastructures are situated near the Training Center — are accessible by road and visible from the town of Carranglan, giving them a good understanding on the significance of forest conservation.

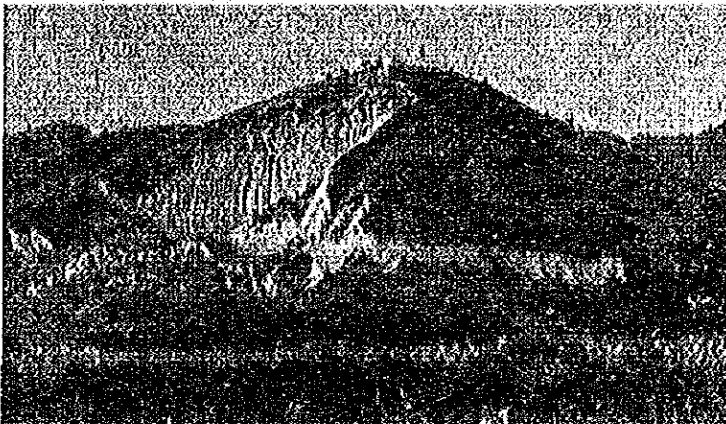
*Former condition just after construction*



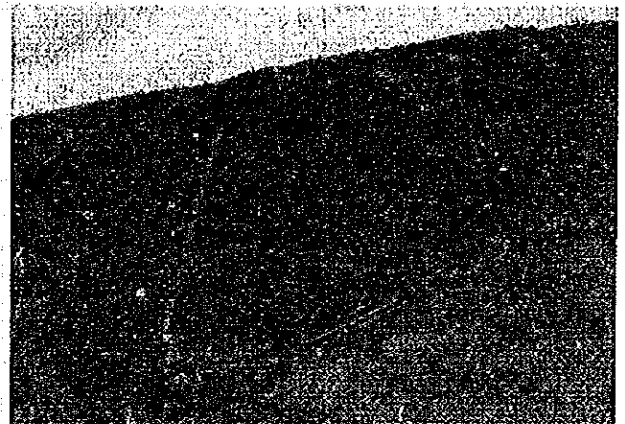
*Present condition of the site, Parcel one, Tubuan, Carranglan, Nueva Ecija (Model Erosion Control Facilities)*



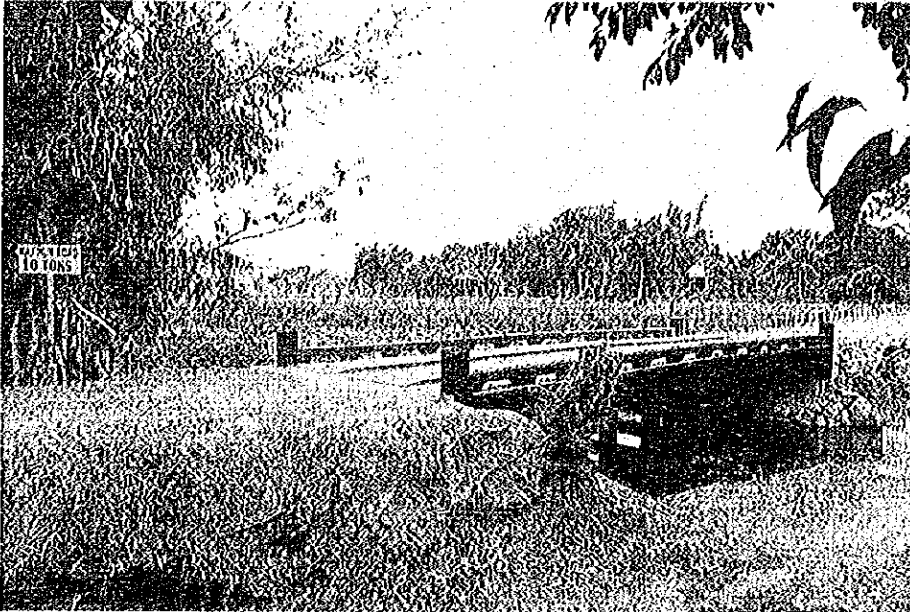
*Hillside condition before construction*



*Hillside foundation work just after construction, Baluarte, Carranglan, N. E. (Model Infrastructure)*



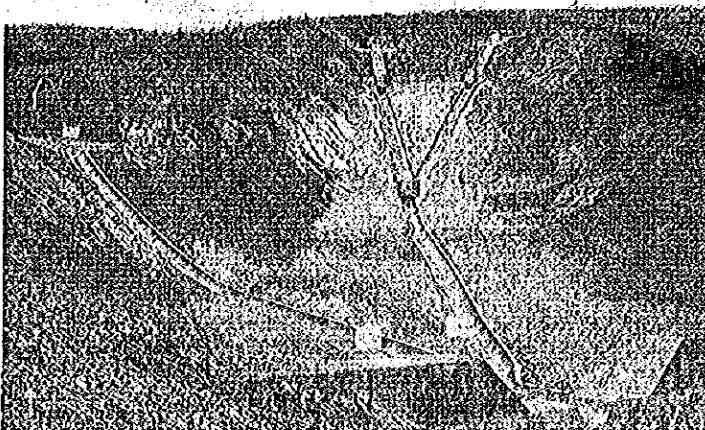




*Rebuilt wooden bridge just after construction, Bantug, Carranglan, N. E.*



*Hillside condition before construction, Talatalan, Carranglan, N. E.*



*Hillside foundation work just after construction, Talatalan, Carranglan, N. E. (Model Infrastructure)*

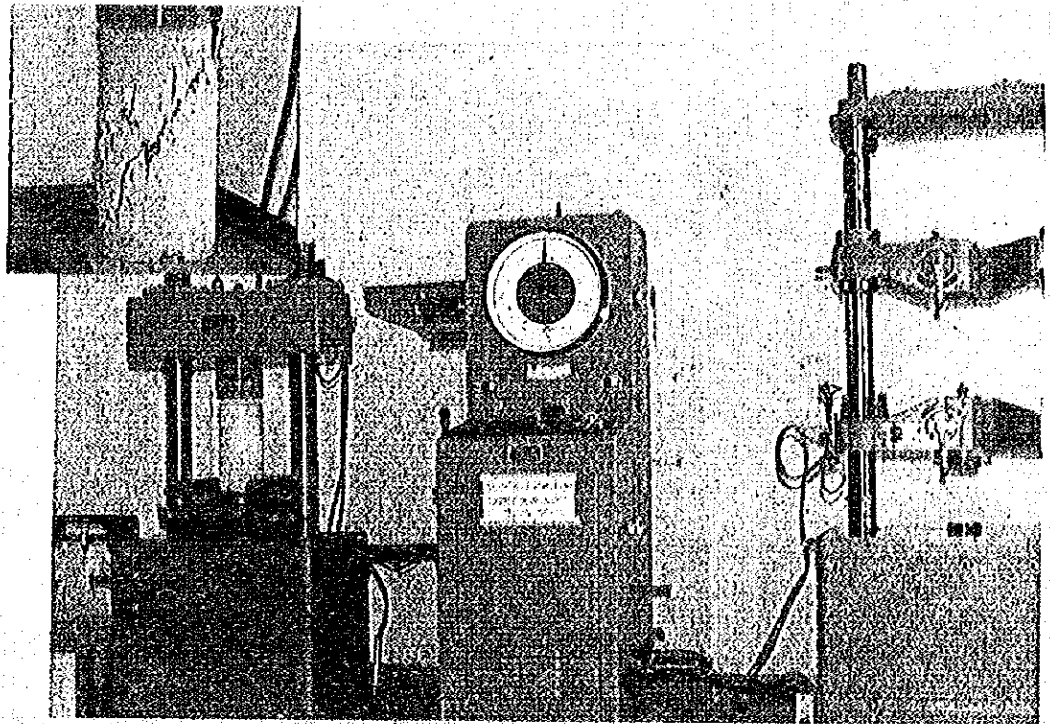
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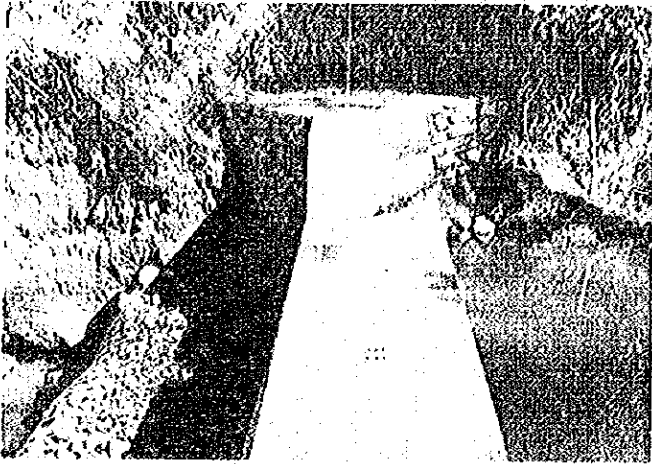
## Development and Improvement of Techniques on Forest Conservation

The main objective is to come up with various techniques on said forest conservation and soil erosion which can be applied not only in the Pantabangan area but throughout the country as well. For this purpose, even small scale erosion control methods are practiced in order to determine the most suitable approach in a given site. Based on experiences in the Training Center some basic guidelines on the development and improvement of techniques on forest conservation may be outlined to wit:

1. in rehabilitating landslide areas, it is practical to introduce vegetative measure using pioneer control facilities.
2. methods and materials for erosion control should be selected based on their adaptability and suitability to the site.
3. for demonstration purposes, work methods using industrial materials, such as wire basket, may be adopted.
4. inter-relationships among devastated forest land, water run-off and soil condition in tropical forest zone should be considered.

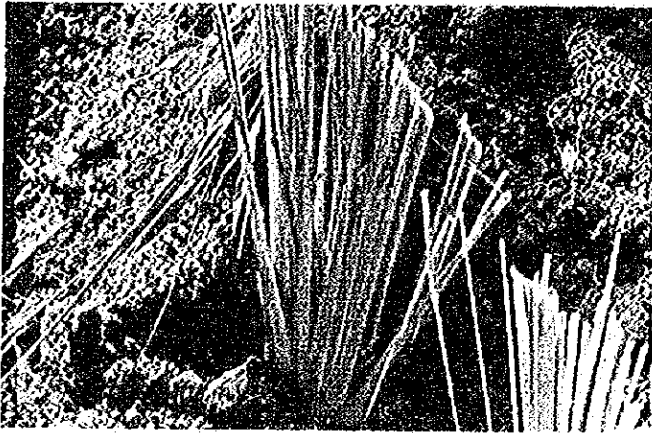


*Compression and universal testing machine at the Training Center (under testing the strength intensity of concrete piece)*



*Small scale check dam by concrete,  
Baluarte, Carranglan, N. B.*

*Vegetative measure for erosion control,  
"Talahib" (*Saccharum spontaneum*)*



*Vegetative measure for erosion control,  
"Napier Grass" (*Saccharum spp.*)*



*Vegetative measure for erosion control,  
"Sun Flower" (*Helianthus tuberosus*)*



*Vegetative measure for erosion control,  
"Kakarate" (*Gliricida spium*)*



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## Other Activities

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**I**n the Project, local people work harmoniously with the Project. To give them job opportunity and let them know the purpose, the community meeting, film showing every year and also poster contest for students for fire prevention are carried out.

Moreover, sports such as the basketball, volleyball and pre-planting ceremonies are conducted to harmonize with local people. Before establishing plantation, preplanting ceremonies prior to start the planting season are conducted.

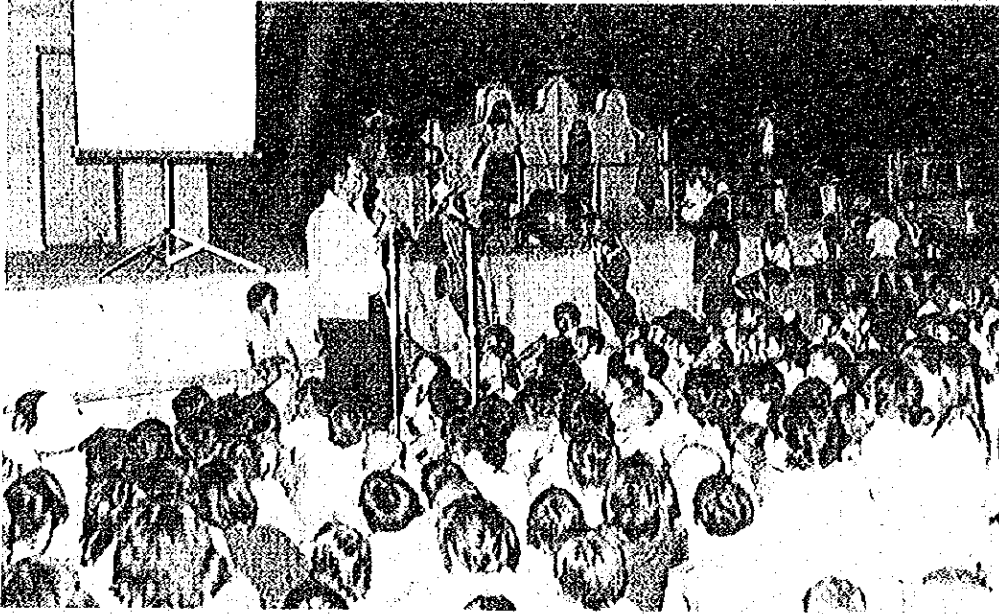
Recently, many visitors from different countries have visited the Project to observe various techniques and development of the Project.

*First prize winner for Fire Prevention  
Poster Contest in 1982*



*Volleyball tournament with the local people*

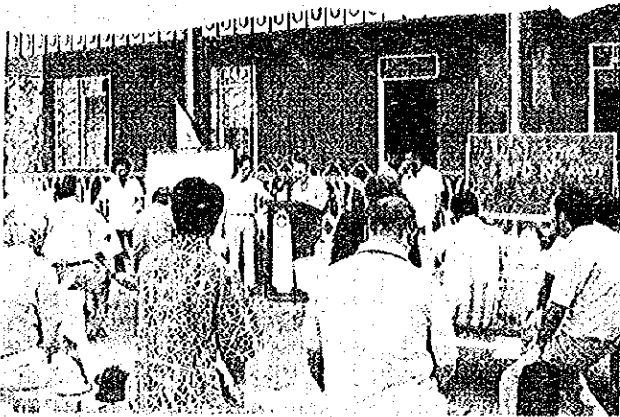




*Film showing and informational dissemination*

*Foreign visitor observed the project*

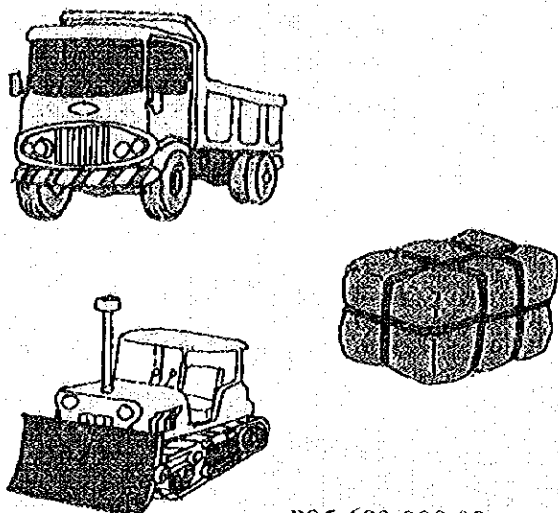
*Pre-planting ceremony with the participants*



## Main Cooperation by JICA

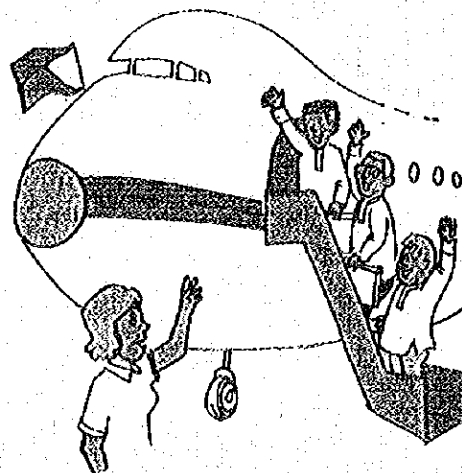
After the establishment of the Project, the main cooperation by JICA is the following:

### 1. Grant of Equipment



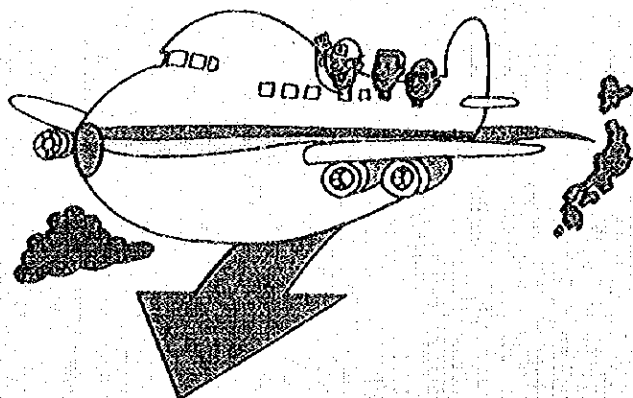
₱25,693,000.00  
(As of the end of 1983)

### 3. Training of Counterparts in Japan



21 Filipino Foresters  
(As of the end of 1983)

### 2. Dispatch of Japanese Experts



31 Long term Experts  
(As of January, 1984)

### 4. Assistance for Infrastructure

Forest Road  
Check Dam  
Overflow  
Permanent Water Tank  
etc.

₱5,473,000.00  
(As of the end of 1983)

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## Japan International Cooperation Agency

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**T**he RP-Japan Forestry Development Project has been implemented based upon the Record of Discussions reached in 1976 between the Japanese government and the Philippine government.

The Japanese government provides necessary technical assistance through the Japan International Cooperation Agency (JICA). And the Project has been conducted by the technical cooperation scheme which is called "project-type technical cooperation."

What is JICA? What is "project-type technical cooperation?" With a view to promoting international cooperation for the social and economic development of the developing world, JICA was established by the Japanese government on August 1, 1974.

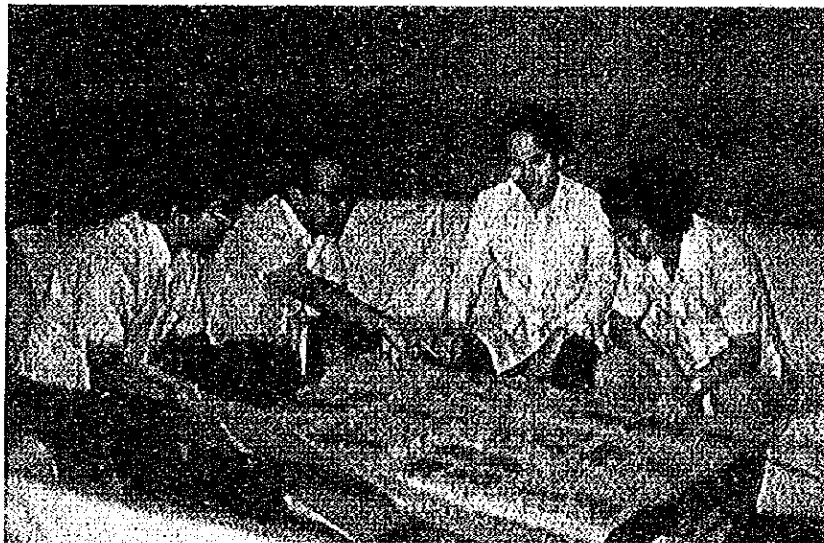
JICA is the sole government agency of Japan whose main function is to extend technical cooperation to developing countries based on agreements between the Japanese government and the governments of such countries.

Such technical cooperation is designed to help developing countries in their economic and social

development. For this purpose JICA:

- (1) accepts people from developing countries for technical training in Japan
- (2) dispatches Japanese experts and Japan Overseas Cooperation Volunteers (JOVC) members
- (3) dispatches survey teams to help in formulating development plans and projects
- (4) recruits and trains Japanese experts to be dispatched abroad
- (5) supplies necessary equipment for technical cooperation
- (6) promotes capital grant assistance to the developing countries

The acceptance of trainees, the dispatch of experts, and the grant of equipment constitute three basic components of JICA's technical cooperation programs. They are sometimes combined to form a technical cooperation scheme which is called "project-type technical cooperation". These three components integrated into a specific development project will serve it comprehensively and systematically, from its planning to follow-up evaluation.



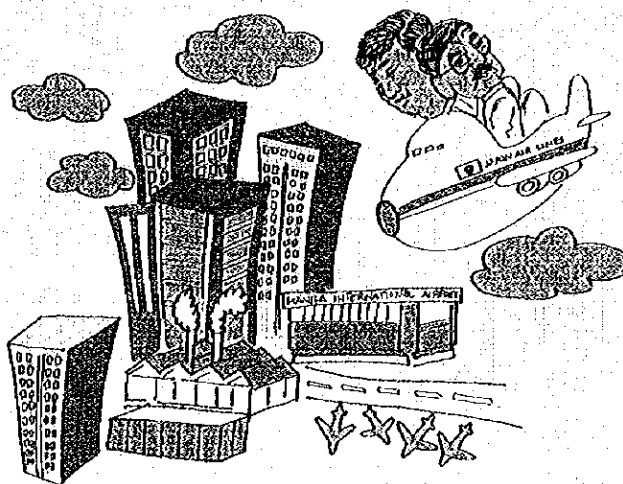
*Meeting at JICA Manila Office*

## Chronological Events

- May 1973 — Request to Japanese Ambassador to the Philippines by the Minister of the then Department of Agriculture and Natural Resources.
- September 1973 — Discussing the matter between the Minister of the Philippines and the Minister of Agriculture, Forestry of Japan.









- October 1973 — Request by an official letter of the Philippine Government through the Japanese Embassy
- Feb. - March 1975 — Follow-ups request Japan to send the forestry survey mission.
- April 1975 — Pre-feasibility studies by JICA.
- October 1975 — Preliminary negotiation by both sides.
- December 1975 — Second forestry survey by JICA.
- June 1976 — Signing of the Record of Discussion by BFD and Japanese forestry survey team by JICA.
- November 1976 — Activation by two Japanese experts arrival.
- July 1982 — Extension of Record of Discussion for another 5 years.





# MAP of the Project Site

MAP SHOWING PROPOSED  
RP-JAPAN TECHNICAL COOP.  
PROJECT SITE

-  PROJECT SITE
-  CENTRAL TRIAL PLTN.
-  ALIENABLE AND DISP
-  FOREST LAND
-  RP-JAPAN TECHNICAL COOPERATION CENTER
-  RP-JAPAN TRAINING CENTER

