

# Observations And Impressions On Some Aspects Of Forestry In Indonesia

By TIBURCIO S. SEREVO  
*Associate Delegate*

## STUDY TOURS:

In connection with the Third FAO Regional Conference for Asia and the Far East held in Bandung, Indonesia on 8-10 October 1956, study tours were made by the entire delegations attending the Conference on 14 October and 17-18 October 1956. Some members of the Philippine Delegation made study tours on 20 October 1956.

The study tour on 14 October 1956 was made in Lembang and Tjimindi. The projects visited were the Commercial Crops Research Station, Agricultural and Veterinary Projects, Forestry Projects, and Faber Vegetable Raising Project. In mid-afternoon a visit was made to Bodjonglao Fish Breeding Project at Tjimindi.

The study tour on 17-18 October 1956 was made in Tjiandur, Tjibodas and Bogor. In Tjiandur observation was made on the method of rice planting. In Tjibodas visits were made to Tjibodas Mountain Gardens, Gunung Mas Tea Factory and the Experiment Garden. In Bogor, visits were made to General Agricultural Research Station, Veterinary Institute, Central Animal Husbandry Experiment Station, Faculties of Agriculture and Veterinary Surgery, Soil Research Institute, Forest Research Institute and Bogor Botanical Gardens.

The study tour on 20 October 1956 was made by three Philippine Associate Delegates to Sumedang Extension Office and the farm cooperatives in two villages.

## GENERAL INFORMATION ON FORESTRY IN INDONESIA:

All forests throughout Indonesia are managed and supervised by the Government. The Forest Service of the Republic of Indonesia is the largest service in the Ministry of Agriculture.

In Java all forests, teak and non-teak, are state-owned and managed by the Forest Service, except 2,625 sq. km. which are owned by the industrial corporations, cooperative societies, etc. Most of the teak forest are situated in Java and some other islands.

In the OUTER TERRITORIES, Forests of Self-governed Territories are partly not managed by the Forest Service and their administration is partly executed by this Service and is based on development and management plans in order to obtain a durable and progressive yield.

Communities also owned forests—communal forests—and they have full rights over their forests. These communities have, however, to ask the Forest Service for advice for a rational maintenance and utilization of these forests.

*Forest Area:*—Indonesia has a total land surface area of 1,483,293 sq. km. of which 797,946 sq. km. are covered with forest. Of the total forested lands, 633,846 sq.km. are accessible and 164,100 sq.km. are inaccessible. Of the accessible forests, 160,118 sq. km. are state forests, 471,103 sq.km. are communal forests, and 2,625 sq.km. are pri-

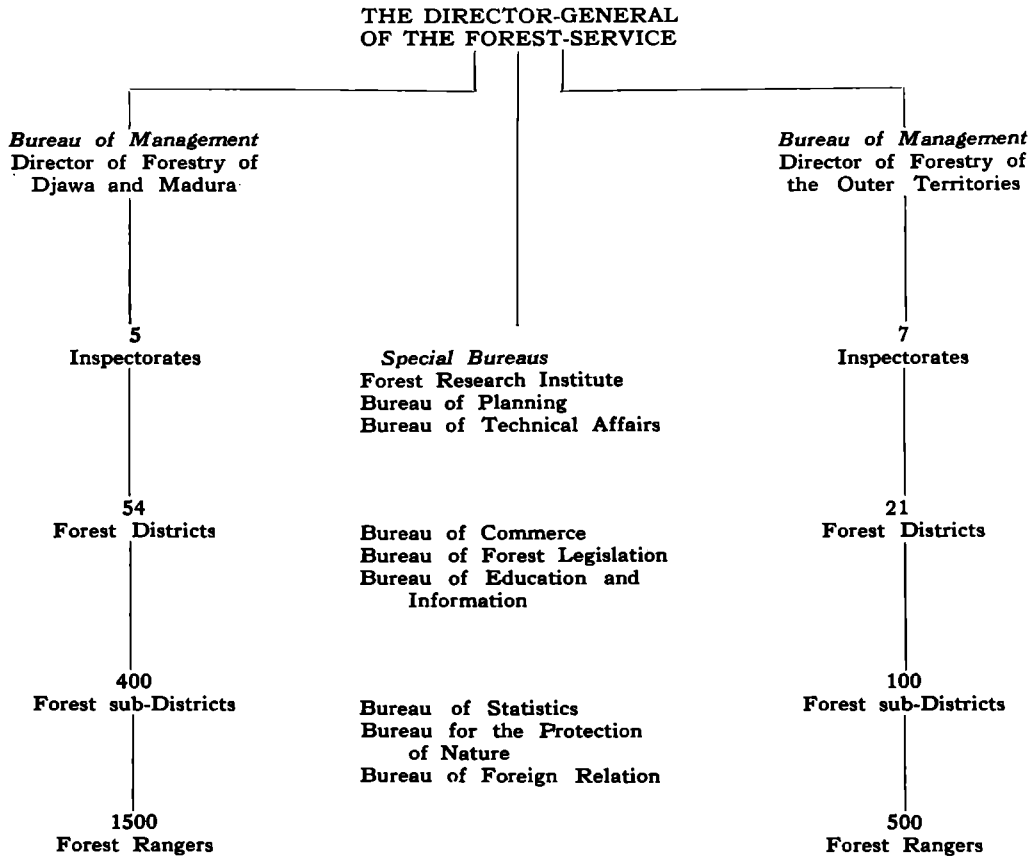
vately owned (located in Java as above-stated).

*Organization of the Forest Service:*—The organization of the Forest Service of Indonesia is centralized in Djakarta headed by

the Director-General who is fully responsible to the Minister of Agriculture.

The general organization is depicted in the attached chart.

### SCHEME OF THE ORGANIZATION OF THE FOREST SERVICE OF THE REPUBLIC OF INDONESIA



Forest administration on Java has developed more than half a century. However, forest activities in the Outer Territories have taken place only in recent years. Due to increasing demand of timber both locally and abroad, more attention has been made on the economic utilization of non-teak species which were considered to be of inferior quality during pre-war time.

A greater part of the forests in the ter-

ritories outside of Java are still under way. Exploitation and management are still in development phase.

In order to perform its activities the Forest Service functions through institutes and bureaus as depicted in the chart. These institutes and bureaus cover the various aspects of the duty of the Service.

The Forest Research Institute carries out basic research and experiments concern-

ing silviculture as well as forest products technology. The Planning Bureau carries out surveys on a large scale to create development and management plans. Much progress has been made on survey by means of forest-photo-interpretation complemented by ground survey. The Bureau of Technical Affairs takes charge of exploitation—especially mechanized—in the forests of thinly populated regions. Two Indonesian trainees in Mechanical Logging Training Center held in the Philippines in 1952-1953 are assigned in this Bureau.

**Silviculture:**—In Indonesia, particularly on Java, after every clear-cutting new planting (cultivation) is carried out at the shortest possible time to prevent deterioration of the open land.

Taungya-system is the only best way, where the contractor-planters are allowed to plan their food crops between the rows for two years. Labor-planting (cultivation) is the other method especially on the cultivation of *Pinus merkusii* on lalang-grass (*Imperata sp.*) fields. Natural regeneration is ordinarily applied in the Outer Territories for Dipterocarp species.

Regular thinning of plantations is carried out to cut down suppressed and sick trees to obtain valuable stand and maintain fertility of the soil.

Reforestation and afforestation have been intensively and extensively carried out. For the five-year period from 1950 to 1954, 235.6 thousand hectares were planted or an average of 47.1 thousand hectares a year.

**Forestry Education:**—Forestry Education in Indonesia is of four categories, namely: (1) Primary Education, (2) Secondary Education, (3) Semi-University Education, and (4) University Education.

The *first category* is a Forest Police School of one year duration. Graduates of this school will become forest rangers whose principal job is police work. Besides, they also supervise planting work, exploitation and other technical forestry operations in their own forest police district.

**Requirements for admission:** Selected foremen who have shown ability and diligence in their daily work, having at least four years of active service and not more than 30 years of age.

**Purpose:** To raise the knowledge of non-forestry educated personnel on forestry and forest management.

The *second category* is of two types, namely: (a) Senior High School of Forestry, and (b) Advance course for lower educated middle ranking personnel. The first type is of three years duration while the second type is of two years duration.

**First Type: Requirements of admission**—Selected from graduates of Higher Grade Schools, physically and mentally healthy, able to do hard work, nature loving, and not more than 17 years of age. **Purpose**—To educate young men for middle ranking personnel, especially sub-district officers. All students are free of school fees, obliged to stay in dormitories free of charge, but they have to draw up a five-year contract with the Forest Service after having finished the study.

**Second Type: Requirements for admission**—Forestry officers having passed the Junior Forestry High School on pre-war and post-war conditions, which has been abolished to prevent difficulties in personnel policy. **Purpose**—To increase the knowledge of lower educated middle ranking personnel to enable them to occupy higher middle ranking functions and to give the opportunity to enroll in the Academy of Forestry after selection.

The *third category* is the Academy of Forestry of two years duration. **Requirements for admission**—Selected Forestry officers having passed the Senior High School of Forestry, pre-war and post-war conditions and having at least eight years of practical experience. **Purpose**—Temporarily established to fill the shortage of university graduated personnel as foreign foresters are no more in active service except for special forestry work such as research, planning and

training. Graduates are directly placed in leading positions.

One cannot but observe the industry of the farm population along the roads and highways. I gathered that the average family holding of farm land is about one-half hectare in a village of Sumedang about 90 kilometers from Bandung. Transmigration to Sumatra and Borneo has taken place and in that village alone no less than 150 persons have migrated. Migrants to Government settlement projects are given transportation and subsistence allowance for six months in order to tide them over to the first harvest.

The higher hills and mountains are well covered with forest vegetation and there are indications of extensive forest planting. The well maintained upper watersheds are responsible for the excellent irrigation system. I gathered that in West Java practically no encroachment has been made in forest lands and I am inclined to believe that the people must have realized and appreciated the value of upper watersheds to their farm and domestic water supply.

*Observation in Lembang:*—The forestry project visited in Lembang was a forest nursery where *Pinus merkusii* seedlings were raised. It appears to be comparatively new and located in a nearby grown-up plantation of the same species. Seedlings are raised in seedbeds. One special feature observed in nursery practice in this project is the method used in infecting the soil in the seed beds with mycorrhiza necessary for the growth of the seedlings. "Mother trees" are planted in a center row lengthwise the seedbed. These mother trees are enough to infect the seedbed.

The seedbeds are covered with a mulch of pine needles to prevent direct impact of raindrops on the seedbed so as not to disturb the soil.

Vast areas have been planted to *Pinus merkusii* which does not require fertile soils. This species is used for afforestation of poor devastated soil. Their results have been

very satisfactory. This species has a very great possibility for paper and pulp industry.

I gathered that the pine plantations are managed on a forty-year rotation for sawtimber and a twenty-year rotation for pulpwood. But for purposes of soil rehabilitation the pulpwood rotation is being lengthened to 30 years. The Government is proposing to install a pulpwood and paper plant in Kalimantan (Borneo).

*Observation at Tjibodas and Bogor:* Along the Highway from Bandung to Tjibodas, I observed teak plantations which indicated vigorous growth. Teak cultivation has been carried on by Taungya-system and for the five year period from 1950-54, there were planted 120.4 thousand hectares to teak.

We visited the Tjibodas Mountain Gardens, a branch of Bogor Botanic Gardens. This has an area of about 80 hectares and established to facilitate investigations of tropical mountain flora and fauna. I have seen our own benguet pine growing vigorously. The elevation is about 5,000 feet. I understand that studies on watershed and forest influences have been initiated here.

At Bogor my special interest was in the *Forest Research Institute*. This Institute was established in 1913 and is under the control of the Forest Service of Indonesia.

The research program of the Institute is drawn up with regard to the current and future problems in forestry, particularly on the establishment of "industrial forests." For this purpose two main scopes of research can be distinguished:

1. Basic research covering subjects of general importance which may make the solution of incidental problems in the future much easier.
2. To obtain a reasonably quick answer to the current practical problems mainly concerning the "industrial tree species."

The sudden increase in the number of research objectives requires the reorganization of the Institute. The following divi-

sions are to be established:

1. Silviculture
2. Physiology
3. Forest mensuration and Evaluation
4. Botany
5. Forest Influences
6. Wood Utilization
7. Chemistry
8. Wood Properties and Wood Identification
9. Forest Economics.

In addition there will be the library, the museum, the service branch and the publicity and liaison branch.

We were conducted through the Botany Division and were shown how herbarium materials are kept in tin containers. There are about 5,000 species of trees in Indonesia from 35 cm. in diameter and up. There are about 50 species described each year.

There are only seven species exported, three of which are Dipterocarp species. These are *Dryonalanops lanceolata* (Dipt.), *Shorea laevifolia* (Dipt.), *Dipterocarpus* spp., *Octomeles sumatrana* (Datis), *Callophyllum* spp. (Gatt.), *Agathis borneensis* (Arau.), and *Tectona grandis* (Verb.),

Exportation of timber are made to Japan, Hongkong, Holland, Australia and South Africa. About 6,000 cubic meters were exported last year to Japan and about the same amount for the current year. The price per cubic meter is from US \$11-13 F.O.B. of average fair quality logs, British North Borneo grading rule.

Mechanical logging operations are being carried out in Kalimantan (Borneo) but the

stand is only about 40 cu. m. per hectare of commercial species.

The Institute is conducting studies on veneer and plywood qualities of several species of wood like *Agathis borneensis* and *Albizzia falcata* as well as the Dipterocarp species.

One striking thing that I learned is the use of mangrove tannin-formaldehyde resins as hot-press plywood adhesives. A paper of the Forest Research Institute describes laboratory experiments on the preparation of hot-press plywood adhesive from the barks of six prominent mangrove species which have not been previously used for adhesives (1953).

Mangrove tannins react with formaldehyde to form resinous condensation products. The condensates of paraformaldehyde with mangrove tannins formed as a result of hydroxyl-ion catalysis, have been examined as plywood adhesives. Hot-press adhesive have been prepared by addition of woodflour and about 5% paraformaldehyde to aqueous

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bark extracts containing approximately 45% solids at PH's ranging from 4.3 to 5.7. The adhesives have an unlimited storage life, and a working life from one to about eight hours.

Mangrove tannin-formaldehyde adhesive may be prepared simply by mixing the stable, aqueous bark extracts, containing some alkali as catalyst, with woodflour and a small amount of paraformaldehyde.

Another interesting work being done at the Institute is aerial photo interpretation. I gathered that in 1954 the Indonesian Air Force took aerial photos covering 3 million hectares of forest lands. The photos are on the scale of 1:20,000. From these photos, type maps have been produced as well as topographic maps on the scale of 1:10,000 with 2½ meter contour intervals.

The Institute has also investigated the possibilities of many species for pulp and paper manufacture. The sulphate process is being used. Aside from *Pinus merkusii*, the following species have been tried: *Eucalyptus*, *Aleurites*, *Shorea*, *Hopea*, *Albizzia*, and *Agathis*. Fiber-length test show *Endospermum* to have the longest fiber, followed by *Cinnamomum*.

Within the compound of the Institute, I have noted one fast growing species, *Albizzia falcata*. This species is said to grow on poor soil and this has some possibility in this country as a reforestation crop. I have been informed that this species grow to a height of 20 meters in five years. It may be worthwhile trying it here in the Philippines.

Within the compound of the Head Office of the General Agricultural Research Station, I have noted two species of grasses similar to what I have noted in the Southern United States. These grasses are used in the Southern States to fix soil in gulleys and gully heads. These grasses are *Eragrostis amabilis* and *E. curvula* (Weeping Love Grass).

Bogor Botanic Gardens cover 110 hectares and was laid out in 1817. Here are grown thousands of tropical species in their

natural surroundings. Attached to the gardens are an herbarium, a zoological museum, a library of scientific works, and a laboratory. We visited the orchid house where our *Vanda sanderiana* is being raised and crossed with local and other *Vanda* species.

#### OBSERVATIONS IN BANGKOK:

While waiting for our flight connections at Bangkok, I took the opportunity to meet the present Director-General of the Department in the U.S.A. in 1951. He kindly showed to me the organization of the Department which is depicted in the attached chart. Graduates of our College of Forestry are now holding responsible positions in the Department.

I also passed the School of Forestry, Kasetsart University. This school was formerly located in Phrae, upper Thailand. The Assistant Dean is a graduate of our College of Forestry in 1937.

I visited Thai Sawmill owned and operated by the Forest Industry Organization, a government concern. This band sawmill has a capacity of 40 cubic meters of logs a day and the conversion per cent is 42. This sawmill cuts teak logs only. The manager of this sawmill is a 1941 graduate of our College of Forestry.

The other band sawmill owned by the Forest Industry Organization in Bangkok is Kasetra Sawmill sawing species other than teak, mostly Yang (*Dipterocarpus alatus*) similar to our red lauan.

I learned that the forests of Thailand are government owned. One third of the teak forests is assigned to the Forest Industry Organization, another third to the use of the population, and the last third to private operators.

I gathered that the Royal Forest Department has just established at Phrae a Ranger School—a three-year ranger course. The courses offered are the same as those offered by the School of Forestry, Kasetsart University.

# THAI ROYAL FOREST DEPARTMENT

CHIEF TECHNICAL FOREST OFFICER

DEPUTY DIRECTOR GENERAL

DIRECTOR GENERAL

