

water for experiment and drinking. The water tank has a volume of 40M³, getting water from the roof of the trial plantation center. Total expense used for the construction was 10.824.000 Rupiah and its construction period was during July 1985.

3. Technical activity at the site

The technical activity of the Project consisted of five aspects, that is, nursery, silviculture, forest engineering, forest protection and ecology which were conducted by respective Indonesian counterparts and experts.

Each annual technical activity was implemented according to the annual plan based on the five year plan or two year plan of the Trial Plantation Project which should be approved by the Joint Steering Group Meeting and supported by the budget of the Indonesian government.

In this section, each activity will be described briefly according to the Phase which was already been stated in Chapter I from the beginning of the technical activity to the present.

i) Technical activity in Phase I

The year of 1979/80 was the preparatory period of the Project activity, the Model Infrastructure consisting of the forest road and nursery constructions which were the foundation of the Project activity was established. At the same time, all efforts were concentrated to make the five year plan and the annual operation plan. According to the five year plan, during Phase I, the targets of plantation for 1980/81 and 1981/82 fiscal years were 200 ha and 400 ha respectively. In order to realize these target, activities of each section were started, but there was no activity for forest ecology section until the dispatch of the expert on forest ecology in March 1981. Needless to say, the purpose of the nursery is to produce a number

of seedlings based on the annual operation plan, so the nursery activity should be started several months before plantation activity and at the same time the forest road construction.

* Nursery

Completing two ha nursery construction by Model Infrastructure, seedlings production for 1980/81 Fiscal Year was started first. Number of seedlings which should be planted in 1980/81 Fiscal Year was estimated at 439.100 seedlings, and main species were Albizia falcata, Swietenia macrophylla, Eucalyptus deglupta and Pinus merkusii. In order to plant out this number of seedlings, it was a problem as to the number of pots of pricking, since all the 470 thousand pots have been pricked.

At first gathering of pot medias was started early in June, and P. merkusii seeds were sown on June 20, aiming at its planting out in February 1981, as the first time of sowing at Benakat. The low germination capacity of seeds, this is, according to germination test, germination percentages of P. merkusii, E. deglupta and A. falcata were 28%, 38% and 71.8% respectively, shortage of water and delay in the arrival of equipment supplied from Japan interferred smooth seedling production, for instance, P. merkusii had to be sowed several times and as number of E. deglupta seedlings for pricking were not enough, E. urophylla seedlings had to take place of E. deglupta seedlings.

The problems of this year were : a) The height of seedlings, especially, of P. merkusii was too low due to the delay of potting period as result of the disturbance to the germination boxes by someone who was indentified, b) The seedlings of E. deglupta had not been prepared enough because of the above mentioned and at last the seedlings of E. urophylla seedlings which were transferred from the other nursery were planted in the place of

E. deglupta seedlings.

In 1980, many kinds of examination have been done in the nursery section.

The number of seedlings which should be raised up in 1981/82 Fiscal Year was 806 thousand, and main species were Acacia mangium, Schima wallachii var. bancana, Anthocephalus chinensis and Peromema canecens, totally 13 species, besides four species which had been raised up in the last fiscal year.

Though this year was the second year from the start of seedling production, labourers in nursery handled the seedlings roughly and carelessly, being unaccustomed of such work, so the expert perseverantly gave guidance to careful handling.

The main problems in the nursery activity in this year were a) The insufficient seeds of some species such as Enterolobium cyclocarpum, A. mangium and Aleurites molucana, b) Seedlings were attacked by diseases at planting-out time which was in the wet season, especially, needle blight of P. merkusii seedlings was notable. Bordeaux mixture was sprayed against needle blight.

* Plantation

Land preparation work in 1980/81 was carried out manually, each plot of 50 ha of A. falcata, P. merkusii, E. deglupta and E. urophylla, and S. macrophylla seedlings, planted at three kinds of planting density, namely 4 X 1,5M, 4 X 2M and 4 X 4M were established. According to Mr. R. KATO, the survival rate survey was conducted two months after planting and the survival percentage of A. falcata, E. urophylla (may be in some part of the compartment, E. deglupta), P. merkusii and S. macrophylla were 87%, 76% 90% and 93% respectively and the replanting was executed for all species. However, the survival rate survey was done once more in May 1982 and survival percentage of these four species changed to 76%

68%, 54% and 87% respectively. The low survival percentage of P. merkusii and E. urophylla was due to the low quality of seedlings, the delay of planting time and the unsuitable treatment of seedlings during the transportation.

The problems of plantation activity in the first year were as follows :

a) Land preparation (manual method, strip line clearing)

Concerning the height of alang-alang, though strip line clearing which was 2 M wide and cutting down of bush and shrubs was guided, but it was not sufficient to cut them down.

b) Hole digging

Although it was instructed that the hole was dug at 50 cm's diameter and 30 cm's depth, and in planting the top soil was filled into the hole, insufficient diameter and depth of many holes were seen. It is said that the auto-auger which was supplied from Japan could not be used adequately because of the lack of the labourer's physical strength.

c) Planting

Treading down soil in order to prevent the soil from drying was insufficient and smashing of the top soil which was used to fill into holes was incomplete.

d) Tool

The weeding scythe and hoe were not sharpened on time and operation of the bush-cutter were incomplete.

Total plantation area in 1981/82 Fiscal Year was 400 ha consisting of 200 ha of manual land preparation, 150 ha of mechanized land preparation and 50 ha of introduction experiment area. Thanks to the Advisor, counterparts and experts' guidance and last year's experience, the survival ratio had a sufficient percentage. Although mechanized land preparation was to be implemented by malboard plough (button plough) and desk harrow prepared by JICA, when operation had been

started, the molboard plough was troubled frequently.

During the operation of land preparation, it was proved that the molboard plough was not so tough to cultivate such a heavy clay soil as in Benakat area and also this type was not suitable for alang-alang field mixed with the bush and shrub vegetation which remained a lot of stumps and roots after clear cutting of the vegetation. And in view of the fact that most of the afforestation contractors in South Sumatra used the disc plough type for land preparation, it had to be considered to change from the molboard plough type to the plough type from 1982 on.

Plantation work had become late slightly, because of the problem in molboard plough mentioned above and troubles of the tractor supplied in 1980 Fiscal Year. Mechanized land preparation had to be carried out up to February 1982. Guidance to manual weeding for the plantation done in 1980/81 was provided.

* Forest road.

Due to the delay in the arrival of machinery and equipment supplied from Japan at Benakat as result of the long time taken in clearing the customs, there has been no activity in the forest engineering section until the machinery and equipment has been arrived at the field site. However, after the arrival of angledozer and shovel dozer at the field site in October 1980, forest road construction activity was carried out in full swing and the delay in the forest road construction was solved step by step, so there was no problem for the planting activity and concerning the forest road. Although the construction of the forest road itself posed no problem, there was still the problem of how to construct forest road surface in heavy clay soil area in a tropical rain forest; after some consideration of this problem, the forest road surface was constructed in semicylindrical form for good

draining.

Forest road construction was carried out each fiscal years in 1979/80 Fiscal Year 0.7 Km of main forest road, in 1980/81 Fiscal Year 1.0 Km of main forest road and 6.0 Km of warking forest road, and in 1981/82 Fiscal Year, 2.0 Km of main forest road and 11.2 Km of warking forest road respectively. From November 1981, one motor grader was arrived in project site and has been used for forest road maintenance.

Accordingly, the forest road construction work did not meet any difficult problem owing to the availabili-ty of the basic machinery such as angledozer, shoveldozer and motor grader.

As transfer of technology in the use of machinery in forestry, guidance was given to the use of bush cutters and chain saw and their maintenance such as setting then up.

* Forest protection

One of the most important function of the forest pro-tection section is fire control, so the construction of fire belt was the first business of this section. The fire belt should be established along the forest road mainly but its establishment was delayed due to the same reason for the delayed forest road construction.

There are three kinds of fire belts which were constructed in the Project, that is : a) The green belt which was planted with Acacia mangium and Swietenia macropyhylla along the forest road and forest warking road, of 8.82 ha in 1980/81 Fiscal Year, and 5.83 ha in 1981/82 Fiscal Year, b) The fire belt which was planted with cover crop was 1.78 ha in 1980/81 Fiscal Year, and 3.26 ha in 1981/82 Fiscal Year, c) The yellow fire belt which was not planted any was made 0.25 ha in 1980/81 Fiscal Year, and 10.44 in 1981/82 Fiscal Year.

Answering to the question as to what is the best fire belt if there were not enough budget prepared for seve-ral times' maintenance in each year, the green belt would be the best and it should be planted by fast growing trees

first in order to kill alang-alang grass.

* Forest ecology

An expert for forest ecology was dispatched to Indonesia on March 31, 1981, and counterparts for forest ecology were appointed in November of the same year, and in 1981/82 Fiscal year, no budget for forest ecology section was allocated. After the arrival of the forest ecology expert, the request for the budget for the activity was proposed by the Japanese side, but the allocation of the budget has not yet been fixed because of the difficulty to ask for the new budget in the middle of the fiscal year. As a necessary consequence, the activity in forest ecology section could not be carried out vigorously by while the main business of forest ecology section comprised a) Vegetation and soil survey for plantation activity in alang-alang grasslands; b) Advice for many kinds of examination and surveys and; c) Guidance for the Pilot Infrastructure Construction works in agro-forestry at that time.

Since the preparation of the Pilot Infrastructure work and construction itself needed much time, the real activity of the forest ecology was carried out gradually after the appointment of the counterpart.

ii) Technical activity in Phase II

Magnification of works which had already been carried out was characteristic during Phase II, namely the acreages of plantation planned in 1982/83 and 1983/84 had become 700 ha and 800 ha respectively, and in accordance with the plantation acreages, seedling production had also become more than 1,5 million in both fiscal year; automatically, forest road and fire belt construction had to be increased. To implement these works, it is needless to say, budget was necessary and its smooth distribution was also necessary. From 1982/83 Fiscal Year the budget for plantation, nursery forest road construction

and forest protection had become INPRES budget. This was no problem, but the delay of distribution of the INPRES budget had interfered the smooth implementation of each section activity.

* Nursery

In 1982/83 Fiscal Year, about 1,9 million seedlings, including 300 thousand seedlings for the South Sumatra Provincial Forest Office, which consisted of 25 species (some species only thousand seedlings) were pricked into pots. Main species were P. merkusii, E. deglupta, S. wallichii var. bancana, Pterocarpus indicus, A. mangium, Dalbergia latifolia and Samanea saman. Besides the above mentioned species, many species seedlings were produced for the introduction test.

Mixture ratio of the pot media is very important in raising healthy and vigorous seedlings. The experiment concerning the mixture ratio of pot media conducted in 1981 recommended that the best mixture ratio of topsoil, sand and compost is 7 : 2 : 1 respectively. This mixture ratio is applicable to all species, so from this fiscal year on this ratio has been applied.

In this year the most serious disease was needle blight which attacked P. merkusii seedlings. Cooper fungicides or bordeaux mixture had been sprayed against needle blight. Another important disease was damping-off which was infected by a variety of different soil borne fungi. In order to avoid this disease, soil sterilization was done either by heat or by chemical substances. Besides sterilization of the soil media, the seeds need to be sterilized too.

Seedling quality in this year was found to be better than in the past two years, particularly for P. merkusii seedlings. This may be caused by the natural infection by Mycorrhiza on the nursery, besides the improvement of the soil structure in every pot.

In 1983/84 Fiscal Year, the number of pricking were

about 1,5 million seedlings, consisting of 26 species, and the main species were A. mangium, S. macrophylla, Eucalyptus alba, E. deglupta, Peronema canescens, Sama-
nea saman, A. falcata, Leucaena leucocephala and Alsto-
nia scholaris.

Activities in the nursery such as preparation of pot media, pot filling, seed sowing, fertilizing and others had been mostly accomplished, even though the project had been faced with the delay in budget disbursement. But the delay of budget disbursement has complicated the timing of planting-out, although some species could not be planted in the field on time and the seedlings had already grown up sufficiently. Therefore some species, namely, S. macrophylla, E. deglupta, S. saman and P. canescens, had to be planted out from April to July.

* Plantation

Plantation acreage to be planted in 1982/83 Fiscal Year was 700 ha, consisting of 300 ha of manual land preparation, 300 ha of mechanized land preparation, 70 ha of agro-forestry scheme and 30 ha of species introduction test area. For some unknown reason, the approval was issued in mid-August 1982, and after some administration procedures the INPRES budget could be used by early September 1982. So far, however, budget problems could be solved by borrowing money from the South Sumatra Regional Forest Office, so the plantation work was finished during April 1982. The survival ratio of the seedlings were good according to surveys. Cultivating soil is very important to improve physical soil structure, enhancement of soil aeration and to eliminate along-along rhizomes. In such good condition the root system is able to develop vigorously, so as to make the tree grow fast. In order to find the best method of soil tillage, several treatment experiments were done as follows :

- a. Total tillage 1 time ploughing
- b. Total tillage 1 time ploughing + 1 time harrowing
- c. Total tillage 2 times ploughing + 1 time harrowing
- d. Strip tillage 1 time ploughing + 1 time harrowing
- e. Strip tillage 2 times ploughing + 1 time harrowing

Weeding is one of the main problems facing this Project. In general, weeding means reducing the competition between the grasses and seedlings so as to provide the seedlings with preferable conditions. Experiments in order to find out the most suitable weeding method would be conducted from 1983 on.

Plantation area to be planted in 1983/84 Fiscal Year included 800 ha, consisting of 470 ha of mechanized land preparation, 300 ha of manual land preparation and 30 ha of agro-forestry scheme, and the plant spacing of the trees was mainly 4M X 2M, but in some part of the total tillage area there were 2M X 2M and 3M X 3M spacings. Due to the delay of INPRES budget distribution, the planting activity had to be delayed, for instance, some compartment had to be planted during April to July 1984 for the reason of seedling production. Furthermore, A. falcata and E. alba seedlings were planted in December 1984 and January 1985. Survival ratio of seedlings in this Fiscal Year was not so good with each variety, for example, survival ratio of E. deglupta planted at the manual site preparation compartment in December 1983 was 95%, but that of E. alba planted in the same place and in the same month was only 30%. The Chief Advisor sent a letter to the Field Manager asking the reason for the low survival ratio of E. alba, like what Mr. K. KATO did, there was no written answer to the letter but an oral answer said that the method of putting of E. alba seedlings in the nursery was a fatal one, but this answer did not give adequate explanation why so survival ratio was low. In 1983 the weeding method examination was started and the examination methods were as follows :

- a. Planted trees species :
A. mangium, E. deglupta, S. macrophylla and S. walla-
chii var. bancana.
- b. Site preparation method :
- b1. Total land clearing only;
- b2. Total tillage 1 time plough;
- b3. Total tillage 1 time plough + 1 time harrow;
- b4. Total tillage 2 times plough + 1 time harrow;
- c. Weeding method :
7 type of weeding methods.

The purpose of weeding method examination was to find the most suitable weeding method, and Mr. T. OHARA, former expert for silviculture, was dispatched as short-term expert from October 26 to December 25, 1984 in order to analyze this examination. The result, according to Mr. T. OHARA, was that the economical method of site preparation and the suitable time of weeding were land clearing plus once ploughing for land preparation and practice weeding in the second, sixth and tenth months after planting in the first year of the weeding time.

* Forest engineering

Forest road construction plans in 1982/83 Fiscal Year consisted of 3.8 Km of main forest road and 16.0 Km of working forest road, meanwhile, the realized lengths of forest road were 4.0 Km and 10.7 Km respectively. It is needless to say, the forest road has a multi-dimensional function, for example, as fire belt besides transportation function. So if budget condition allow, a higher forest road density would be good for against fire.

Up to this year, forest road construction machinery namely 2 angledozers, 1 shoveldozer and 1 motorgrader, have already been prepared and most of the technical problems in construction have been overcome. Method of forest road construction have been discussed in the field; then, forest road construction in this area, it seems

that soil road form was better like as P.T. STANVAC used. But the main problem of this type forest road is the maintenance.

Frequent machinical trouble in many kinds of machines showed that suitable maintenance, management, daily check and a good manner of operation were necessary. But these basic items had to be instructed in on the job training. The forest road constructed in 1983/84 Fiscal Year consisted of 3.1 Km of main forest road and 16.5 Km of working forest road. Constructing forest road, the final process of road construction is levelling the road surface which is done by the motor grader, it had only completed 9 Km in this year.

* Forest protection

One of the most important problems for afforestation in along-alang grasslands is fire control; a fire fighting organization is thus needed in order to protect the established forest, so it was proposed to establish a fire brigade in the Project; consequently, a fire brigade led by the Field Manager was organized in August 1983. Meanwhile, some fire fighting tools to be used at the initial stage of fire were made or proved and a fire extinguisher was prepared un the Project. Indeed, spreading fire from outside agro-forestry scheme to inside, the fire brigade turned out for fire fighting and fire belts made by tractors and bulldozers were carried out besides of direct fire fighting by hand tools. And during the dry season, watching from the look-out tower and patrol were implemented to find any initial stage of fire and make someone take care of fire.

In this phase there was no severe damage by insects or pests except damage in S. saman seedlings by field mouse and in A. falcata by deer; frequent patrol was done against the latter.

The fire belt which was green belt was constructed 21.14 ha, was yellow belt was constructed 1.78 ha and was fire line was constructed 3.27 ha in 1982/83, but in 1983/84, the green belt was constructed 6.94 ha only.

* Forest ecology

The activity of the forest ecology section has been started vigorously since 1982. Ecological study aimed at examining the pattern of vegetative succession, studying the growth of alang-alang grass and the physical and chemical properties of soil.

Biomasses were collected from sample plots of five types of the natural vegetation composition to study the growth rate of alang-alang grass; the result of this study is being examined, and some 110 of vegetation have been identified. In the plantation site, joint studies with the plantation section have been carried out in order to study the regeneration of alang-alang grass on cultivated land and with the forest protection section concerning the tending of the fire belt.

The agro-forestry scheme has been started since 1982. According to progress report, the agro-forestry scheme had the practical objective to develop, test, demonstrate and extend improved agro-forestry practices. Through the agro-forestry scheme, it is expected that local inhabitants farmers as well as the forest get good benefits. For the forest, it serves in establishing and protecting it by preventing farmers from uncontrolled slash and burn, working in harmonious relations with the local inhabitants and providing the required labour force. In April 1982 the construction of 30 temporary houses for participants was started, and construction works for the Pilot Infrastructure consisting the access road, ponds, warehouse, look-out towers and cultivation of some 70 ha of demonstration and intercropping areas were carried out.

After the first contract between DGRLR and participants on October 1982, the agricultural activity was

started by sowing mainly paddy in the intercropping area and then A. falcata and E. deglupta seedlings were planted in each other's line. Technical activity of forest ecology section in 1983/84 was continued from last year's study. After the cultivation of 30 ha the same as last year in agro-forestry scheme, planting with the same species as those last year, agricultural crops with 80% rice sowing and 10% peanut sowing were completed. The study on the socio-economic aspect of the farmers has been carried out to collect data concerning income, monthly expenditure, consumption pattern etc. , according to the technical report in 1983/84 for Joint Steering Group Meeting in 1982/83, agro-forestry contributed to 42% of the annual budget of the farmers.

iii) Technical activity in Phase III

Main technical activities in the Project were to put together of survey and examination and to make a technical guidance. The plantation acreage had been decreased to only 200 ha including the agro-forestry scheme in each year by "2 Year Plan of Operation of the Trial Plantation Project in Benakat, South Sumatra (Extention)" But until early April 1984, it has not been decided where to station the plantation site. It was in the middle of April that the station of the new plantation area was determined at an adjoining area North-West of agro-forestry scheme.

After consultation by the Japanese Project Consultation Team led by Mr. R. KATO, activities of the two extended years for four objectives, namely fire protection system, agro-forestry, transfer of technology and further study and development have been started vigorously since June 1984. In this phase, many results were put together in some examination and survey, and a technical guidance was written.

* Nursery

The number of seedlings producted was 610 thousands,

consisting of 19 species, in 1984/85 Fiscal Year. Although the plantation acreage had become 200 ha, 50 ha of the plantation acreage of last year was to be planted in this Fiscal Year, so the total plantation acreage had become 250 ha, therefore, the nursery section had produced seedlings for share for the 250 ha plantation. Main produced seedling species were A. falcata, A. mangium, E. alba, E. deglupta, S. wallachii var. bancana and S. macrophylla.

A. mangium and E. alba trees, species of which should be raised up in the nursery, were planted and grew big near and in the nursery. As these trees have not only become the source of insects and diseases but also made sunlight condition for seedlings unhomogeneous, they have to be cut down or changed by other species that would not be raised up in the nursery; but counterparts did not agree to cut them down for the reason that the Project needed to let the trees grow. After several times explaining the reason for cutting them down, those trees in and very near the nursery were finally cut down.

Many seedlings produced in 1982/83 and 1983/84 Fiscal Year remained in the nursery. Though especially some remaining seedlings which were produced in 1983/84 and have become more than 2 M in height, have interfered in nursery management, their disposal could not be done until inspection. But those remaining seedlings would become the sources of insects and disease damages, so the unnecessary remaining seedlings should be disposed as soon as possible. The remaining seedlings have already been disposed.

In 1985/86 Fiscal Year, the number of seedlings produced would be 344 thousand, consisting of 13 species, main species were A. falcata, A. mangium, E. deglupta, S. wallachii var. bancana and S. macrophylla. Production time of seedlings become already 6 times by 1985/86, some laborer who have been employed can work smoothly in nece-

ssary works, meanwhile the foreman knows his work well.

Cost analysis which was planned in the Two Year Plan was carried out by short-term experts the result of the analysis was about 60 thousand Rupiah per 1.000 seedlings produced in 1984/85. What seedlings will be produced at lower cost and with better quality by mean of cost analysis is one of the foundation of nursery management, but for a cost analysis necessary data should be recorded correctly.

* Plantation

Plantation acreage in 1984/85 Fiscal Year was 200 ha including 30 ha agro-forestry, but 50 ha of last year's plantation was to be planted the same time, so actually 250 ha of plantation was carried out in this Fiscal Year. Before planting was carried out, a new plantation site should be determined where to be stationed. Therefore, after the field survey, 340 ha of the alang-alang grasslands located near by to the North-West of the agro-forestry scheme area was determined as the new plantation site for the extended two years. But there was no map and aerial photograph to make the plantation plan, therefore a map which would be used for the purpose was to be drawn. So experts made a land feature line map on the scale of 1 : 10.000 from aerial photographs scaled at 1 : 100.000. Then counterparts, experts and other staffs took measurements of the area by compasses, using the above mentioned land feature line map, in order to make a plantation plan.

The method of making a land feature line up is as follows :

At first slides at a scale of 1 : 10,000 were made from aerial photographs scaled at 1 : 100,000. Then roads were measured and drawn at a scale of 1 : 10,000. Then they made a land feature line map using both materials. Thanks to all persons concerned, the measurement was finished in about one month, thus the correct map was drawn. The

map was used in the planning of plantations forest roads, fire belts and the Pilot Infrastructure for fire protection.

In 1984/85 Fiscal Year, land preparation applied one type of method only, that is the mechanic one. Normally, land clearing and ploughing should be accomplished in the dry season. Yet due to delay of the INPRES budget, those two operations could not been carried out smoothly. Consequently, these activities could not be finished within the wet season, and this could reduce quality and efficiency, and at the same time would raise costs.

In this Fiscal Year plantation was not finished on time, that is, though planting work had started in February, it was not finished until April.

Thus far, weeding has only been tending work in the mechanized plantation area, but the early time of plantation of the field, lianas, bushes, fascicles, trees which did not grow well etc. can be seen. As additional, salvage cutting and pruning should be performed, the preliminary test of pruning and salvage cutting test area are set before the actual tests in the near future.

In 1985/86 Fiscal Year, planting work was already finished by the middle of February, and continued by re-planting, thanks to the early INPRES budget distribution and the good skill of labourers, futhermore it seems that what new two tractors that are crawler type one were introduced and the troubles of machinery were a few were cause of smooth implementation of planting.

Land preparation has been implemented by the method combining several works; in 1985 the test of land clearing was carried out by using rake blades. Meanwhile, when the operator could be see through the field and there were no obstacles, the ploughing test was also carried on without land clearing. These tests asking economical operations should be continued more in the future.

As the crawler type tractor introduced as machinery supplied by Japan can plough deep and as it is powerful, if after with adequate after-service care, it would be useful in heavy clay soil area like as Benakat. A plough that is corresponding to this tractor should be used, i.e. such plough as purchased and supplied by Japan in 1986.

The cost analysis of plantation was carried out by short-term expert, in the same way of seedling. In spite of insufficient data efforded by short-term experts, counterparts and experts concerned enable the analysis to be completed excellently. Through analyzing, not only counterparts but also some officials of the South Sumatra Regional Forest Office and South Sumatra Provincial Forest Office have been given cost conscionsness.

* Forest engineering

One total length of forest road constructed in 1984/85 Fiscal Year, including the Model Infrastructure for fire protection was 21,6 Km consisting of a main forest road of 4,6 Km, working forest road of 5,6 Km and feeder road of 11,4 Km. For the construction of the forest road, though the angledozer has been used for road surface construction usually, the motorgrader was used for the same construction this year in order to construct the forest road more economically. When construction those forest road, even though plan lines of forest road were showed to heavy duty machine operators in the field, as they have already got skill, so they can construct forest road well.

Forest road construction in 1985/86 Fiscal Year included the main forest road of 2,2 Km, working forest road of 5,3 Km and feeder road of 5,8 Km, total length was 13,3 Km.

Concerning forest machinery, many forms were made in 1984, in order to know the condition of machinery

operation for the purpose of analyzing machinery operation, but those forms were not used at all.

When crawler type tractors arrived at the Project site, the training for operation and maintenance was performed in order to level up operators' operational skill and mechanics' maintenance skill by the lecturers who were dispatched from manufacturer and dealer by request of the Project in July 1985. This training was carried out systematically for 5 days, and it seemed that this training was very useful for levelling up trainees' skill.

The future problems concerning forest machinery are their maintenance and management, for the former, it seems that usual maintenance has already reached some essential level, but further guidance should be given for spare parts control and for the latter, necessary forms for management have already been made, so these forms should be carried out soon in order to assist in good machinery management.

* Forest protection

The Albizia falcata forest which was planted on December 1980 have already grown in a canopy closure, but some insects attacked the trees, therefore insect damage surveys and volume surveys were carried out. Several plots in the S. macrophylla forest were established and development of damage is observed in order to survey for S. macrophylla tree damage by Hypsiphylia robusta since February 1985.

The most important event in this Phase concerning the forest protection section was the construction of Model Infrastructure of fire protection. This Model Infrastructure was suggested by the Japanese Project Consultation Team which was dispatched in May 1984, then its design was performed by all experts, from measurement to expenditure calculation, for one month. After one

month preparation by short-term experts dispatched since November 1984, the contract was signed in Jakarta on December 27, 1984. The contents of the construction work consisted of the construction of forest road at a total length of 1,3 Km, fire belt at a total length of 11,5 Km, 5 units look-out towers, 3 unit ponds, 15 unit gates, an under drainage and 3 units bridge repair. Finishing this Model Infrastructure, facilities for fire control have been prepared completely.

The fire belt which was green belt was constructed 11.52 ha and fire line was constructed 5.60 ha in 1984/85 Fiscal Year, the former was 5.03 ha and latter was 4.20 ha in 1985/86 Fiscal Year.

The first fire fighting exercise was carried out on May 15, 1985 in order to catch efficiency and necessary improvement of some hand equipment. After reinforcement of these equipment, the second fire fighting exercise was carried out on December 18, 1985 by more than 70 persons of the Project and many observers.

* Forest ecology

The main activities of forest ecology section in this Phase were implementation of many kinds of experiments which were continued from the former Phase, collection and analysis of data from them, setting permanent plots in the ecological experimental area, and construction of the forest road, carried out in order to observe the above mentioned permanent plots.

* Others

The technical exchange program among JICA reforestation cooperation Project as a new type of JICA cooperation program was carried out in 1985 and 1986.

This program provided opportunities of exchanging experiences and opinions on technical matters to Japanese experts and their counterparts for smoother implementation. In this connection, three members of the Reforestation Research and Training Project, Thailand, namely

Mr. Uichi ANDO, silviculture/Team Leader of The Japanese Experts, Mr. Paisal Kawapairat, Field Manager, Sakaerat Field Station, and Mr. Aran Sorn-Ngai, Plantation Sakaerat Field Station, visited Indonesia from March 27 to April 3, 1985. At Benakat, they saw the nursery, trial plantation and agro-forestry activities very eagerly, and discussed about technical problems encountered by each Project. They showed many slides showing their facilities and activities in Sakaerat Field particularly, some technical problems were discussed while watching the slides. Inversely from March 11 to 18, 1986, four members of the Project, namely, Mr. T. IKEDA, forest protection/Team Leader of Japanese Experts, Mr. O. TANDO nursery, Mr. Kardi Sabarudin, Chief of the Balai, and Mr. Sutomo silviculture, visited Thailand. They observed facilities and activities of the Reforestation Research and Training Project in Thailand and had discussions like they did last year in Benakat, but this time our Project side provided some data for cost analysis of plantation and seedlings especially.

Such technical exchange program is very useful for project activities of each other, not only to know the technical problems, to solve problems in the project activities, and how to manage the project, but also general forestry information of each other's countries.

VII. MISSION TEAM FROM JAPAN VISITED THE PROJECT

Up to now, the 16 mission teams from Japan have visited our project for the various purposes and here the activity of the mission teams will be stated briefly.

1. Cooperation planning survey team for the project.

This cooperation planning survey team headed by Mr. K. KOTARI had visited the project from June 3 to 15, 1980 in order to examine the problems concerning the facilities and annual operational plan of the project through the inspection in the field site and the discussion with the Indonesian officials concerned and Japanese experts.

The members of team were as follows:

- * Katsuhiko KOTARI (Leader): Special Assistant to the President of JICA.
- * Seinosuke KADOYA (Cooperation planning): Planning Division, Forestry Agency, Ministry of Agriculture, Forestry and Fisheries.
- * Kazuto ARIMITSU (Afforestation): Forest Soil Department, Forestry Agency, Ministry of Agriculture, Forestry and Fisheries.
- * Noriko NANBA (Liaison Officer) : Forestry development Division, Forestry and Fisheries Development Cooperation Department, JICA.

They had discussed with Mr. Apandi and his staffs on the improvement of accommodation at the project site in Benakat, supplementation of the budget for Fiscal Year 1980 and immediate take-over of machinery and equipment and their effective use. The report of the result of this survey team was published in Japanese in June 1980. Thanks to the team activity, the problems were fairly improved afterwards.

2. Advice team for forestry technical cooperation project

This advice team headed by Mr. T. MATSUDA had visited the forestry technical cooperation project in Burma and Indonesia in order to give the JICA experts the advice and guidance from the technical and administrative point of view.

The members of the team who visited our project were as follows:

- * Takashi MATSUDA (Leader): Director, Planning Division, Forestry Agency, Ministry of Agriculture, Forestry and Fisheries.
- * Katsura WATANABE(Logging technique): Director, Forestry and Fisheries Development Cooperation Department, JICA.
- * Osamu TAKADA (Forestry machinery): Training officer, Forestry Training Institute, Forestry Agency, Ministry of Agriculture, Forestry and Fisheries.

They had stayed in Indonesian from November 23 to 30, 1980 and visited the field site on November 26 to 28 their report written in Japanese was published in February, 1981. And they had left the letter to Mr. Apandi, who had been unwell at that time and had no chance to discuss the project problem together.

3. JICA team for design of facilities for the project

In view of the situation that the living circumstances of Japanese experts was inferior, Japanese government wished to provide the grant aid of the amount of about 80 million yen for the construction of lodging house in the field.

This team came to our project in order to discuss and arrange the design of facilities from February 9 to 18, 1981. The members of this team were as follows:

- * Kunio TAKAHASHI (Chief): Second Economic Cooperation Division,
Ministry of Foreign Affairs.
- * Masayuki OKAJI (Facility design): Deputy manager, Architectual
Department, Nippon Koei Co. Ltd,
- * Akiyoshi MARUYAMA (Facility plan): Chief, Design Division,
Architectual Department, Nippon Koei Co., Ltd.
- * Noriko NANBA (Coordinator) : Forestry development Division,
Forestry and Fisheries Development Cooperation
Department JICA.

After their visiting the project site, they consulted with the Indonesian authorities about the basic design for the facilities which was called the trial plantation training center including the facilities for dormitory, workshop and training building. And from the beginning of June, 1981 the construction work had begun.

4. Survey team for JICA expert's living condition

The purpose of this team was to decide whether the special allowance for remote rural area would be supplied or not for the expert of ATA-186. The members of this team were as follows:

- * Seijiro SHIRAHAMA : First Technical Cooperation Division,
Ministry of Foreign Affairs.
- * Keizo KAGAWA : Technical Personnel Division, General Affairs
Department, JICA.

After observing the experts living condition in Palembang and Benakat on April 17 - 19, 1981 they made the report to JICA and Japanese government who had decided to supply the special allowance for the experts of ATA-86 from Fiscal Year 1981 because of their poor living condition in the field site.

5. JICA consultation mission for the project

This JICA consultation mission headed by Mr. M. FURUYA was dispatched from June 25 to July 10, 1981 in order to make the basic plan for the pilot infrastructure scheme that aims at carrying out the agro-forestry activity which is the important activity to test and study the social implication of our afforestation activity under the trial plantation project.

The members of this mission were as follows :

- * Masato FURUYA (Leader) : Director, Training Division, Forestry Training Institute, Forestry Agency, Ministry of Agriculture, Forestry and Fisheries.
- * Katsuo OKA (Forest management) : Deputy Director, Planning Division, Forestry Agency, Ministry of Agriculture, Forestry and Fisheries.
- * Tadashi NAKAMICHI (Silviculture) : Deputy Director, Forestry Development Division, Forestry and Fisheries Development Cooperation Department, JICA.

After their investigation of the project site and discussion with the expert and Indonesian officials concerned, they made the minutes of discussion and exchanged with the Indonesia authorities concerned as shown in Appendix 5, and their report was written in Japanese.

6. Guidance team for agriculture and forestry technical cooperation project.

This guidance team headed by Mr. R. MATSUYAMA had visited our project site to observe our activity and discuss how to develop our activity in October 3 - 5, 1981. The members of the team were as follows :

- * Ryoza MATSUYAMA (Leader) : Executive Director, JICA.
- * Haruo TSUCHIYA (Cooperation planning) : Director, Office of Oversea Technical Cooperation, International Cooperation Division, Economic Affairs Bureau, Ministry of Agriculture, Forestry and Fisheries.
- * Isao KABURAKI (Project management) : Director, Agricultural Development Division, Agricultural Development Cooperation Department, JICA.
- * Yoshizo TAKIZAWA (Project management) : Deputy Director, Development Planning Division, Agricultural, Forestry and Fisheries Planning and Survey Department, JICA.
- * Eitaro MITOMA (Project management) : Senior official, Forestry Development Division, Forestry and Fisheries Development Cooperation Department, JICA.

Their report written in Japanese was published in December, 1981 and also they sent the summary report to the Indonesian authorities concerned and in this summary report three matters concerning our project were stated by them as follows :

i) The promotion of afforestation in deserted area is a very serious subject and we recognize the important role of this project.

ii) Though there had been certain delay, this project is now going smoothly and we think it owes much to the joint effort of the expert and counterpart staff under the unfavorable condition.

iii) To proceed the project more smoothly, we should like to draw your attention to the following points,

a) to secure the necessary budget and its quick and appropriate disbursement

b) to secure the counterpart staff, especially those with sufficient experience.

7. JICA guidance team for the pilot infrastructure improvement works on the project.

This guidance team headed by Mr.K. KOTARI was sent to make the detailed plan for pilot infrastructure scheme which was made by Mr.M. FURUYA's JICA consultation mission as the basic plan. They had stayed in Indonesia from November 4 - 17, 1981 and the members of the team were as follows :

* Katsuhiko KOTARI (Leader) : Special assistant to the President, JICA.

* Tsutomu HANDA (Afforestation) : Deputy Director, Planning Division, Forestry Agency, Ministry of Agriculture, Forestry and Fisheries.

* Kyohei NISHIKAWA (Forest road) : Chief, Technical Information Section, Forestry and Forest Products Research Institute, Ministry of Agriculture Forestry and Fisheries.

After finishing their field survey they consulted with the Indonesia authorities concerned on the pilot infrastructure scheme and made their program and supplement document based on

the information by the short-term expert who had just stayed in the project site,

These program and supplement document were discussed together and approved generally on the meeting with the Indonesia authorities concerned.

8. JICA equipment maintenance and management team for forestry cooperation project.

This team headed by Mr. Y. AOKI had visited Indonesia in order to offer guidance on maintenance and management and also to make study on actual condition of equipment and machinery supplied to forestry cooperation project such as ATA-184 and ATA-186 projects. The members of the team were as follows :

- * Yukio AOKI (Leader, Afforestation and forest road machinery):
Service Department, IWAFUJI Industry Co., Ltd.
- * Yoshiro YACHIUNE (Logging machinery) : Quality Control
Department, IWAFUJI Industry Co., Ltd.

They had visited our project site from November 22 to 30, 1981 and inspected the actual condition of the equipment and machinery in our project. The guidance for the maintenance and management on the equipment and machinery they gave was very useful for our project activity, because the good result of the project activity would chiefly depend on the good condition of the machinery and equipment which should always be maintained and managed properly.

9. Machinery maintenance technical guidance team for the Project

This guidance team led by Yoshitaka OKUHARA visited Indonesia in order to guide maintenance and machinery from November 1 to 15, 1982. The members of this team were as follows :

- * Yoshitaka OKUHARA (Leader) : Official, Numata District Forest Office, Maebashi Regional Forest Office, Forestry Agency, Ministry of Agriculture, Forestry and Fishery
- * Tadao YOKOKOJI (Reforestation machinery) : Official, Planning and Development Department, Forest Engineering Co. Ltd.
- * Terunori GOHDA (Forest civil engineering machinery) Official, Overseas Department, Iwafuji Industrial Co., Ltd.

* Katsuro SAITO (Coordination) : Official, Second Procurement Division, Procurement Department, JICA

During their stay in Benakat, they eagerly gave guidance to the vehicles and heavy duty machines, and to their control for the Project activities, especially maintenance of heavy duty machines would be useful for the future project implementation.

10. Technical guidance team for the Project.

This technical guidance team led by Mr. Hiroshi INOH had visited the Project from November 29 to December 12, 1982 in order to make a survey concerning the implementation of Project activities and the agro-forestry scheme, and to give guidance on problem solving concerning project implementation.

The members of this team were as follows :

* Hiroshi INOH (Leader) : The Chairman of Directors, Japan Forestry Techniocal Association.

* Bunemon KOSUGIYAMA (Cooperation planning) : Planning Division, Private Forest Department, Forestry Agency, Ministry of Agriculture Forestry and Fisheries.

* Yoshio FUNAYAMA (Agro-forestry) : Director Management Department, Tohoku Station of Forestry and Frest Products Research Institute, Ministry of Agriculture, Forestry and Fisheries.

* Tooru AYUKAWA (Coordination): Forestry Development Division, Forestry and Fisheries Development Cooperation Department, JICA.

They had discussed with experts about project implementation mainly in the agro-forestry scheme.

They had given many useful advice concerning not only the technical points of view but also administration points of view.

The report of the result of this technical guidance was published in March 1983 in Japanese.

11. Joint evaluation team for the Project.

This joint evaluation team Japanese side led by Mr. Y. NOMURA

had been dispatched from August 30 to September 14, 1983 in order to evaluate achievement of the Project activities and to discuss the possibility of handing over to and, if necessary, extension of the cooperation with the Ministry of Forestry, Indonesian government.

The members of the team were as follows :

- * Yasushi NOMURA (Leader) : Director, Planning Division Private Forest Department, Forestry Agency Ministry of Agriculture, Forestry and Fisheries.
- * Minoru KUMASAKI (Adjustment): Director, Forest Economic Division, Forestry and Forest Products Research Institute, Ministry of Agriculture Forestry and Fisheries.
- * Tetsuro MATSUO (Forest machinery) : Chief of Training Division, Forest Training Institute, Forestry Agency, Ministry of Agriculture, Forestry and Fisheries.
- * Tadoyoshi KONNO (Afforestation) : Senior Officer, Planning Division, Private Forest Department, Forestry Agency, Ministry of Agriculture, Forestry and Fisheries.
- * Hikojiro KATSUHISA (Coordination): Acting head, Forest Product Division, Forestry Administration Department Forest Agency, Ministry of Agriculture, Forestry and Fisheries.

The Joint Evaluation Team was organized in order to review the achievements of the Project and to give suggestions for the future course. The team had recognized that achievements of the Project had been made to a satisfactory degree. However, in the light of the initial purpose of the Project which was development and transfer of afforestation technique, some outstanding issues still remained. Therefore the Team deemed it necessary to recommend to their respective government that the term of cooperation of the

Project should be extended for at least another two years. On September 13, 1983, "The Report of the joint Evaluation Team on the Trial Plantation Project in Benakat, South Sumatera (ATA-186)" was signed by Ir. Victor M. Sinaga and Dr. Minoru KUMASAKI (Appendix 8).

The report of this team was published in Japanese in March 1984. Based on the recommendation of the Team, the R/D of extension of the Project was signed by Ir. Wartono Kadri and Mr. Hiroshi MIYAMOTO on March 24, 1984 (Appendix 6)

12. Technical Consultation team for the Project.

This Technical consultation team led by Mr. R. KATO, the first Chief Advisor of the Project, had been dispatched from May 16 to 29, 1984, for the purpose of working out the tentative implementation plan of the Project. During their stay in Indonesia, the Team exchanged views and had a series of discussions with the Indonesian authorities concerned with regard to the plan and desirable measures to be taken by both governments for successful project implementation.

The members of this team were as follows:

- * Ryosuke KATO (Leader) Director, Asakawa Experimental Forest Office, Forestry and Forest Products Research Institute, Ministry of Agriculture Forestry and Fisheries.
- * Hiroshi KUDO (Afforestation): Deputy Director, Silviculture Division, Private Forest Department, Forestry Agency, Ministry of Agriculture, Forestry and Fisheries.
- * Takashi OYAMA (Forest protection): Deputy Director, Forest Protection Division, Private Forest Department Forestry Agency, Ministry of Agriculture Forestry and Fisheries.
- * Seiichi OHTA (Agro-forestry): Senior Researcher, Overseas Cooperation and Information Division, Forestry and Forest Product Research

Institute, Ministry of Agriculture, Forestry
Fisheries.

* Tooru AYUKAWA (Coordination): Official, Forest Development
Division, Forestry and Fisheries Development
department, JICA.

They held a Joint Meeting with the Joint Steering Group on May 28, 1984, to discuss the technical schedule of implementation, technical cooperation programme, research and development programmes, etc. As a result of the discussions, "The Minute of Understanding Concerning the Technical Cooperations for Trial Plantation Project in Benakat, South Sumatera (ATA-186)" was signed by Ir. Victor M. Sinaga and Mr. Ryosuke KATO (Appendix 9).

13. Technical guidance for fire protection

This technical guidance mission has one member, Mr. T. MISAWA, who was dispatched to Indonesia from October 8 to 14, 1984 in order to exchange views with authorities concerned in the Ministry of Forestry on the development of a fire protection system and to give guidance to the construction of fire control model infrastructure at the Project.

The member of the mission was as follows:

* Tsuyoshi MISAWA : Director, Planning Division, Private Forest
Department, Forest Agency, Ministry of
Agriculture, Forestry and Fisheries.

During his stay in Benakat, he gave guidance about technical problems in the field and had discussions with experts and counterparts on technical problems, especially on fire control. At Jakarta he discussed some technical points with Ir. Wartono Kadri and also future cooperation activity. Thanks to his visit to Indonesia, future cooperation activities started to be examined.

14. Technical guidance team for the Project.

This guidance team led by Dr. M. MATSUI from JICA aimed at visiting and guiding tree plantation projects namely those in Indonesia, Thailand and the Philippines.

The Team visited Indonesia from March 6 to 9, 1985.

The members of this team were as follows :

- * Mitsuma MATSUI (Leader) : Technical Advisor, Japan Forest Technical Association.
- * Yasushi MORIKAWA (Silviculture) : Senior Researcher, Forestry and Forest Products Research Institute, Ministry of Agriculture, Forestry and Fisheries.
- * Hisaharu HAYASHI (Coordination) : Head, Forestry Development Division, Forestry and Fisheries Department JICA.

The Mission saw the plantation site enthusiastically and gave some technical guidance to experts and counterparts at the field. They had recognized that nearly all afforestation techniques on glassland had already been transferred and achievement of the Project activities were successful. They pointed out that the next problem was how to protect forests against fire.

When they paid courtesy call on Ir. Wartono Kadri, Director General, DGRLR, they discussed some technical points of view with him and exchanged view about future JICA cooperation activities.

15. Survey team for Project machinery supply .

This survey team led by Mr. T. FUJIMOTO was dispatched from JICA in order to survey some cases concerned with development in business of machinery supply in agriculture, forestry and fisheries technical cooperation from April 1 to 7, 1985. The team had the purpose of finding data on ways to supply machinery and equipment more efficiently by means of discussions with experts.

The members of the team were as follows :

- * Tatsuo FUJIMOTO (Leader) : Deputy head, Development Planning Division, Agriculture, Forestry and Fisheries Planning and Survey Department, JICA.

- * Hidekatsu SHIRAISHI (Management) : Deputy Head,
Administration Division, Procurement
Department, JICA.
- * Makoto AOKI (Management) : Official Development Planning
Division, Agriculture, Forestry and
Fisheries Planning and Survey Department,
JICA.

The team surveyed the progress and problems in the proposal of machinery and equipment to Japan, from the start of procedure until it reaches JICA Headquarters, progress and problems during the procedure in taking until its submission to the Embassy and problems in the procurement of machinery and equipment in Indonesia.

16. Technical guidance team for the Project.

This technical guidance team led by Mr.K.WATANABE visited Indonesia in order to review the achievement of the Project activities during the extended two years and to give guidance to technical problems from October 21 to November 1, 1985.

The members of the team were as follows :

- * Katsura WATANABE (Leader) : Former Director, Forestry and
Fisheries Development Cooperation Department, JICA.
- * Masatoshi NUMATA (Silviculture) : Official, Planning Division,
Private Forest Department, Forestry Agency,
Ministry of Agriculture, Forestry and Fisheries.
- * Mr.Tooro AYUKAWA (Coordination) : Official, Forest Development
Division, Forestry and Fisher Development Department,
JICA.

The Joint Evaluation Team was organized in order to review the achievement of the extended two years implementation and give suggestion for future activities. The team had understood that the project has been carried out successfully, but there were still a few remaining outstanding issues. After the joint Meeting, the Team decided to recommend to their

respective governments that a follow up for the Project was necessary until the end of March 1988, and the "Review Report of the Joint Consultation Team on the Extension Period of the Trial Plantation Project in Benakat, South Sumatra (ATA-186)" was signed by Ir. Victor M. Sinaga, Indonesian Team Leader and Katsura Watanabe on October 28, 1985. (Appendix 10).

VIII, VARIOUS KINDS OF MEETINGS AND CONFERENCES

There were various kinds of meetings and conferences that had important roles on the project. One of the most important meeting held by Indonesian side is the Joint Steering Group Meeting and the other one is the Project Leader's Conference on agriculture, forestry and fishery that is held by JICA. The former meeting was held twice a year to discuss and get the solutions for the problems in order to implement the project activity smoothly, and also discuss the annual plan and the result of project activity. The latter conference was held once a year to exchange information and opinion on respective projects among the leaders, to study and examine annual operation plan of the project, and to explain new JICA administrative procedure concerning the supply of machinery and equipment, fellowship for trainee and expert's assignment with a view to implementing the projects smoothly and efficiently. Here, the various kind of meeting and conference concerning the project activity will be illustrated briefly.

1. Joint Steering Group Meeting

Up to present, the Joint Steering Group meetings were held eighttimes, so that there the contents of discussion and conclusion of each meeting will be explained briefly.

- i) First Joint Steering Group meeting: the first meeting was held on June 12, 1980 at the conference room of Directorate General of Forestry under the chairmanship of Mr. Apandi, Director of Directorate Reforestation and Rehabilitation. The proceeding of this meeting was reported as ATA-186; JSGM-1. The number of attendant is 11 persons from Indonesian side and 10 persons from Japanese side including 4 observers who were the number of the cooperation planning survey team for the project headed by Mr. K.KOTARI and had just stayed in Indonesia.

In the opening statement, Mr. Apandi, the chairman, after introducing the attendance, informed the main task of this meeting would be to formulate annual operation work plan, to evaluate the progress and to deal with the specific problems of the project. Mr. M. MIYAMOTO, the representative of JICA JAKARTA office, also expressed his glad feeling to attend at this first meeting and he asked the experts and counterparts to find the suitable techniques in which social life can be involved as sounded in World Forestry Congress last year in Jakarta. Mr. Sagala as the co-manager of the project reported three points on the project: plan of operation, progress and problems of the project. After discussing among the members and hearers the meeting had the conclusions as follows: the acceptance of the plan of operation as master to prepare annual working plan by Joint Steering Group, sitting the next meeting to legalize 1980/81 annual plan before Fasting month, acceleration for the dormitory establishment and equipment delivery from Palembang harbour to be ready for use in November 1980, and taking the effort to extend the lodging permit in Stanvac mess until completion of dormitory constructed by Indonesian side. In spite of the conclusion that next meeting would be held before Fasting month, the second Joint Steering Group meeting was not held until the end of October.

ii) Second Joint Steering Group meeting: The Second meeting was held at the conference room of Directorate General of Forestry on October 30, 1980 attended by 8 persons from Indonesian side and 6 persons from Japanese side, but Mr. Apandi the chairman, could not attend the meeting because of his health condition. The meeting was taken the chair by Mr. Soedjadi Hartono, Vice Director of Directorate Reforestation and Rehabilitation, and after opening remark by chairman, Mr. Suhariyanto, acting field manager at that time,

stated the progress report and current matters that had been dealt with in the project. The result of the meeting was as follows: Adjustment of the seeds by Japanese team needed in next year, delivery of the remaining stock of seedlings planted in 1980/81 after arrangement of consultation with regional forest office by Mr. Wazil, supply of the document for custom clearing of angledozer as soon as possible, preparation of the handling cost amounting 1.8 million Rupiah to transport the equipment from Palembang harbour to Benakat, delivery of the lighter cargo truck (4 wheel drivers and 2 ton capacity) because of the difficulty to get the transportation licence, supply of mechanic and drivers for angledozer and cargo trucks, and so on.

The total budget for the equipment for Fiscal Year 1980/81 was reported from Japanese side as about 120 million yen. The annual plan 1980/81 was approved officially but the legalization the annual plan 1981/82 could not be approved because of the uncertainty of the budget amounting to 490 million Rupiah at that time.

iii) Third Joint Steering meeting: The third meeting was held at the meeting room of Secretary of Directorate General of Forestry on June 8, 1981 under the chairmanship of Mr. Apandi and the number of attendant was 14 persons from Indonesian side and 5 persons from Japanese side.

The meeting evaluated the conclusion of the second meeting and reported that the several matters, that is to say, preparation for seed requirement, delivery of seedlings remained and driver's and mechanic's problem did not yet be settled.

Progress report was delivered by the field manager and the meeting noted that the realization on planting activities

was below the target because of the arrival delay of the equipment on the project site. In the meeting, the question on the absence of the project manager in the central office in Bogor was asked by Japanese side and the chairman explained that the position of project manager should be occupied by Mr. Soedjadi Hartono who was nominated as the co-manager.

The meeting approved the five-year plan and annual plan of 1981/82 and also discussed on the miscellaneous problem, that is to say, making the progress report, sitting of the seminar or workshop of the project activity, agro-forestry activity, budgetal problem for forest ecological activity, schedule of the short-term expert, training schedule in Japan and so on.

- iv) Fourth Joint Steering Group meeting: The fourth meeting was held on January 5, 1982 at the conference room of Directorate General of forestry attended by 13 persons from Indonesian side and 6 persons from Japanese side. Unfortunately, Mr. Apandi, the chairman of the meeting, did not attend due to his health condition. Mr. Soedjadi Hartono, the project manager, took the chair and introduced the participants, especially the newly assigned experts, and counterparts after expressing his welcome and wishing a Happy New Year.

The meeting evaluated the conclusion of the last meeting and recommended the sitting of the seminar or workshop again. The progress report was delivered by the field manager and discussed on the short supply of the seeds for species trial, the security problem in nursery site, the delay of building construction by Indonesian side, the delay of planting by the late coming of rainy season, the reason for the unsuccessful survival of the seedlings in the field, handling cost for the equipment and so on.

The plan of operation for 1982/83 was decided by the meeting and other matters on standard terminology of the silvicultural subject, the meeting plan and form of compartment by making the accessible road based on the topography of the site, and so on were discussed.

- V) Fifth Joint Steering Group meeting: The Fifth Joint Group meeting was held on September 21, 1982 at the conference room of the Directorate General of Forestry under the chairmanship of Mr. Apandi Mangundikoro, Director for Reforestation and Rehabilitation. The proceedings of this meeting was reported as the Report of the Fifth Joint Steering Group Meeting. The number of attendant was 14 persons from the Indonesian side and 5 persons from the Japanese side. After the chairman informed the Meeting of the conclusion which were brought up and discussed in the last meeting, the progress report was delivered by the Field Manager ; the meeting noted the question asked by Mr. K. KATO on the possibility of earlier road construction prior to the establishment of plantataion for the next fiscal year, and the meeting suggested to the Field Manager to speed up the construction living quarters for personnels.

The Meeting decided that the Co-Manager and Field Manager proposed a plan for fire protection as part of the important activities in the Project, which should include organization of fire management system and equipment to be used. Regarding this, there were suggestions from Mr. Apandi to build more look-out towers and from Mr. Soedjadi to make more pools, for example. The JICA representative promised that he will try to discuss the possibility of obtaining fire trucks for the Project to the authority concerned.

The chairman informed to the Meeting of the coming visit to the Project by the Minister of Agriculture together with the Ambassador of Japan in the latter half of November 1982; however, this visit was postponed until December 4, 1982.

- vi) Sixth Joint Steering Group Meeting: The sixth meeting was held on March 14, 1983 at the conference room of the Directorate General of Forestry under the chairmanship of Mr. Soedjadi Hartono, Chief of the Sub-Directorate of Reforestation, as Project Manager. The proceedings of the meeting was reported as the Report of the sixth Joint Steering Group Meeting. The number of attendants was 16 persons from the Indonesian side and 6 persons from the Japanese side. After the chairman referred to the conclusion of the last meeting, progress report was discussed. In the Meeting, agro-forestry scheme items were discussed such as the suggestion from Mr. OHTA and Mr. APS Sagala concerning the Project's offer of Rp. 50.000.- per ha to the farmer for the purchase of seed, the argument of Mr. OHTA concerning the necessity to accomplish a study to identify the desire and demand of the farmers in the Tangya system, the opinion of Mr. OHTA concerning the Tangya system, of the possibility endangering the main plants as the farmers will only think of their crop and the damage by wild animals on agro-forestry scheme site plants and hunt these animals.

In the meeting Mr. Marzuki stated that the achievement of technological transfer from Japan to Indonesia was a great importance for the Project, and concerning his opinion, the chairman responded that technological transfer had been conducted to the counterparts, besides that foresters of the Forestry Agency were visiting Benakat for comparative study and so forth Mr. K. KATO insisted on that experts would be able to obtain some room in the South Sumatra Regional Forest Office for the purpose of the contact. For this request, thanks to Mr. Dodo and Mr. Wazir Nengkeman's effort a small office in the South Sumatra Provincial Forest Office was realized.

From this meeting a technical report was reported. This technical report was meant to give a short review on the achievement of Project activities among plant species, techniques and management of the afforestation of the Project. In this report many technical items were reported such as seedling quality, sowing media, composition of plant media for the pot, seedling bed, watering system and so on in nursery section, for instance plantation in the other section was also reported,

vii) Seventh Joint Steering Group meeting: The Seventh Joint Steering Group Meeting was held on April 23, 1984 at the conference room of the Ministry of Forestry, attended by 23 persons from Indonesian side and 6 persons from Japanese side. The meeting was chaired by Mr. Wartono Kadri, Director General, DGRLR and taken over to the Acting Chairman Mr. Victor M. Sinaga, Director of Reforestation. The seventh meeting was very important, because it was finished with termination of the five years cooperation period; the objectives of the meeting were to evaluate project activities in 1983/84, and to prepare the two years' plan of operation and annual operational plan of 1984/85 for the extension of the technical cooperation of the two years' period. Mr. Wartono Kadri presented a note for the extension period of the Project, stating that in the future the project will develop as Reforestation Technology Development Center, and in the center it was hoped that all kind of techniques of afforestation should be tested as well in order to get a reasonable data of the best techniques of afforestation especially in grass-land areas. He also stated some problems of the project, such as problems of wild hogs, chemical method in alang-alang, undergoing agro-forestry and forest fire control.

Conclusions of discussion of the evaluation of the Project activities in 1983/84 were as follows:

The remaining activities of the 1983/84 Fiscal Years, especially plantation, was postponed because of the delay in budget distribution, so it was agreed to postpone the planting of the remaining 100 ha up to next rainy season. However, the actual plantation postponed until the next rainy season was 50 ha only. And

the meeting noted that the Final Report of Five Years Project Implementation should be prepared by the Project Manager based on counterparts' and experts reports.

In the discussion concerning the two years operation plan and the annual operation plan for 1984/1985, at first these two items were proposed to be discussed; after some decision these two items were agreed by all attendance. The discussed matters were as follows:

- a) The budget for the Project comes from two sources i.e. INPRES budget and DIP budget, and especially the INPRES budget had a disbursement problem, so many activities in the last three years' implementation project had to be postponed. So this problem was discussed in the meeting, with a conclusion that the acting Chairman expected more effort be made this Fiscal Year 1984/85 to make the procedure of disbursement smoother, so it would be realized in July or August. However, the disbursement of the INPRES budget has not been done completely until March 1985.
- b) For the Experiment in the Project, trial implementation of two stories stand plantation combination between fast growing species and slow growing species, and species for trial plantation including some species from some region were decided to be carried out in field.
- c) The meeting noted a comment by Mr. Hendromono regarding the pattern of research activities and a suggestion by Mr. Suharyanto that project should recommend suitable machinery and equipment for the tropical area.
- d) Concerning purchase of machinery and equipment supplied by Japan, Mr. YAMAMURA suggested that some of them would be bought in Indonesia as many as possible if they were available.

viii) Eight Joint Steering Group Meeting: The Eight Joint Steering Group Meeting was held on March 19, 1985 at the conference room of the Ministry of Forestry under chairmanship by Mr. Wartono Kadri and Mr. Victor M. Sinaga as Acting Chairman. The proceedings of this meeting were reported as the Report of the Eight Joint Steering Group Meeting. The Number of Attendants to the Meeting was 28 persons from the Indonesian side, 5 persons from the Japanese side and one observer from the International Funds.

After a review to the last meeting, the progress report and the Technical report were delivered by Field Manager. The meeting discussed these two reports and others. Concerning the evaluation of project activities in 1983/84 Fiscal Year, the meeting noted that planting would be finished by May or June, 1985; however, it had been finished in April 1985 besides replanting. Concerning agro-forestry, the meeting noted that the objective of agro-forestry was to increase farmers' income participating in the Project, and bee-keeping program in the framework of agro-forestry activity would be implemented after recognizing its suitable condition, getting the assistance from the Directorate of Regreening and Arable Lands.

Concerning machinery and equipment supplied by the Japanese government, the meeting requested JICA Jakarta Office to inform budget promptly and all the prices of machinery requested by the Project; owing to the great efforts by the JICA Jakarta Office, finally the total amount of machinery and equipment to be supplied was as much as ¥ 50.000.000.-

For overcoming the attack of Hypsiphylia robusta pest on young Swietenia macrophylla plantation, the meeting requested the Project to take into consideration inviting entomologists or to establish mix forest plantation next time. The forest protection section established some plots for experiment and two stories forest that S. macrophylla seedlings were

planted under the five years Albizia falcata forest concerning this request.

ix) Ninth Joint Steering Group Meeting: The Ninth Joint Steering Group Meeting will be held in the last ten days of April 1986 at the conference room of the Ministry of Forestry.

2. Project Leader's Conference on agriculture, forestry and fishery

Up to present, the Project Leader's Conferences were held seven times, once per year in order to exchange information and opinion on respective projects among leaders.

i) Ninth Project Leader's Conference in 1979/80

The Ninth Project Leader's Conference was held at the Sari-Pacific Hotel in Jakarta, Indonesia from February 19, to 25, 1980.

The number of leaders were 32 persons from 31 projects in the 13 countries, and the participants from the central government and JICA in Japan were 14 persons. The conference consisted of the plenary and sectional sessions. In the plenary session the main agenda was the symposium on the target and the management of the progress of project activity and the discussion was based on the case study reported by Mr. NAKADA, project leader of agricultural extensions project in Bangladesh. As the contents and targets of each projects were different and the lapse of time of each projects were also varied, the results of management for the projects were not the same, but the progress of all the projects in general developed smoothly, based on the initial plan, in spite of the many problems involved.

The sectional session for forestry and fisheries was held under the chairmanship of Mr. K. HORI, Director of the Forestry Development Cooperation Department of JICA, and the number of leaders participating in this sectional session were 7

persons from 7 projects in 5 countries. The subject matter in the sectional session was how to utilize efficiently and maintain the supplied equipment and machinery and opinions on the situation and the problem of this matter in each project were exchanged. The outline of the project activity in the next year such as the dispatch of the long-term and short-term experts, the total amount supplied equipment and machinery and the number of the trainees in Japan were discussed and decided roughly.

ii) Tenth Project Leader's Conference in 1980/81

The Tenth Project Leader's Conference was held at the JICA headquarters in Tokyo from February 18 to 24, 1981.

The number of leaders were 35 persons from 34 projects in the 14 countries. The participants from the central government and JICA were 68 persons.

In the plenary session the special theme on "how to proceed the project activity" was discussed, based on the reports by the leaders from 6 different projects of different fields. The sectional session for forestry and fishery was held under the chairmanship of Mr. K. WATANABE, Director of Forestry and Fisheries Development Cooperation Department of JICA and continued the discussion on the methods to proceed the project activity.

The result of the discussion was that the serious obstacle for the management of the project was the lack of correspondence by the partner country so that it was necessary to seize the real situation of the partner country for human and economical correspondence in advance at the stage of prior survey.

The individual meeting with Mr. K. WATANABE was held at the room of JICA's Forestry and Fishery Development Cooperation Department. And the outline of the project activity in the next year such as the dispatch of the long term and short-term experts, the total amount of supplied equipment and machinery and the number of the trainees in Japan were discussed and decided roughly.

iii) Eleventh Project Leaders Conference in 1981/1982

The Eleventh Project Leader's Conference was held at the Narai Hotel in Bangkok, Thailand from February 8 to 13, 1982. Attendant from the Project was Mr. K. KATO, Team Leader. The number of leaders was 32 persons from 30 projects in 9 countries. There were 21 participants from the central government and JICA. The conference consisted of the plenary and sectional sessions. In the plenary session, the main theme, "how to carry out the project activities" was discussed based on some reports of the implementation in this fiscal year, purchase of machinery and equipment supplied from Japan in each appointed country and suitable techniques. The sectional session for forestry and fishery was held and seven project leaders from seven projects in four countries. In this session at first the outline of each Project activity was reported, then the opinions from different projects were exchanged.

The individual meeting with Mr. K. WATANABE, Director of Forestry and Fisheries Development Cooperation Department, was held to discuss the outline of the Project activities in the next year such as the dispatch of long and short-term experts, total amount of supplied machinery and equipment and number of trainees in Japan.

iv) Twelfth Project Leaders' Conference in 1982/1983

The Twelfth Project Leaders' Conference was held at Village Hotel in Manila, Philippine from February 14 to 19, 1983. Mr. K. KATO, Team Leader of Japanese Expert, attended this conference from our Project. The number of leaders were 28 persons from 24 projects in 8 countries. The participants from the central government and JICA were 18 persons. The conference consisted of the plenary and sectional sessions as usual.

In the plenary session, the main themes were report and discussion about the situation of implementation of works in 1982/83 Fiscal Year and plan of that in 1983/84 of JICA, and situation of implementation of works in 1982/83 Fiscal Year and plan of that in 1983/84 Fiscal Year of each project. The sectional session for forestry and fishery was held and discussed a special theme for "Problems and Solution on the Transfer of Technology".

The individual meeting with Mr. K. KADOYA, Head of Forestry Development Division, Forestry and Fisheries Development Cooperation Department, JICA, was held to discuss the outline of the project activities in the next fiscal year such as the dispatch of experts, total amount of supplied machinery and equipment and number of trainees in Japan, as the same of usual conference. And in this meeting, Mr. K. KATO requested improvement of living condition of the Project site.

v) Thirteenth Project Leaders' Conference in 1983/84

The Thirteenth Project leaders' conference was held at Sari Pacific Hotel in Jakarta, Indonesia from February 29 to March 6, 1984. The number of participating leaders was 29 persons from 27 Projects in countries, and the participants of the central government and JICA were 23 persons. From our Project Mr. H. OKABE-Chief Advisor for the Project, and Mr. T. IKEDA, Team Leader, attended the conference.

In the plenary session after the opening ceremony, agriculture, forestry and fishery technical cooperation activities in 1982/83 fiscal year and the draft budget of JICA in 1984/85 Fiscal Year were mainly discussed. In the sectional session, two themes were discussed, that is, how to take measures to ensure local cost and problems and countermeasures on technical training for counterparts. The individual meeting with Mr. K. WATANABE was held to discuss the outline of the Project activities in next year like an previous years conference, such as the dispatch of

long and short-term experts, total amount of supplied machinery and equipment and number of trainees in Japan.

vi) Fourteenth Project Leaders' Conference in 1984/85

The Fourteenth Project Leaders' Conference was held at Ambassador Hotel in Bangkok, Thailand from February 26 to March 6, 1985. Mr. H. OKABE attended this conference. There were 28 leaders from 26 Projects in 9 countries. The participants from central government and JICA were 21 persons.

After opening ceremony, agriculture, forestry and fisheries technical cooperation activities in 1983/84 Fiscal Year, draft budget of JICA in 1984/85 etc. were discussed in the plenary session mainly.

The sectional session was held, for the second section (establishing, training and extension), 13 leaders from 13 Project in 7 countries attended this session. There were two themes that had been discussed in the session, namely the purchasing system of machinery and equipment supplied from Japan and how to take measures to ensure local costs.

The individual meeting with Mr. H. HAYASHI, Head, Forestry Development Division, Forestry and Fisheries Development Cooperation Department, JICA was held to discuss the outline of Project activities in next fiscal year, like in previous year, how ever as the Project would be terminated in April 1986, the method for carrying out the Project in 1985/86 Fiscal Year was discussed eagerly.

vii) Fifteenth Project Leaders' Conference in 1985/86

The Fifteenth Project Leaders Conference was held at JICA Headquarters in Tokyo, Japan from February 25 to March 3, 1986. Mr. H. OKABE attended the conference from the Project. The number of leaders attending was 36 persons from 35 projects in the 17 countries who came from all JICA agricultural, forestry and

fishery project in the world. the participants from the Ministry of Foreign Affairs, Ministry of Education and Ministry of Agriculture, Forestry and fisheries were 14 persons. The participants for the plenary session from JICA Headquarters were 23 persons, more people attended the sectional session.

In the plenary session at first Mr. I.ARAKATSU, Vice-President of JICA, declared opening of the conference, Mr. E. YAMAGIWA Executive Director, JICA, made a speech under the theme of the situation and problems on the cooperation of agriculture, forestry and fisheries. Then the Director concerned explained some items of each competence, Mr. S. Suzuki, Director of Forestry and Fishery Development Cooperation Department explained about forestry cooperation in Africa, supplied machinery and equipment by Japanese government being more used, asking earlier submission of A4 Forms to JICA Headquarters.

Eight forestry project leaders, 2 leaders who attended as observers from some forestry projects, some staffs of the Forestry Agency Ministry of Agriculture, Forestry and Fisheries, Mr. K. KOTARI, Special Advisor for the President of JICA, Mr. S.SUZUKI, Director of Forestry and Fisheries Development Cooperation Department and his staffs attended the sectional session.

The main theme of the sectional session was the discussion on the condition of counterparts and exchange of opinions in about on-the-job training etc.

Individual meeting with Mr. H. HAYASHI and some of his staff was held at the room of the Director of Forestry and Fisheries Development Cooperation Department on February 28, 1986. In the meeting, one of the most important themes was a Record of Discussion for the Follow-up of the trial plantation Project in Benakat and all form for long-term experts. The second ones were those on the new project in South Sulawesi Province and Development Survey for Timber Estate near Benakat. Dispatch of experts counterparts' training and machinery and equipment were also discussed as usual.

Another meeting was held with Mr. ONODA, staff of First Grand Aid Division, JICA on March 3, 1986. In this meeting, it has been informed that Grant Aid for Technical Assistance Request for the Afforestation Machinery Provision Project will be determined by Japanese Cabinet Conference during the latter half of March 1986. And in accordance with this, several things for the grand aid were discussed, such as the mission from Japan, additional machinery and procedure etc.

3. Other meeting.

A meeting of Japanese agricultural, forestry and fishery experts in Indonesia under JICA program has been held by JICA Jakarta Office once a year in Jakarta.

The purpose of the meeting is to exchange the information and views regarding the respective project, to brief the experts on the new administrative system of technical cooperation procedure adopted by JICA and thereby to make it more efficient and smoother for the experts to perform their assigned duties in Indonesia.

Every year's meeting consists of plenary and sectional sessions. From the Japanese Embassy many persons attended every year besides participating expert, representatives of JICA Jakarta office and his staffs.

There were various kinds of meetings in the project office in Bogor, Jakarta and also at the implementation center in Benakat. The meeting between Mr. Apandi and the project manager or the Chief Adviser which was held irregularly when the problem had happened was the important administrative one, of course, after Mr. Apandi's assignment terminated, the meeting between his successor and others also has been held when the problem had happened, especially, to communication meeting between the project manager or Co-Manager and Chief Adviser of Japanese experts was also held irregularly in the project office in Bogor, before the Directorate General of Forestry has raised Ministry of Forestry which has moved to Jakarta. Needless to say, after

the Ministry of Forestry has moved to Jakarta, these communication meeting have also been held at Jakarta irregularly.

In the field site the most important meeting was the administrative staff meeting and technical staff meeting. The former meeting was chaired by Mr. Soedjadi Hartono, Project manager, and held almost about every two months when he had visited the field site. The latter meeting was also held every two months when Mr. Sagala, Co-Project Manager, or Mr. R. KATO, Chief Adviser, had visited the field site, sometimes both meetings were held at the same time in Palembang or Benakat. The purpose of both meetings was to discuss the administrative or technical problems which had happened after the last meeting and to find out the way to solve the problems. But sometimes it was so difficult to solve the problems as soon as possible because for financial or administrative reasons that the real solution was sometimes obliged to postpone until coming next fiscal year in spite of the efforts made by Indonesian and Japanese officials concerned. However, these meetings were very useful to improve the administrative and technical problems of the project and to promote the project activity. These meetings were continued, after Mr. Soedjadi Hartono, Mr. Sagala has been moved to another post and Mr. R. KATO returned to Japan, by their successor, but less frequently because of less problem. And also the meeting between counterparts and experts was held frequently in order to promote the project activity smoothly and effectively in the field site.

IX. IMPRESSION AND SUGGESTION

These statements in this chapter are the author's personal impression and suggestion on the actual implementation of the Project, mainly during Phase III that have been stated in chapter 1-2. Therefore the author must declare that these are not the united view of Japanese experts who have stayed in Benakat during Phase III, experts' opinions before Phase II and also the official opinion of Japanese side.

However, these are also the matters which have always been discussed with the Director of Reforestation, the Project Manager, the Chief of the Reforestation Technique Development Center, counterparts, Japanese experts and some staffs of the Sub-Directorate of Rehabilitation personally and semi-officially when we had a chance to have frank discussions with each other, and some matters have been reported to the Director of Reforestation as my report of my official tour to the Project in Benakat.

Reading "Impression and Suggestion" in Mr. R.KATO's report, quoted in many previous chapters in this report, some of Mr. R.KATO's impressions and suggestions are quite the same as mine, especially on many parts of the budgetary problems. This means that some problems have not yet been solved.

The impressions and suggestions are as follows:

1. Impressions and suggestions on the organization of the Project.

Concerning the organization of the Project, only a few can be mentioned, as fortunately the Project has been raised to the Reforestation Technology Development Center which is a permanent organization, and the organization has become bigger than before. However, some counterparts were engaged in desk work more than before. It seems that field works which should be guided by counterparts or technical officials

are necessary for the afforestation technology development, so the Chief of the Center should guide his staffs in field management. If they only work at the desk, the activities of experiments, surveys and implementation will become more ideal than actual. The activities of the Center should be those of silvicultural technique in along-alang grasslands, therefore they should go to the field site as frequently as possible. This is very important for future activities. An old saying in Japan which says, the good forest plantation will be grown if the foresters concerned visit the plantation, is quite true in Indonesia, and good forest plantation will yield useful silvicultural techniques.

2. Impression and suggestion on the budgetary problem

The Project activity is somewhat different from other afforestation activities, that is to say, the Project activity consisted of not only afforestation management activity including forest road construction and forest protection activity but also research, experiments, surveys and agro-forestry activities, because of Trial Plantation Project. Therefore the Project should examine some technical matters. But INPRES budget system does not consider these items, and also DIP budget seems not enough for those activities. Accordingly necessary adjustment in the budget for the investigation of all Project activities should be done.

In connection with the disbursement of budget, the Project suffered from delay of budget distribution sometimes. The Project activities have to be carried out at the right time, for example, tree planting in the rainy season, ploughing in the dry season. If the budget could not be used until December, for instance, the Project could not be ploughed or harrowed at the right time unless a loan is obtained from another organization. Even though some money could be borrowed from other organizations, the Project activities might suffer from insufficient implementation. In the dry season, it is more suitable to plough or harrow

than in the rainy season. In the rainy season, as the soil contains much water, it is very hard to plough or harrow. The tractors are more troublesome and needs much more fuel and working time than in the dry season. This is for the efficiency of operation, but the project is one of trial Plantation, so trials should be carried out in the best conditions. In other words, it seems to depend on early distribution of the budget, mainly that the progress of all kinds of operation have to be carried out at the right time, because an early budget distribution enables every operation to be carried out on time, consequently the operation would have been done efficiently and it is the best condition for investigation too.

One of the most important aims of the Project is the trial of mechanized plantation in along-alang grassland; actually there are many heavy duty machines in the Project, however sometimes some of them could not move because of trouble. The reason why they could not be maintained was lack of budget, whereas more sufficient budget should be allocated for the Project in order to get good fruits which would be useful for a few million ha of the afforestation.

As Mr. R. KATO wrote in his report, the wages for operators and mechanics for machinery working in the Project should be raised to the same level as the wages for operators or mechanics working for some company near the Project. Some people who have got techniques from experts have moved to other companies. More cases of employees moving to other companies would happen, even the operators and mechanics may change occupations from the Project to the private company in order to get higher wages, because private companies require their technical knowledge which has reached a high level, in this case, activities concerning machanization will be stopped or slowed.

3. Impression and suggestion on the technical activity.

There are many important impressions and suggestions

on the technical activities in the MR. R. KATO'S report. They were written about 4 years ago, but they are still quite important for the Project activities. Especially, in connection with the trial. "We need not be afraid of the end or failure" indeed it needs investigation of the reason of failure, in order to avoid the same failure in the future. "As our Project is a trial plantation Project, the result of the activity is not always successful but some times it may end in failure".

Mr. R. KATO pointed out importance of producing seedlings by bare root or stump, constructing the forest road which easily dries up after the rain and selecting the most suitable fire belt for this area among green fire belt, besides those above-mentioned in his report. In this report I would like to write from the viewpoint of actual technical activities carried out at field site.

Comparing the effect of land preparation method effect in new plantation site between site clearing only and site clearing plus twice ploughing in strip area, there is very big difference in the growth of Acacia mangium and Eucalyptus deglupta young trees, which were planted February and March 1985 and observed on October 9, 1985. A. mangium young trees are about 1.70 Cm tall on the average and very good in their tree forms in the area of land clearing and twice ploughing, but the same tree species trees are about 1.40 Cm in height averagedly and their tree forms were very slender and weak at the site prepared by clearing only.

In the same area of land preparation, E. deglupta young trees are averagedly about 100 Cm in height in land clearing and twice ploughing but the same trees are averagedly 50 Cm in height in land clearing only, and tree form is also different the way with A. mangium trees. The difference in tree growth may depend on the improved soil physical condition mainly; other factors

might be the soil chemical condition, the time when trees were planted, seedling condition etc. Seeing this difference in tree growth, it is understandable that the way of ploughing contributes to tree growth. These two methods of site preparation are only separated by forest road. Therefore the difference of tree growth should be observed for a long term, in order to get effect of ploughing.

Since December 8, 1980 when Abizia falcata seedlings were planted in A-1 compartment firstly, planting activity has become six times in 1985/86 Fiscal Year. According to experts' report and forest condition, during these five years, it seems that labourer's planting skill has improved gradually. But still nowadays, some planting works should be improved, such as seedlings handling, planting method and planting depth.

Seedlings handling gives some influence on survival ratio, that is to say, good handling will yield a high survival ratio, but bad handling will give a low one. This means good handling does not only bring good result but also saves plantation cost, because there is no need replanting. Seedlings handling includes supplying seedlings from the nursery to the plantation site seedlings should be planted on the same day or at least next morning; of course, the seedlings should be watered before starting nursery and kept in a shaded place in order to keep them vigorous.

Next, the planting method should be taken up. When labourer plant seedlings in a cultivated area, they bury them with clods of dried earth. This is not a good way noting the following matters. First, clods of dried earth absorb water from the earth brought from the nursery with the seedlings. Second, clods of dried earth are very hard, so it is difficult to adhere to each other, consequently not only the capillary tubes will be disconnected with deep soil which contains more water, but

also water will evaporate through the cracks of earth clods.

It is apt to plant seedlings deep, but planting too deep is not good for seedlings, especially in moist soil. If the soil is rather dry, seedlings should be planted rather deep, this means 2 or 3 Cm deep from the ground line to the surface of the pot, while it is usually at the same level. On the field there are many seedlings which are planted more than five Cm deep.

These basic points that should be improved could be improved by counterparts, if they go to the field and give guidance in all the works as frequently as possible.

The trial for two canopy forest combinations with fast growing species and slow growing ones was suggested by Mr. Victor M. Sinaga at the Seventh Joint Steering Group Meeting. Indeed a two canopy forest trial is very important in order to know what kind of species will be able to make two canopy forest. Before fast growing tree species are cut down, if some slow growing species can be planted under the fast growing tree species, it might be advantageous not only for the utilization of the area but also against forest damages. There are some shade tolerant species in slow growing tree species, so it might be possible to make two canopy forest, and this might be the only method for making a forest by very strong shade tolerant tree species.

At Benakat, there are two small two canopy forest trial areas; one is Albizzia falcata and Hopia odrata, another is A. falcata and Swietenia macrophylla. Although these tests have only lasted about two years, the planted slow growing tree have grown under the A. falcata trees stand. And seeing Shorea leprosula young trees which have been planted in an Acacia mangium green belt, it seems that S. leprusula can also make a two canopy forest with A. falcata trees stand. A two canopy forest trial should examine more tree species and a

larger area.

By the method of land preparation, the post-planting treatment will be different. For example, if land preparation will be done manually in a strip, weeding will be necessary soon after planting in the strip, and total weeding will be necessary at an early time, but if land preparation will be done by total tillage like twice plowing and once harrowing, weeding growth will be slower than that by manual land preparation. As weeding is carried out in along-alang grass, Eupatorium palescens, Cilibadium surinamense and other shrub type tree, which compete with planted trees should be cut-down, the weeding times and timing will be decided in connection with the growing of planted trees and its competitor naturally. Therefore weeding times for planted trees are different between fast growing species and slow growing ones. It is very curious if weeding times would be determined uniformly.

In other words, weeding times and method should depend on the condition of land preparation, vegetation and soil richness. However, if not any weeding pattern is made, it is very difficult to make a program for weeding. One of such pattern is shown in the Technical Guidance.

The weeding pattern in the Technical Guidance has been made by the result of weeding test in mechanized land preparation in plantation I. The pattern confirmed weeding standard of INPRES budget generally that weeding should be done every 3 month, except in the case of Acacia mangium. It seems that in the case of A. mangium weeding times are not necessarily the same as according to INPRES standard, weeding times for the case of some slow growing tree species in the along-alang grassland with Eupatorium palescens, Cilibadium surinamense and shrub type trees are need for more times, of course total weeding should be done once per several times, damage by shade from other trees or weeds should be able

to avoid.

After weeding, there are important works, namely cleaning cutting, liana cutting, thinning and pruning. After weeding, some fast growing useless kinds of trees will become competitors to the planted trees, cleaning cutting aims cutting down useless species trees, competitors for planted trees and damaged planted trees by disease, insect and wind, planted trees that are not good in character. Liana cutting is a work that liana in the plantation area should be cut, liana cutting will be carried out during follow up, it means the trial for clearing cutting and liana cutting should be done. But in Indonesia, some parts of clearing cutting will have been done as weeding, like as weeding in B-4 compartment, Swietenia macrophylla plantation and B-9, Pinus merkusii plantation. During follow up, clearing cutting test should be done. Clearing cutting should be done as much times as it need.

Thinning and pruning are also essential for some kinds of trees, especially high value trees. Thinning is a kind of work which aims at controlling tree density in the stage of tree growth and lead to forest that owner will want to grow up. This managerial aim is connected with planted density, thinning times, thinning method and pruning in every tree species. These tending after weeding should be examine in order to make good, strong and high valued forest.

In the nursery they had experience of about 1.9 million pots in 1982/83 Fiscal Year and about 1.5 million pots in 1983/84 Fiscal Year in transplanting, so the nursery has become a nursery which can supply seedlings for large scale afforestation. Labourers' skill in nursery has improved owing to the permanent labourers. Permanent labourers like in Benakat is one of the merits of the fixed nursery, good labourers' skill is indispensable for rising up good seedlings. It may be necessary

to grow up about half million seedlings every year in order to keep the technical level of the nursery.

It is necessary to supply good seedlings in order to establish a good forest. Good seedlings here mean not only good in figure but also good genetically. Hereafter it should be considered that seedlings should be raised up from good seeds, from the viewpoint of tree breeding. When large scale plantation will be carried out, it is very difficult to collect much seed, so if seeds will be neglected in considering the tree breeding view of point, this will be come back as great loss for forest management. It is said that about 4 million ha of plantation will be done in the near future, it is to be hoped that seed orchards that will be considered in the viewpoint of tree breeding will be established soon, and good seeds should be supplied from these orchards. Tree breeding may bring the following merits :

- a) Adaptability to environment will be improved and extension of afforestation area can be expected;
- b) Resistance against diseases and insects will be improved stronger and safety for afforestation will be increased;
- c) Gains from forest will be increased;
- d) Quality of wood will be better;
- e) Forest management rationalization will be possible, and so on.

Seedlings production has an appointed task that as much good seedlings as needed should be supplied and as cheap as possible. Although supplying good seedlings needs time and as much as need numbers is a matter, of course, these conditions have some technical difficulty, because seedlings in the nursery have many possibilities to be attacked by diseases, insects and weather damage. Overcoming these difficulty, it is necessary to supply cheaper seedlings. In 1984/85 Fiscal Year, there were about 660 thousand transplanted seedlings, but numbers of out planted seedlings were about 410 thousand, this showed how many seedlings lossed by dieing or getting

rid of seedling that did not need. Let the ratio numbers of transplanting to numbers of out-planting call seedling getting ratio temporarily here. Increasing the seedling getting ratio itself is one of the stronger way to reduce seedlings cost, so it is necessary to improve techniques in nursery in order not to let seedlings die, and to make good plans to raise up seedlings.

For the cheap seedling product, it is necessary to know the cost of seedlings which will be raised up every year. Through seedling cost calculation, reflection of nursery management and also techniques will be done and cheaper seedlings will be producted, because it will make people concerned have consciousness for cost through cost calculation every year. For a correct cost calculation, it is necessary to record expenses correctly, and such record can be made by the nursery spervisor.

Nursery environment maintenance condition will make some effort to seedling getting ratio in the nursery that is fixed, that is used for long period. In concrete terms, in the nursery or close to the nursery, if there are some which are the same trees species as to be raised up the trees nursery, sometimes these trees will become the sources of some diseases or insects. Actually at Benakat Acacia mangium trees planted near the nursery were attacked by sooty mold and the trees gave pathogen to A. mangium seedlings. Some high trees in or near the nursery will not only be the source of diseases or insects, but also the cause of shade that will have effect on raising seedlings. Sometimes some seedling that have fall into disuse and to be burnt, that have remained, are apt to become sources of diseases and insects. Therefore, these seedlings should be burnt when they are deemed useless.

One of the most difficult obstacle in afforestation in alang-alang grassland is fire. It is the most difficult problem how to protect forest against fire. In the Project, forest is protected against fire by means of high density of fire belts which were made by using natural

topography, look out towers, preparation of water, organization of fire brigade, patrolling in dry season etc. The Project is proud of that none of the trees in 2.500 Ha of trial plantation which has been planted since 1980 is not burnt by fire, thanks to efforts by everyone concerned. Carrying out large scale afforestation in along-along grassland in Indonesia, it is a very important, big and difficult problem to protect planted trees against fire. In the case of protecting forest against fire, it is necessary to prepare two methods, namely, protecting fire from out side of plantation area and fire which happened in the plantation area. Against the spread of a fire from out side the plantation some river, fire belts or forest roads are useful to stop the spread of a fire. In the case of fire which would happen in the plantation area, and even if fire would happen, if there is a high density of fire belts, the loss by fire would be stopped in only a small area. Even though it seems difficult to establish so high density fire belt which costs many budget, fire belts are indispensable to establish good forest. It is indispensable to extend fire control not only to inhabitants near forest but also inhabitants in town in order to make some morale to protect forest against fire. In this connection, at first, all officials who work in the Ministry of Forestry should take care of fire, especially cigarette butts especially in the plantation field site.

It is said that foreign tree species have no experience against the native pathogen or insect, so the most dangerous disease or insect in the world are combination of foreign tree species and native pathogen or insect, and native tree species and foreign pathogen or insect. Up to now, there has not been some damage as serious as dead trees by diseases or insects in Benakat. Generally speaking, damage by diseases or insects in new plantation is seldom in young plantation site, but some years after, when planted trees have grown larger, some

damage by disease or insect seems to be apt to happen suddenly. As the plantation area of Trial Plantation in Benakat has become a forest which is easily attacked by diseases or insects, we should take care of diseases or insects. In the case of industrial plantation implementation, establishing a uniform forest is hopeful from the utilization stand point, but considering damage by diseases and insects, we should plant several species in the area like as checks or resistant species. It is believed that mixed forest, if possible to be established, has an effect which makes receptively against diseases or insects more. The provenance test or tree breeding by selecting method on resistant species should be done early.

New shoots of young Swietenia macrophylla are attacked by shoot-borer (Hypsipyla robusta) that attack trees in many other countries. But fortunately, we still hope to establish S. macrophylla forest in Benakat. It is said that H. robusta imagos do not lay eggs in dark environment or that the imagos do not enter the alang-alang grass or bush, actually when S. macrophylla become about 1.5 m in height, the trees are attacked by this insect. There is an interesting case in Benakat, that is to say, S. macrophylla trees which were planted in 1982/83 in B-4 compartment were weeding by total, the trees are rather slender but they did not be attacked by shoot borer. If this compartment would become good S. macrophylla forest. The weeding method and timing for the compartment will seems to be able to adopt ecological control method against H. robusta.

Since agroforestry scheme was started in 1982/83 Fiscal Year, afforestation activities have been carried out four times. During these three years, from the forestry viewpoint, afforestation activity has already got an outlook for establishing good forests, but from the agricultural viewpoint, there is a problem, that is to say, about two third of participants who have joined

from the beginning of the agroforestry scheme have dropped out. They might have some reason, it may be because the income from agroforestry was smaller than they expected. But there are some participants who think they got better condition in their lives before they joined the agroforestry scheme. It is necessary to make agroforestry more attractive for participants, to prevent dropping out from the agroforestry scheme, finding out second crops for planting in dry season, implementing loan for fertilizer, employment of more persons from participants etc. will be considered. Any way many kinds of trial should be done in order to make a success of the agroforestry scheme.

4. Impression and suggestion on the mechanization.

Mechanization is indispensable for large scale afforestation in large area of alang-alang grassland outside Java island, because there is a shortage of labour for afforestation. Many kinds of machinery are indispensable for forest road construction, fire belt construction, land preparation, nursery works and so on. In concrete terms, land clearing, ploughing and harrowing are carried out by using bulldozers and tractors, and preparation of potting soil is prepared by using shoveldozers, dump cars, concrete mixer, belt conveyors etc. In view of using many machinery, it is indispensable to keep wages of good operators and mechanics higher than the wages of ordinary workers as already mentioned above. Under bad condition, good operators and mechanics can not to be employed for the Project, so that it is hoped that the wages for skilled operators and mechanics should be improved.

Using bulldozers and tractors for land preparation is useful not only for a counter measure against shortage of labour, but also in proving the soil's physical condition by cultivation. Ploughing will improve physical condition of soil very much from the very bad physical condition of soil like that on pure alang-alang

grassland. This is evident by comparing tree growth in ploughed area with unploughed area at plantation II as already mentioned above. If planting was done by manual method on land preparation in alang-alang grassland with Eupatorium palenscens, Clibadium surinamense and shrub, the initial tree growth will be not so good, because of bad physical condition of soil and damage of shade. This is evidence by comparing Acacia mangium in B-11 with A-11 compartment. Difference of plantation results seems to depend on improvement soil physical condition by ploughing and effect of clearing E.palenscens, C.surinamense and shrub from plantation area.

Considering man-days for planting work, in the case of manual land preparation, it needs about 15 man-days per ha to dig planting holes for 1.250 seedlings per ha. In comparison with manual in the case of mechanized land preparation, digging plantation holes that is very heavy work is not necessary. So this difference is great merit for planting work in the alang-alang grassland in some region where population density is small. And also weeding times will be different.

When bulldozer will be used for land clearing, top soil can not be allowed to push outside the plantation area in principle, but a lot of top soil is pushed outside plantation area partically. This problem can be solved by using rakes by which alang-alang rhizome will be cut. After then ploughing will be done, so it will be able to avoid treading down so as to harden soil even though the soil is heavy clay soil like in Benakat. Although the method for land clearing is one of improve work method, this method should be recommended for the land clearing in alang-alang grassland.

The Project should have some budget for attachment improve is necessary for Reforestation Technique Development Center. Nearly all machinery were designed for use in different soil condition, climate condition etc. in Temperate Zones, so there ought be many improve points.

Therefore, the constant improvement of the machine and its attachment to be fitted to the condition of the alang-alang grassland in the tropical country is indispensable and important to promote the mechanization efficiently. Of course, it is difficult to make big improvement for the machine itself, but it is possible to make some improvement for the parts or attachment of the machine.

When experts were writing "Technical Guidance", the time for INPRES distribution budget was discussed, then they decided that, as usual, the budget should be distributed in September so the Technical Guidance could be written based on this distribution of INPRES budget. But if the budget would be distributed earlier, all works could be done more on time and more efficiently. Working timing which is shown in Technical Guidance is not perfect, if possible some works, such as all land preparation works and planting works, should be done earlier and in connection with this, nursery works should also be done earlier.

Maintenance for machinery is very important, and whether mechanized afforestation could carry out smoothly or not would depend on whether maintenance for machinery would be done smoothly or not. If someone wants machinery maintenance completely, machinery should be maintained during idle time, if so enough spare parts should be prepared smoothly before maintenance will start.

5. Other impression and suggestion.

Cost analysis : In the near future, large scale industrial plantation will be carried out in alang-alang grassland, near Benakat, when such a large scale industrial plantation will be carried out, cost may become an important factor as indicator for efficiency. Also such a large scale industrial plantation will be done by mechanized plantation method, so it is very important to analyse mechanized plantation cost.

As one of the most important aims of the Trial Plantation Project is trial of mechanized plantation, so how to manage planting mechanized method is a very important object. For management of some economic activity, cost for each works is indispensable, because some techniques should be evaluated from the efficiency point of view. For afforestation, because of long terms for its production, it is very difficult to calculate its total cost, moreover in the case of Trial Plantation more difficult to calculate, but each part work, for example, the cost for land clearing, ploughing, planting, weeding and so on can be calculated, if convenient accounting system for calculating cost will be introduced.

As mechanized afforestation technique has been already established in Benakat, so cost calculation system should be established next, like the system of Dr. TAJIMA or Mr. YAMAGUCHI showed. If not so, evaluation in efficient point of view for some techniques will be unable to compare with other techniques, efficiency is very important for economic activity. Evaluating some afforestation technique, how evaluation will be done, for example, in the case of plantation how many labourer days were used, how much liters of fuel was used, how many hours heavy duty machine operation were done for afforestation etc. and results of works should be needed for evaluation. Getting above mentioned data will be very useful for making some large scale industrial plantation.

One could calculate real cost of plantation and seedlings more easily, if the accounting system was an enterprise accounting system. The accounting system of the Project is not so, but at least cost analysis should be made for the purpose of knowing each work cost. For the analysis cost of works it is necessary to record how many labour-days, how much material and how many hours using machine for the works. So some record system of each works should be introduced, and when the fiscal year terminated, the cost of each work should be calculated in

order to know its efficiency.

Soil survey : The soil survey aims at finding out the important properties of soils in a given area to know about the relationship between soil properties and soil use, that is to say, for the forestry, what kinds of tree species will be planted and how to manage forest etc. are given from result of soil survey in view of soil. Before the project have been start, soil survey was carried out, but after the Project have been started, any soil survey was not carried in the plantation area.

ANNEX 1

CALENDAR OF THE TRIAL PLANTATION PROJECT

YEAR	Date On/From/In	Progress of the Project:
1972		Mr. Sudjarwo, then Director of Directorate of Forestry the Republic of Indonesia, (at Present Minsiter of Forestry) visited Japan and required the cooperation of the Japanese government on afforestation activity in Indonesia.
1975	Jun.	The first survey Team surveyed in North and South Sumatra to find out the most suitable area for the afforestation project and decided it to be the project area.
1975	Nov.	The second survey Team negotiated with the Indonesian government about the planning of the afforestation project in grasslands of Benakat and Subanjerji.
1976	Aug.	Based on the Second Survey Team the Planning Team was dispatched to Indonesia.
1977	Apr.	The afforestation development cooperation project was listed in BAPPENAS list as ATA-186, and was officially requested to the Japanese government.
1977	Sep.	The Scope of Work for this project was concluded.
1977	Sep.	Based on the Scope of Work, aerial photography covering 50.000 ha in Benakat area was commenced.
1978	May.	Topographical charts commenced to be made.
1978	Jun.	The soil survey and afforestation plannings were performed in accordance with the afforestation development cooperation project.

1979 Apr, 1 Ir. M. Wazir Nengkeman was appointed Field Manager.

1979 Apr. 12 The Record of Discussion was signed between Mr. Moch Harris Soeranggadjiwa, Director of Forestry planning, the Directorate General of Forestry, and Mr. Kenji HORI, head of the Japanese Implementation Survey Team. The Trial Plantation Project has been started.

1979 Sep. 11 The Japanese Implementation Survey Team to headed by Mr. R. KATO was dispatched to Oct. 14 Benakat.

1979 Sep. 19 Ir. Soeharto Soemarmo was appointed Project Co-Manager and Ir. Arif P. Sagara was appointed Assistant Project Co-Manager.

1979 Nov. 16 Mr. K. OHMI, the Team Leader and expert for silviculture, was dispatched as the first expert, this date was the actual starting point of the project.

1979 Dec. 17 Mr. R. KATO and Mr. Y. SAKAMOTO were dispatched as the Chief Advisor and Liaison Officer for the Project.

1979 Dec. 18 The Proposal for model infrastructure from Japanese government was sent by the Japanese government, to construct a part of the trunk forest road, nursery, nursery road and nursery beds.

1979 Dec, 29 The Temporary Project Implementation Office in Palembang was opened, and the Project Office in Bogor was opened at the corner of the office of the Sub-Directorate for Reforestation and Rehabilitation on December 31, 1979.

1980 Jan. 14 Messrs. K. OHMI and Y. SAKAMOTO's equipment arrived at Palembang Airport, and were delivered from the Airport on April 26, 1980.

1980 Feb.29 The Model Infrastructure for the Project was
to constructed. Contents of this construction
Jun.24 work consisted of the access road with a total
length of 1.520 m, the land preparation of
nursery of 1.5 ha and the arrangement of 108
nursery beds.

1980 Feb.17 Ir. Soeharto Soemarno, Project Manager left
this world.

1980 Mar.1 Ir. Syahrir was appointed Project Manager.

1980 Mar.21 An item on the provision of special measure
by the Japanese government was added after
agreement by both Indonesian and Japanese
sides.

1980 Mar.21 The first equipment supplied by Japan arrived
at Palembang port. On July 31, 1980 these
equipment arrived at Benakat.

1980 Apr.30 Ir. Zulkifli Mulsani was appointed Field
Manager in Place of Ir. M.Wazir Nengkeman.

1980 Jun.3 The Technical Cooperation Planning Survey Team
to led Mr. K.KOTARI was dispatched to Indonesia,
Jun.15 all problems closely connected with the Project
activity were discussed and the results of
discussion were outlined in the form of minutes.

1980 Jun.14 The First Joint Steering Group Meeting was
held in Jakarta, the progress report and
operation plan etc. were placed in the agenda.

1980 Jun.20 Pinus merkusii seeds were sowed as first time
sowing at the Project.

1980 jun. Temporary Project Implementation Center Office
in Benakat was opened.

1980 Jul. Temporary facility which was built by the
Indonesian government functions as warehouse.
and temporary dormitory.

1980 Sep.18 Manual land preparation was started in the
trial plantation field.

1980 Sep.25 Potting house for the nursery was completed by the Japanese government.

1980 Sep.17 Messrs.M.Wazir N. (Senior course, from
to September 17 to October 17), Zulkifli Mulsani
Dec,16 (Silvicultur from October 1 to December 16)
and Hardjono (Nursery from September 17 to
December 16) were accepted as the first trainees
by JICA.

1980 Oct.30 The second Joint Steering Group Meeting was held at Jakarta; annual plan, budget, handling cost for equipment and machinery supplied by Japan etc. were placed on the agenda.

1980 Oct.30 Construction of drinking water facility was done until January 13, 1981. However, the effort
1981 Jan. 13 to get underground water for drinking water did not succeed because of the difficulty to reach the vein of underground water.

1980 Nov. the sprinkler for the nursery was put together under the short-term expert's guidance.

1980 Nov.23 The Advisory Team led by Mr. T. MATSUDA was
to dispatched the project in order to give the
Nov.30 Project advice and guidance on technical and administrative viewpoints.

1980 Dec.8 First trial planting was done with Albazzia falcata seedlings.

1980 Dec.9 Actual planting activity in the field was started with Albizzia falcata seedlings.

1981 Feb.9 The Living Facilities Design Team led by Mr. K. TAKAHASHI visited the Project in order to discuss and arrange the design of the facilities for living circumstances.

1981 Feb.10 Construction work of the temporary storehouse,
to in order to cover the shortage of storehouse
May 9 for equipment and machinery was done.

1981 Mar.3 experts gave guidance to weeding by the use of bush cutters.

1981	Mar.31	Ir. Syahrir was succeeded by Ir. Soedjadi Hartono as Project Manager.
1981	Apr.17 to Apr.19	The Living Condition Survey Team. Messrs. K. KAGAWA and S.USHINO visited the Project, aiming to decide whether the special allowance for remote rural area would be supplied or not for the experts of the Project.
1981	Apr.27	The Project Implementation Center in Benakat was settled.
1981	Apr.30 to May 31.	Construction work for wiring for electricity outdoor was done in the Nursery site.
1981	Jun.8	The Third Joint Steering Group Meeting was held at Jakarta, and review of last meeting, progress report of 1980/1981, annual plan of 1981/82, five year plan etc. were placed on the agenda.
1981	Jun.25 to Jul.10	The Consultation Mission for the Project led by Mr. M. FURUYA, was dispatched by JICA in order to make the basic plan for the pilot infrastructure scheme activity to test and study the social implication of the agroforestry activity.
1981	Jun.25 to Jul.30	Construction work for site preparation of new facilities was done. Total area of site preparation was 4.000 m ² .
1981	Jun.25 to	Construction Work for the Trial Plantation Training Centre in order to cover the shortage facilities and to improve the living condition
1982	Mar.20	of the experts in the field site was done. The construction consisted of a dormitory of 580 m ² , workshop of 220 m ² and a laboratory and training room of 92 m ² .
1981	Aug.20	The ceremony of laying the cornerstone of the Trial Plantation Training Center was carried out.

1981	Sep.7 to Oct.10	Construction Works for Temporary Improvement of the sprinkler pond and iron bridges were done in order to improve the leakage of water in the sprinkler pond and to recover the two bridges damaged during the rainy season.
1981	Oct.3 to Oct.5	The Guidance Team for Agriculture and Forestry Technical Cooperation Project led by Mr. R MATSUYAMA (Executive Director, JICA), visited the Project site in order to observe Project activity and discuss how to develop the Project activity.
1981	Oct.14	The short-term experts for the Pilot Infrastructure were dispatched, Mr. T. TAKAHASHI as expert on the design of the Pilot Infrastructure until December 13, 1981, Dr.M. KUMAZAKI as the expert on socio-economy of the community and Dr. Y. IZUMIYAMA as the expert on the experimental plan of dry field farming until November 12, 1981.
1981	Nov.4 to Nov.17	The Pilot Infrastructure Implementation Work Guidance Team led by Mr. K. KOTARI, was dispatched to make the detailed plan for the pilot infrastructure, the scheme which was made by Mr. FURUYA's Consultation Mission served as the basic plan.
1981	Nov.22 to Nov.30	The Equipment Maintenance and Management Team led by Mr. Y. AOKI visited the Project site in order to offer guidance on maintenance and management and also to make a study on the actual condition of equipment and machinery supplied to forestry cooperation Project.
1982	Jan.5	The Fourth Joint Steering Group Meeting was held in Jakarta. Review of the last meeting progress report, security problem in nursery, delay of building construction, survival ratio of seedlings in the field, handling cost for the equipment, etc. were placed on agenda.

1982 Feb.1 Mr. S. SUGIMOTO arrived Indonesia as the successor of Mr. R. KATO.

1982 Feb.16 Mr. R. KATO'S assignment finished and he left for Japan.

1982 Feb.24 Five JICA would-be expert trainees visited the Project as part of their training.

1982 Mar.22 The Trial Plantation Training Center was started as accomodation use.

1982 Mar. Construction Work for Protection Fence was done in order invasion by cattle, goats and thieves; total length of the fence was 1.475 m.

1982 Mar.30 Ir. Victor M. Sinaga had been appointed Project Manager in place of Ir. Soedjadi Hartono.

1982 Apr.1 The budget for implementation of the Project activities had become INPRES except for the general management.

1982 Jun.5 Resident Representative of JICA Jakarta Office made a contract with the Director of P.T. Pramantanto construct the Pilot Infrastructure for agroforestry.

1982 May.5 Construction Work for Pilot Infrastructure was done in order to implement the agroforestry activity smoothly. This construction works consisted of a road of 7.224 m, bridge of one unit, look-out tower of one unit, pond of one unit, warehouse of one unit etc.

1983 Jan.15

1982 jun.7 The construction of the Pilot Infrastructure for agroforestry was started.

1982 Sep.21 The Fifth Joint Steering Group Meeting was held in Jakarta. Review of last meeting, progress report, and other matters were placed on the agenda.

1982 Sep.30 Mr. K. MITANI, supervisor for Model Infrastructure, was seriously injured in a severe traffic accident on the way to Benakat. He is still undergoing medical treatment. We hope he will be better soon.

- 1982 Oct.9 Mr. K. MITANI who was a victim of a traffic accident on September 30 left for Japan in order to undergo medical treatment.
- 1982 Oct. First contract between the DGRLR and agro-forestry participants was done for the agro-forestry scheme.
- 1982 Nov.1 Machinery Maintenance Team led by Mr. T. OKUHARA to
Nov. 15 was dispatched in order to maintain machinery and give advice on machinery management.
- 1982 Nov. 29 The Agroforestry Scheme Guidance Team led by
to Mr. H. INOH, was dispatched to Indonesia in
Dec.12 order to guidance in agroforestry activity.
- 1982 Dec.4 Minsiter of Agriculture of the Republic of Indonesia and Japanese Ambassador to Indonesia inspected the Project.
- 1983 Mar.14 The sixth Joint Steering Group Meeting was held at Jakarta, and review of last meeting, progress report and other matters were placed on the agenda.
- 1983 Mar.17 The Directorate General of Forestry became the minsitry of Forestry.
- 1983 Mar.27 Some kinds of trees were planted as sample plantation (Arboretum) in the agroforestry scheme area such as Acacia mangium, Albizia falcata, Cariandra sp., Eucalyptus euophira, Pinus merkusii and Swietenia macrophylla etc.
- 1983 Jun.13 The Secretary General of Ministry of Forestry sent a letter to the Head of Overseas Technical Cooperation Bureau, Cabinet Secretariat of the Republic of Indonesia and Chief of National Planning and Development Agency, the Republic of Indonesia, proposing to the Indonesian government request to the Japanese government to extend the Project in order to achieve the anticipated objectives.
- 1983 Aug. Fire fighting system was established, and during this dry season the system had played an active part in fire fighting.

1983 Aug. Some kinds of simple tools for fire fighting were prepared at the storehouse at the agro-forestry site.

1983 Aug.30 to Sep.14 The Evaluation Team from Japan led Mr. Y. NOMURA and the Indonesian Evaluation Team led by Ir. Victor M. Sinaga evaluated the Project activities, and held a Joint Evaluation Meeting in Jakarta on September 13, 1983. The Joint Evaluation Team recommended to the respective government to extend the Project activity.

1983 Sep.14 The Field Manager was changed from Mr. Zulkifli Mulasani to Mr. Triyogo Soekanto, former forest protection counterpart.

1983 Sep.16 to Sep.30 Mr. T. WATANABE, audio-visual reporter, visited Indonesia in order to make a audio-visual scenario concerning afforestation activity in alang-alang grassland.

1983 Oct.12 Mr. K. KATO, expert team leader, left for Japan, for his assignment had finished.

1983 Oct.5 ANZAP (Asean New Zealand Afforestation Project) Work Shop Team visited the Project for an inspection.

1983 Oct.31 to Nov.2 JICA would-be expert team led by Mr. K. KATSURAI visited the Project to observe the afforestation cooperation project.

1983 Dec.15 to Jan.18 The Audio-visual Filming Team was dispatched to Indonesia to make an audio-visual film for afforestation activities in alang-alang grassland.

1984 Jan.28 Ir. Victor M. Sinaga was succeeded by Ir. Saptana PH. as Project Manager.

1984 Jan.30 Mr. S. SUGIMOTO, Chief Advisor for the Project, left for Japan, for his assignment had finished.

1984 Feb.4 Mr. T. IKEDA, Team Leader and expert for forest protection arrived in Indonesia.

1984 Feb.27 Mr. H. OKABE arrived in Indonesia as Chief Advisor for the Project.

1984 Mar. Construction work of the Nursery Road Drainage was done in order to create good condition of the nursery road in the rainy season.

1984 Mar.24 The Record of Discussion for the extension of the Project activity for two more years was signed by Mr. Wartono Kadri, Director General, DGRLR, and Mr. Hiroshi YAMAMURA, JICA Resident Representative Jakarta Office.

1984 Apr.23 the Seventh Joint Steering Group Meeting was held in Jakarta. Review of the last meeting, recommendation, Indonesian-Japan Joint Evaluation Team's progress report, technical report, two years plan and the annual plan were placed on the agenda.

1984 May.16 the Japanese Project Consultation Team led by
to Mr. R. KATO, ex-Chief Advisor for the Project
May.29 was dispatched to Indonesia to make consultation concerning the extended two years.

1984 May.28 After discussion at the Joint Meeting at Jakarta, The Joint Steering Group and the Japanese Project Consultation Team agreed on the "Minutes of Understanding".

1984 Jul.17 New Plantation site design was started by measuring the area.

1984 Aug.7 The Fire Protection Model Infrastructure design was started by measuring the field.

1984 Aug.29 Mr. H. YAMAMURA, Resident Representative, JICA
to Jakarta Office, inspected the Project. On
Sep.1 September 1st he paid a courtesy call on the Secretary of the Governor of South Sumatra Province, asking for good cooperation with the Project.

1984 sep.21 The Proposal of Fire Control Infrastructure Facilities for the Project was sent from the Ministry of Forestry, to Resident Representative JICA Jakarta Office.

1984 Oct.9 Mr. T. MISAWA, Director of the Planning Division,
to Private Forest Department, Forestry Agency,
Oct,15 visited Indonesia to guide fire control and
examine the Project and confer with Indonesian
authorities about future development of technical
cooperation.

1984 Oct. Note verbal for the Fire Control Infrastructure
Facilities was exchanged by both governments.
In this connection, the amount of the funds
allocated by JICA was 26.832.000 Yen.

1984 Oct.20 the reforestation Technology development Center
has been established at Benakat, and the Project
has taken the greater part of activities of
the center. Ir. Kardi Sabaruddin was appointed
Chief of the Center.

1984 Oct.25 Ir. Wartono Kadri, Director General, DGRLR,
to made inspection on the Project, and gave some
Oct.27 technical advices.

1984 Dec.27 The Contract of the Model Infrastructure for
to Fire Control was signed in Jakarta between
1985 Apr.5 Mr. H. YAMAMURA, Resident Representative of
Japan International Cooperation Agency, and
Mr. Arsyad Letet, Director of C.V. Waringin and
between Mr. H. YAMAMURA and Mr. Basuki Sutopo
Director, C.V. Hidup sejahtera. And the
construction had been implemented.

1985 Mar. Construction Work of the Concrete Floor for
the Work Shop was done in order to keep clean
work shop and to make a car wash area.

1985 Mar.6 The Technical Guidance Team led by Dr.M. MATSUI,
to inspected and guided in the field. They
Mar.9 suggested many technical points.

1985 Mar.19 The Eighth Joint Steering Group Meeting was
held in Jakarta. Review of last meeting,
progress report placed on the agenda.

1985 Mar.29 Mr. U.ANDO, Japanese expert Team Leader for
to the Sakaerat Field Station, Mr. Paisal Kewapirat,
Apr.1 Field Manager, Sakaerat Field Station, and
Mr. Aran Sorn-Ngai, Plantation, Sakaerat Field
Station From Thailand, visited the Project for
the Technical Exchange Program Among the JICA
Project Cooperation.

1985 Apr.1 The Research Team on the Actual condition of
Equipment from JICA was dispatched in order to
survey the actual condition of the equipment.

1985 Apr.30 Mr. Triyogo Soekanto, Field Manager of the
Project moved to the Ministry, and Mr. M. Kardi
Sabaruddin held concurrently the post of Field Manager.

1985 May.15 First fire fighting exercise was implemented
in the field, using some equipment.

1985 Jul.15 The Annual Consultation Meeting on Technical
Cooperation Between Japan and Indonesian was
held at SEKAB, and follow-up of the Project
was discussed in the Meeting.

1985 Jul. Construction Work for Rain Water Supply System
Improvement was done in order to get clean
water for the experiment and for drinking.

1985 Jul.15 Operators' and mechanics' training was held
to at Benakat in order to improve their techniques.
Jul.19

1985 Sep.18 Afforestation Survey Team led by Mr. T. FUJIMURA
visited the Project.

1985 Oct.21 Technical Guidance Team led by Mr. K. WATANABE
to was dispatched to Indonesia in order to
Nov.1 review the achievement of the Project activities.
The joint Evaluation Team was organized for the
review and gave suggestions for future activities.

1985 Oct.28 Joint Evaluation Team held a Joint Meeting in
Jakarta. After the Meeting the Team decided to
recommend to their respective governments that
the follow-up of the Project was necessary.
The Review Report of the Team was presented.

1985	Dec.18	the second fire fighting exercise was implemented in the field, using all kinds of equipment, with many visitors.
1986	Mar.11	Messrs.T.IKEDA, O.TANDO, Kardi Sabaruddin and
	to	Sutomo visited the Reforestation Research and
	Mar.18	Training Project in Thailand for the Technical Exchange Program Among JICA Project Cooperation.
1986	Apr.2	The Record of Discussion on the Follow-up for the Trial Plantation project was signed by Wartono Kadri Director General, DGRLR, and Mr. Hideo ENDO, Resident Representative JICA Jakarta Office.
1986	Apr.2	The diplomatic notes on a grant aid for technical Assistance Request for The Afforestation Machinery Provision Project was signed and exchanged between the Ambassador of Japan and the Director General of Foreign Economic Relations of the Ministry of Foreign Affairs.
1986	Apr.10	Five Japanese experts left for Japan.
1986	Apr.11	the Extended two years based on Record of Discussion signed on March 24, 1984 is expired.

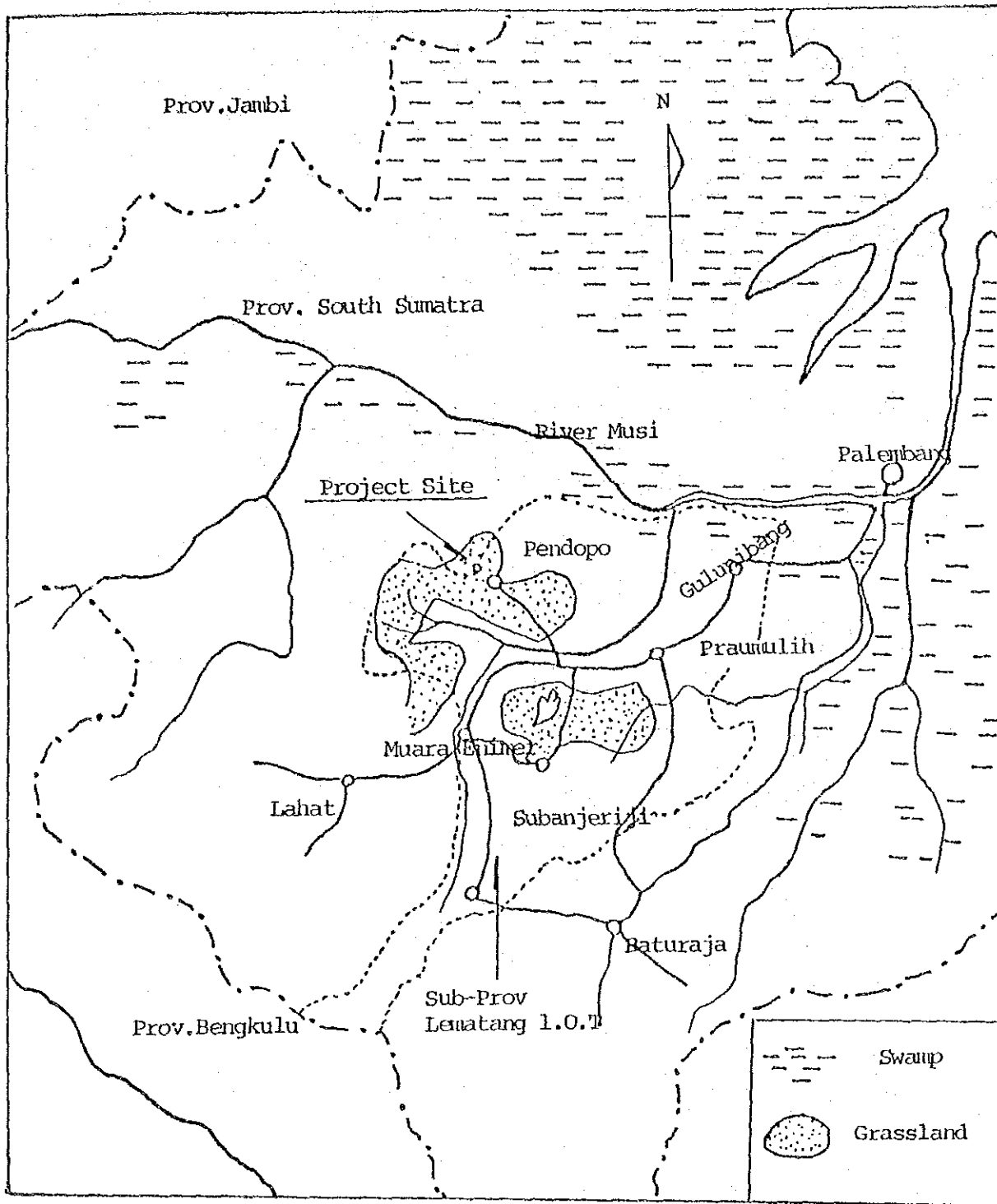


Fig. 1 Location Map

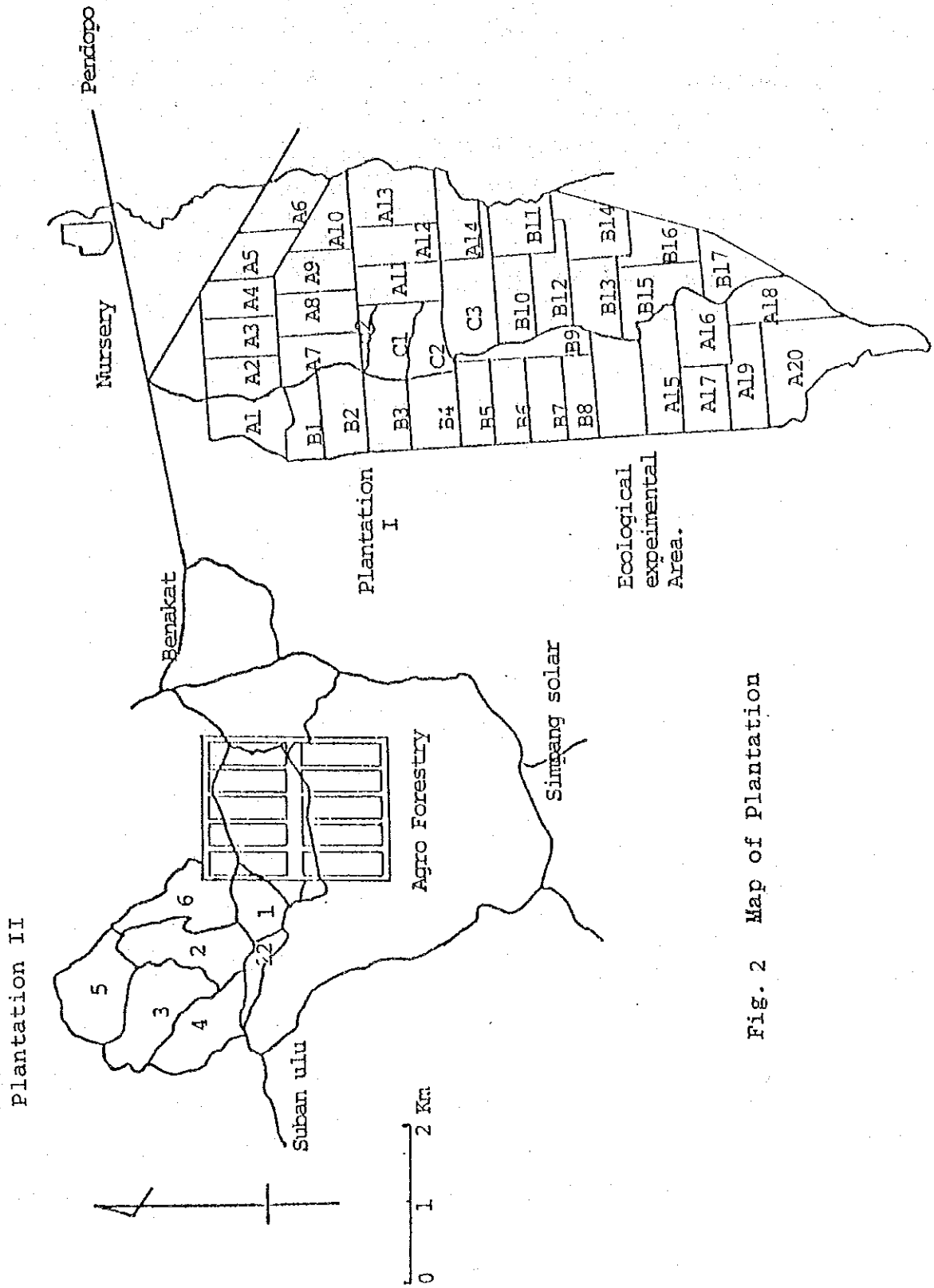


Fig. 2 Map of Plantation

ANNEX 4.

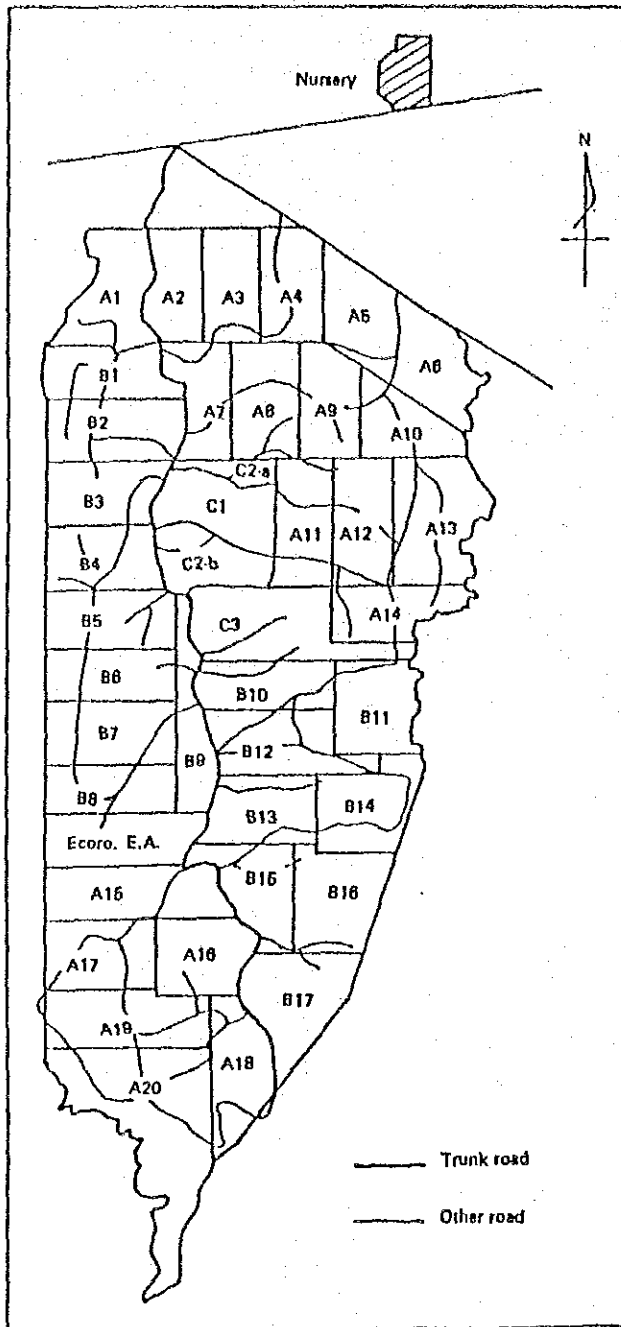


Fig. 3 Map of Plantation I

PLANTED TREE SPECIES

1980/81 (200 Ha)

- A. 1. Albizzia falcata
- 2. Swietenia macrophylla
- 3. Eucalyptus deglupta
Eucalyptus europhylla
- 4. Pinus merkusii

1981/82 (400 Ha)

- A. 5. Anthocephalus cadamba
- 6. Schinus wallichii var. bancana
- 7. Peronema canesens
- 8. Acacia auriculiformis

- B. 1. Eucalyptus deglupta
- 2. Albizzia falcata
- 3. Pinus merkusii

C. 1. 9 species

1982/83

- A. 9. Dalbergia latifolia
- 10. Pterocarpus indicus
- 11. Acacia mangium
- 12. Samanea saman
- 13. Pinus merkusii
- 14. Eucalyptus deglupta

- B. 4. Swietenia macrophylla
- 5. Schinus wallichii var. bancana
- 6. Acacia auriculiformis
- 7. Acacia mangium
- 8. Dalbergia latifolia
- 9. Pinus merkusii

C. 2. 11 species

1983/84 (770 Ha)

- A. 15. Eucalyptus deglupta
- 16. Dicalyptus alba
- 17. Acacia mangium
- 18. Swietenia macrophylla
- 19. Albizzia falcata
- 20. Lecaena leucocephala

- B. 10. Swietenia macrophylla
- 11. Acacia mangium
- 12. Acacia mangium
- 13. Swietenia macrophylla
- 14. Eucalyptus deglupta
- 15. Samanea saman
- 16. Peronema canesens
- 17. Albizzia falcata
Eucalyptus alba

C. 3. 10 species.

ANNEX 5

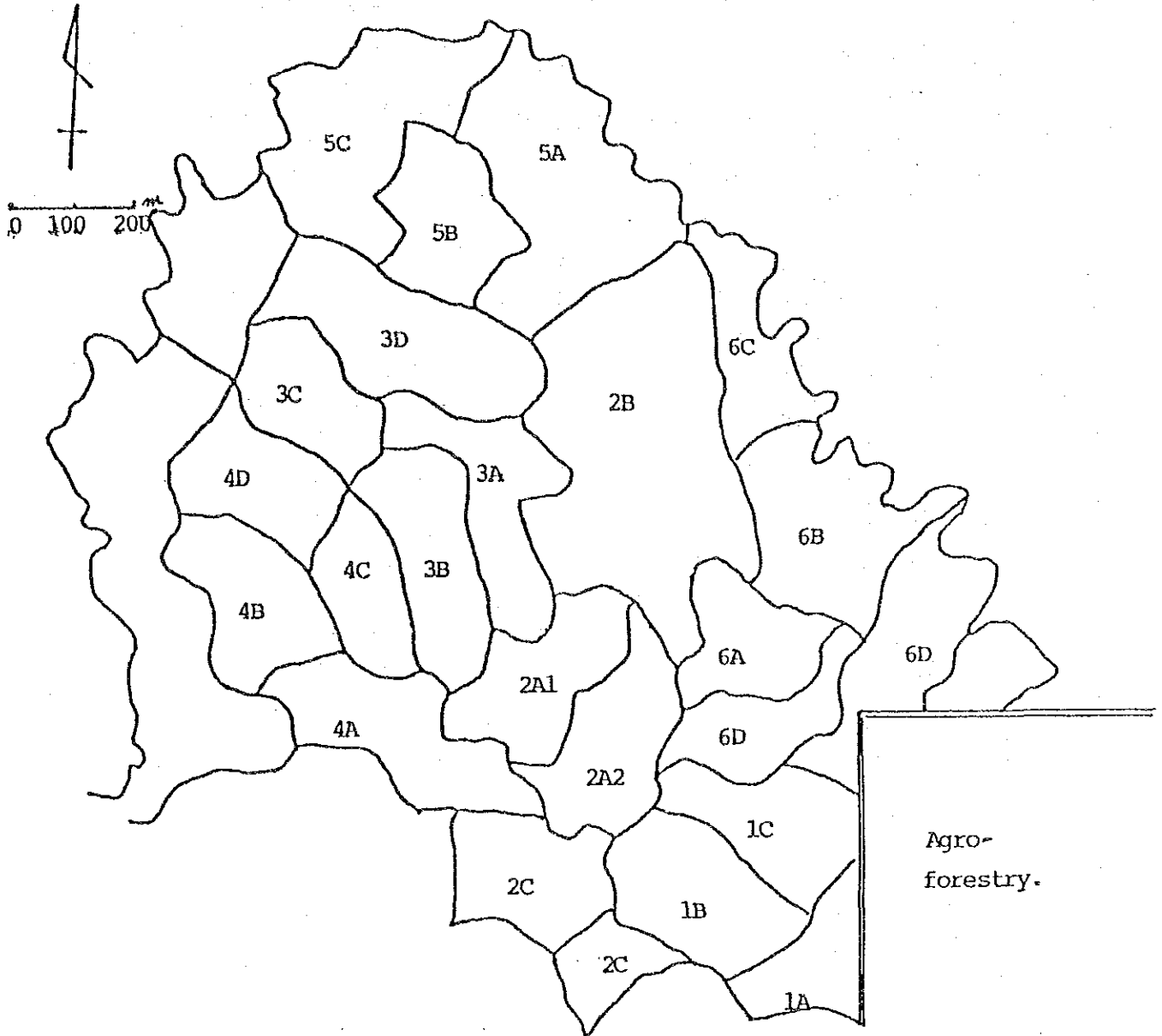


Fig. 4 Map of Plantation II

PLANTED TREE SPECIES

COMPARTMENT	SPECIES	PLANTED
1.A.	Others	1984/85
1.B.C.	<u>Acacia mangium</u> <u>Eucalyptus deglupta</u> <u>Swietenia macrophylla</u> <u>Shima Wallichii</u> var. <u>bancana</u>	1984/85
2.A.1.	<u>Acacia mangium</u> <u>Eucalyptus deglupta</u> <u>Swietenia macrophylla</u> <u>Shima Wallichii</u> var. <u>bancana</u>	1984/85
2.A.2.	<u>Acacia mangium</u> <u>Eucalyptus deglupta</u> <u>Swietenia macrophylla</u> <u>Shima Wallichii</u> var. <u>bancana</u>	1984/85
2.B.	<u>Acacia mangium</u> <u>Eucalyptus deglupta</u> <u>Swietenia macrophylla</u> <u>Shima Wallichii</u> var. <u>bancana</u>	1985/86
2.C.	Others	
3.A.	<u>Acacia mangium</u> <u>Eucalyptus deglupta</u> <u>Swietenia macrophylla</u> <u>Shima Wallichii</u> var. <u>bancana</u>	1984/85
3.B.C.	<u>Acacia mangium</u> <u>Eucalyptus deglupta</u> <u>Swietenia macrophylla</u> <u>Shima Wallichii</u> var. <u>bancana</u>	1984/85

COMPARTMENT	SPECIES	PLANTED
3.D.	<u>Acacia mangium</u> <u>Eucalyptus deglupta</u> <u>Swietenia macrophylla</u> <u>Shima Wallichii</u> var. <u>bancana</u>	1984/85
4.A.	<u>Acacia mangium</u> <u>Eucalyptus deglupta</u> <u>Swietenia macrophylla</u> <u>Shima Wallichii</u> var. <u>bancana</u>	1984/85
4.B.C.D.	<u>Acacia mangium</u> <u>Eucalyptus deglupta</u> <u>Swietenia macrophylla</u> <u>Shima Wallichii</u> var. <u>bancana</u>	1984/85
5.A.	<u>Acacia mangium</u> <u>Eucalyptus deglupta</u> <u>Swietenia macrophylla</u> <u>Shima Wallichii</u> var. <u>bancana</u>	1985/85
5.C.	<u>Acacia mangium</u> <u>Eucalyptus deglupta</u> <u>Swietenia macrophylla</u> <u>Shima Wallichii</u> var. <u>bancana</u>	1985/86
6.A.	<u>Acacia mangium</u> <u>Eucalyptus deglupta</u> <u>Swietenia macrophylla</u> <u>Shima Wallichii</u> var. <u>bancana</u>	1985/86
6.B.	<u>Acacia mangium</u> <u>Eucalyptus deglupta</u> <u>Swietenia macrophylla</u> <u>Shima Wallichii</u> var. <u>bancana</u>	1985/86

COMPARTMENT	SPECIES	PLANTED
6.C.	<u>Acacia mangium</u>	1985/86
	<u>Swietenia macrophylla</u>	
	<u>Shima Wallichii</u> var.	
	<u>bancana</u>	
6.D.	<u>Acacia mangium</u>	1985/86
	<u>Eucalyptus deglupta</u>	
	<u>Swietenia macrophylla</u>	
	<u>Shima Wallichii</u> var.	
	<u>bancana</u>	

THE RECORD OF DISCUSSION BETWEEN THE JAPANESE
IMPLEMENTATION SURVEY TEAM AND THE
AUTHORITIES CONCERNED OF THE GOVERNMENT OF
THE REPUBLIC OF INDONESIA
ON THE TECHNICAL COOPERATION FOR THE TRIAL
PLANTATION PROJECT INBENAKAT, SOUTH SUMATERA
(ATA-186)

The Japanese Implementation Survey Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred as JICA) and headed by Mr. Kenji Hori, Director of Forestry Development Cooperation Department, JICA, visited the Republic of Indonesia from April 2 to April 17 1979 for the purpose of working out the details of the technical cooperation programme concerning the trial plantation project in Benakat, South Sumatera, in the Republic of Indonesia.

During its stay in the Republic of Indonesia, the Team exchanged views and had a series of discussions with the Indonesian authorities concerned in the respect of the desirable measures to be taken by both Government for the successful implementation of the above mentioned Project.

As a result of the discussion, the Team and the Indonesian authorities concerned agreed to recommend to their respective Government the matters referred to in the document attached hereto.

Jakarta, April 12, 1979

Signed

Signed

Kenji Hori
Head of the Japanese
Implementation Survey Team

Ir. Moch. Harris Soerenggadjiwa
Director of Forestry Planning
The Directorate General of Forestry

THE ATTACHED DOCUMENT

I. COOPERATION BETWEEN THE GOVERNMENT OF JAPAN AND THE GOVERNMENT OF THE REPUBLIC OF INDONESIA FOR THE TRIAL PLANTATION PROJECT IN BENAKAT, SOUTH SUMATERA.

1. The Government of Japan and the Government of the Republic of Indonesia will cooperate with each other in implementing the Technical Cooperation for the Trial Plantation Project in Benakat, South Sumatra (hereinafter referred as "the Project") for the purpose of establishing afforestation techniques so as to contribute to successful afforestation in the grassland in South Sumatera.
2. The Project will be implemented in accordance with the Master Plan which is given in Annex I.

II. DISPATCH OF JAPANESE EXPERTS

1. The accordance with the laws and regulation in force in Japan the Government of Japan will take necessary measures through JICA to provide at its own expense services of the Japanese experts as listed in Annex II through normal procedures under the Colombo Plan Technical Cooperation Scheme.
2. The Japanese experts referred to in 1 above and their families will be granted in the Republic of Indonesia the privileges, exemptions and benefit no less favourable than those accorded to experts of third countries working in the Republic of Indonesia under the Colombo Plan Technical Cooperation Scheme, and will include the following:
 - (1) Exemption from income tax and charges of any kind imposed on or in connection with the living allowances remitted from abroad.;

- (2) Exemption from import and export duties and any other charges imposed in respect of personal and household effects which may be brought into from abroad or taken out of the Republic of Indonesia.
- (3) Exemption from import tax, import sales tax, sales tax, and other taxes and charges of any kind imposed on or in connection with the purchase in the Republic of Indonesia by the Experts of one motor vehicle each expert;
- (4) Free local medical services and facilities to the Japanese Experts and their families.

III. PROVISION OF MACHINERY AND EQUIPMENT

1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures through JICA to provide at its own expense such machinery, equipment and other materials necessary for the implementation of the Project as listed in annex III, through the normal procedures under the Colombo Plan Technical Cooperation Scheme.
2. The articles referred to in 1 above will become the property of the Government of the Republic of Indonesia upon being delivered c.i.f. to the Indonesian authorities concerned at the ports and the airports of disembarkation, and will be utilized exclusively for the implementation of the Project in Consultation with the Japanese experts referred to in Annex II.

IV. TRAINING OF INDONESIAN PERSONNEL IN JAPAN

1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures through JICA to receive at its own expense the Indonesian personnel connected with the Project for technical training in Japan through the normal procedures under the Colombo Plan Technical Cooperation Scheme.

2. The Government of the Republic of Indonesia will take necessary measures to ensure that the knowledge and experience acquired by the Indonesian personnel from technical training in Japan will be utilized effectively for the implementation of the Project.

V. MEASURES TO BE TAKEN BY THE GOVERNMENT OF THE REPUBLIC OF INDONESIA

1. In accordance with the laws and regulation in force in the Republic of Indonesia, the Government of the Republic of Indonesia will take necessary measures to provide at its own expense:
 - (1) Service of the Indonesian counterpart personnel and administrative personnel as listed in Annex IV;
 - (2) Land, building and facilities as listed in Annex V;
 - (3) Supply of replacement of machinery, equipment, instrument, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than those provided through JICA under III above;
 - (4) Transportation facilities and travel allowance for the Japanese experts for the official travel within the Republic of Indonesia;
 - (5) Existing suitability furnished accommodations for the Japanese experts and their families.
2. In accordance with the laws and regulation in force in the Republic of Indonesia, the Government of the Republic of Indonesia will take necessary measures to meet:
 - (1) Expenses necessary for the transportation within the Republic of Indonesia of the articles referred to in III above as well as installation, operation and maintenance thereof;

- (2) Customs duties, internal taxes and any other charges, imposed in the Republic of Indonesia on the articles referred to in III above.
- (3) All running expenses necessary for the implementation of the Project.
- (4) The safety of the Project in general and the forest fire in particular.

VI. ADMINISTRATION OF THE PROJECT

1. The Directorate General of Forestry will be responsible for the administrative matters for the implementation of the Project and the Japanese experts will provide technical advice and guidance for the implementation of the Project.
2. In order to secure smooth operation of the Project, a Joint Steering Group will be established. The group will meet regularly at least once a year and its main task will be to formulate annual operational work plan and its main task will be to formulate annual operational work plan and evaluate the progress of the Project, and to deal with the specific problems. The composition of the Group is specified in Annex VI.
3. The Project will be implemented with close cooperation extended by the Forest Research Institute, Forest Product Research Institute Project Organization is specified in Annex VII.

VII. CLAIMS AGAINST JAPANESE EXPERTS.

The Government of the Republic of Indonesia undertakes to bear claims, if any arises, against the Japanese expert engaged in the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in the Republic of Indonesia except for those arising from the wilful misconduct or gross negligence of the Japanese experts.

VIII. MUTUAL CONSULTATION

There will be mutual consultation between the two Government on any mayor issues from, or in connection with this Attached Document.

IX. TERM OF CONSULTATION

The duration of the technical cooperation for the Project under this Attached Document will be five years from the date of signature of the Record of Discussion.

ANNEX I. MASTER PLAN

1. A Project office will be established at Bogor and Project Implementation Centre will be established at Benakat area in South Sumatera.

Note: Existing Forestry Office at Palembang will be used for Communication.

2. The Project Office will conduct the administration and supervision of the Project. It will run the Joint-Steering Group referred to in Article VI.

3. The Project Implementation Centre consists of an administrative office related facilities, trial plantation forest and nurseries. Development and improvement of planting techniques and on the job training will be performed in the Project Implementation Centre.

4. Trial Plantation forest will be established at three different areas, each of which is around 700 ha based on the afforestation model for trial plantation forests as the results of the studies carried out in the previous scope of work signed on September 1st 1977.

5. Items of development and improvement.

- (1) Species trial
- (2) Nursery techniques
- (3) Planting techniques
- (4) Techniques for counter-measures against fire, insect, disease and meteorological damage.
- (5) Techniques for designing and managing forest and soil-conservation work.
- (6) Techniques for the application of machine power.
- (7) Test and investigation on the environmental implication of afforestation.
- (8) Test and studies on the social implication of afforestation
- (9) Planning and evaluation technique of afforestation project
- (10) Other necessary techniques.

ANNEX II. JAPANESE EXPERTS

Category	Field	
1. Chief Adviser		1
2. Experts	Silviculture and Nursery	2
	Forest Ecology	1
	Forest Protection	1
	Forest Engineering	1
3. Liaison officer		

- Note: 1. The Chief Adviser will be attached to the Project Office at Bogor.
2. A team leader will be nominated by JICA from among the Experts.
3. Short-term expert in the fields mentioned above and other field may be dispatched when necessity arises.

ANNEX III. ARTICLES TO BE PROVIDED BY THE JAPANESE AUTHORITIES
CONCERNED

1. Machinery, equipment, spare parts and materials for nursery work
2. Machinery, equipment, spare parts and materials for planting work
3. Machinery, equipment, spare parts and materials for tending work
4. Machinery, equipment, spare parts and materials for forest roads, fire break, and soil conservation work
5. Machinery, equipment, spare parts and materials for fire control
6. Equipment, implements, instruments, spare parts and materials for research and training
7. Vehicles and their spare parts
8. equipment, tools, spare parts and materials for repair work
9. Equipment, spare parts and materials for public utilities including radio communication system
10. Other necessary equipment, tools and materials to be mutually agreed upon

ANNEX IV. INDONESIAN COUNTERPARTS AND OTHER PERSONNEL

Category	Field	
1. Project Manager (senior Officer)		1
2. Field Manager		1
3. Counterparts	Silviculture and Nursery	2
	Forest Ecology	1
	Forest Protection	2
	Forest Engineering and Soil Conservation	2
4. Clerical and Service Employees		
5. Laborers		

Note: Number and period of service of the above mentioned officials and other personnel will be adjusted according to the necessity from time to time.

ANNEX V, LAND BUILDINGS

1. Land

- (1) Land for nurseries
- (2) Land for trial plantation forest
- (3) Land for administration office and related facilities.

2. Buildings.

- (1) A Project office at Bogor
- (2) Administration office and related facilities in Benakat Area.
 1. Administration office
 2. Laboratories and lecture rooms
 3. Sheds for machinery and equipment
 4. Storehouse for forestry materials
 5. Workshop and garage
 6. Generator and pump house
 7. Field accommodation for Japanese experts and Indonesian counterparts.
 8. Guest house
 9. Others.

ANNEX VI. COMPOSITION OF THE JOINT-STEERING GROUP

1. Chairman

Director of Forestry Planning, Directorate General of Forestry

2. Members

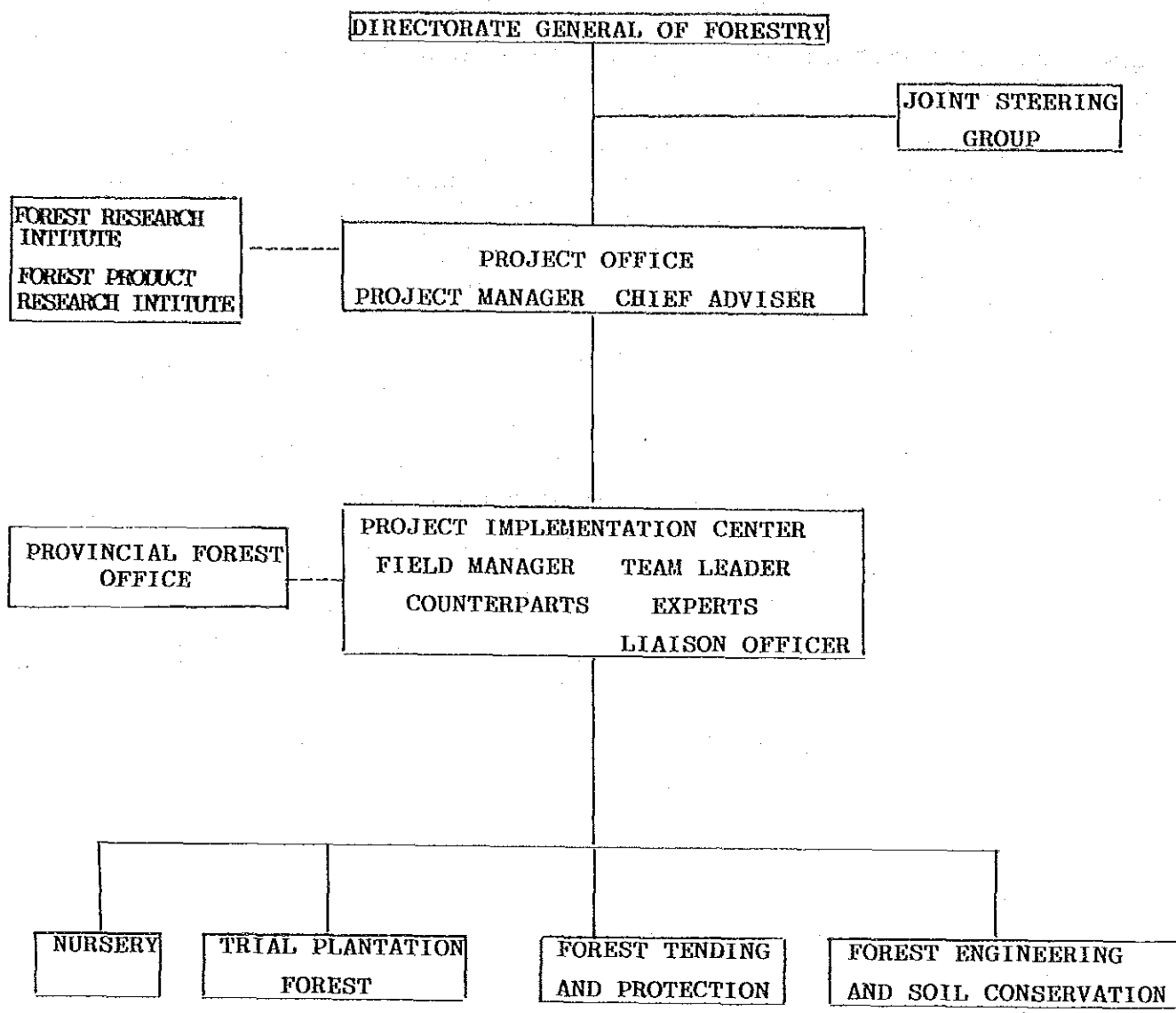
(1) Indonesian side

- Representative of Bureau Planning, department of Agriculture.
- Representative of the Directorate of Forestry Planning Directorate General of Forestry.
- Representative of the Directorate of Reforestation and Rehabilitation, Directorate General of Forestry.
- Representative of the Forest Research Institute and Forest Product Research Institute.
- Representative of the South Sumatera Provincial Forest Office
- Project Manager and Field Manager

(2) Japanese side

- Chief Adviser
- Team Leader
- Representative of JICA
- Expert(s) designated by Chief Advisor
- Liaison Officer.

- Note:
1. Officials of the Embassy of Japan may attend the meeting of the Joint-Steering Group as observes
 2. Officials of the Government of the Republic of Indonesia assigned by the Director General, Directorate General of Forestry may attend the meeting of the Joint-Steering Group as observes.



THE RECORD OF DISCUSSION
ON THE TECHNICAL COOPERATION FOR THE TRIAL
PLANTATION PROJECT IN BENAKAT, SOUTH SUMATERA (ATA- 186)

Mr. Moriya MIYAMOTO, Resident Representative of the Japan International Cooperation Agency in Indonesia has a series of talks with the authorities concerned of the Government of the Republic of Indonesia on the Provision of Special measures by the Government of Japan in the Technical Cooperation for the Trial Plantation Project in Benakat, South Sumatera.

As a result of the talks, both sides agreed to recommend to their respective Government to add the matter referred to in the document attached here to the Record of Discussions on the Technical Cooperation for the Trial Plantation Project in Benakat, South Sumatera which was signed on April 12th, 1979 between the Japanese Implementation Survey Team Organized by the Japan International Cooperation and the authorities concerned of the Government of the Republic of Indonesia.

Jakarta, March 21, 1980

Signed

Signed

Moriya MIYAMOTO
Resident Representative
Japan International
Cooperation Agency

Ir. Moch Harris Soerangadjiwa
Director of Forestry Planning
The Directorate General of Forestry.

X. PROVISION OF SPECIAL MEASURES

For fostering the smooth promotion of the Project, in accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures through JICA to supplement a portion of the local cost expenditures for the execution of the physical infrastructure such as construction work of nursery, forest road and so on when necessity arises.

PRELIMINARY REPORT OF THE JAPANESE IMPLEMENTATION SURVEY TEAM
(THE TECHNICAL COOPERATION FOR THE TRIAL PLANTATION PROJECT IN BENAKAT)

1. Plantation site for the trial plantation project

The area of plantation site is around 2,100 ha. and is situated at the place in the attached map.

The target of this annual planting area during 5 (five) year is as follows:

Second year	200 ha.
Third year	400 ha.
Fourth year	700 ha.
Fifth year	800 ha.

Although the species of *Peronema canescens* was planted in this area in 1976/1977, the rate of the survival of seedling planted is very low according to the survival survey performed in 1979. Therefore it is necessary that the replanting in this areas will be implemented as quickly as possible to get them more productive.

The vegetation of this area is alang-alang grass with scattered shrub trees such as *Eupatrium* and *Lantana*. As the vegetation is a little different from the so-called through alang-alang grass area, therefore, the land preparation may be more difficult than usual and take many labours.

The nursery site of this project is shown in the attached map.

2. Planting species for the trial plantation project:

The planting species in this project was recommended in Dr. Sakaguchi's report based on the scope of work dated on September first 1977. Some species in the above mentioned report

do not, however, all the time apply for this area, such as *Acacia catechu*, *Maesopsis eminii* and *Cassia siamea*.

Reviewing the planting species in this area is necessary, therefore and the decision of the species suitable for this area is formed to be done through the Joint Steering Group for this project.

However, we weight to suggest through our survey that the following five species should be selected at the first step in order to collect necessary seeds for the project in this fiscal year 1979.

- (1) *Pinus merkusii*
- (2) *Albizzia falcataria*
- (3) *Eucalyptus deglupta* (or *Eucalyptus urophylla*)
- (4) *Switenia macrophylla*
- (5) *Leucaena glauca*

Among these species the last tree species, *Leucaena glauca*, is used for soil improvement and should be mixed the other 4 (four) tree species. And the seeds of these species are prepared by Indonesian side. On the second year, the other 4 (four) tree species as follows should be added to be above mentioned 5 (five) species.

- (1) *Pinus caribaea* var. *hondurensis*
- (2) *Gmelina arborea*
- (3) *Peronema canescens*
- (4) Giant ipil-ipil

The following tree species should be taken into construction in the near future.

- (1) *Eucalyptus urophylla* (or *E. deglupta*)
- (2) *Anthocephallus cadamba*
- (3) *Aleurites mollucana*
- (4) *Camposperma auriculata*
- (5) *Eusideroxylon zwageri*

- (6) Dalbergia latifolia
- (7) Shorea species
- (8) Sopea species
- (9) Cordia alliodora
- (10) Albizzia lebleck
- (11) Cedrea alliodora
- (12) Cedrea toona
- (13) Octomelis Sumatrana
- (14) Pterocarpus indicus
- (15) Acacia mangium
- (16) Legume species and others

3. Accomodation for Japanese experts:

As the suitable accomodation for Japanese experts was not able to find at Benakat and so on, it is recommended that Japanese experts will stay at Benakat from Monday to Saturday for work at Palembang from Saturday to Sunday. accordingly, the traffic facilities between Palembang and Benakat on every Monday and Saturday and the suitable dormitory for Japanese experts at Benakat are needed.

Until the time when the suitable dormitory is built at Benakat, one room of STANVAC Guest House or suitable village house just near STANVAC campus should be used for Japanese experts.

4. Construction of buildings and facilities;

Indonesian side will prepare necessary buildings and facilities for the implementation of this project under the following plan.

THE PLAN OF BUILDING FACILITIES

No.	Item	Area (m ²)	Place	Date of Target of Completion
1.	Project office	100	Bogor	November - 1979
2.	Administration office	250	N.S.	February - 1980
3.	Sheds	100	N.S.	February - 1980
4.	Store house	150	N.S.	February - 1980
5.	Japanese expert's dormitory	520	N.S.	February - 1980
6.	Workshop garage	200	N.S.	October - 1980
7.	Generator house	60	N.S.	July - 1980
8.	Pump house	20	N.S.	July - 1980
9.	Laboratories and lecture rooms	320	N.S.	October - 1980
10.	Oil Stock room	30	N.S.	July - 1980
11.	Afforestation office	150	T.P.S.	October - 1980
12.	Potting house	100	N.S.	February - 1980
13.	Fertilizer stock house	80	N.S.	October - 1980
14.	Guest house	380	N.S.	October - 1980
15.	Others	-	-	-

Note : 1. N.S. : Nursery Site

2. T.P.S. : Trial Planting Site

