REPORT OF PRE-FEASIBILITY SURVEY ON REFORESTATION COOPERATION PROJECT IN AMAZON AREA, BRAZIL

MAY 1976

JAPAN INTERNATIONAL COOPERATION AGENCY

Contents

I. PURPOSE OF SURVEY AND ITINERARY

(1. 1.) The forest in the Amazon River (Amazonas) Basin is one of the vastest tropical rain forest in the world, taking rank with Southeast Asia and West Africa, and the propriety of the development of this forest has a far-reaching influence not only on the Federative Republic of Brazil but also on the whole woeld from the standpoint of environmental resources, not to mention that of timber supply. On the other hand, Japan, also in the sense that it will further continue to be a big consuming country of timber produced from tropical rain forests, is highly responsible to those wood surplus countries for the rational exploitation of tropical rain forests and for the conservation and enrichment of the forest resources.

(1. 2.) With this in view, a survey team was organized by Japan International Cooperation Agency (JICA) and dispatched to the Federative Republic of Brazil to lay hold of the actual condition of the forest and forestry in the Amazon River Basin, as well as to study the possibility of cooperation between Brazil and Japan in the field of forestry and the appropriate way it should be.

(1. 3.) The team paid visits to the authorities concerned of the Federal Government in relation with the forestry and the development of Amazônia, the State Government of Pará, private enterprises (mainly those related to Japanese private enterprises) and other organizations concerned, in order to collect information and data as well as to exchange views. The Team also made observations of training and research institutes, natural and man-made forests, timber industries and so forth to study the present situation of activities as well as various problems encountered therein.

(1. 4.) The team is composed of the following members :

Leader	Katsuhiro Kotari	Special Adviser to the President, Japan International Cooperation Agency
Member	Fusho Ozawa	Deputy Director, Planning Division, Guidance Department, Forestry Agency, Ministry of Agriculture & Forestry
Member	Yoshio Hironaka	Overseas Technical Cooperation Officer, International Cooperation Division, Agricultural and Forestry Economy Bureau, Ministry of Agriculture & Forestry
Member	Masayoshi Miyamae	Forestry Development Division, Forestry Development Cooperation Department, Japan International Cooperation Agency

(1. 5.) The survey period was for 30 days from November 8, 1975 to December 7, 1975 with the itinerary as tabulated in the following pages.

Date	(Route) Place Stayed	Main Organizations Visited and Places Surveyed
November 8~9 10~11	(Tokyo→Brasilia) Brasilia	∘ IBDF (Instituto Brasileiro de Desenvolvimento Florestal) : (1) Explanation of the purpose of survey. (2) Collection of information and data on the Federative Republic of Brazil, particularly on the forestry situation and the development scheme of the Amazon Region.
12~14	(Brasilia→Belém)	∘ Branch Office of IBDF : Collection of information and data on the forestry in the Amazon Region. ∘ Office of the State Government of Pará, IDESP (Instituto de Desenvolvimento Econômico Social do Pará) : Collection of information and data on the development scheme and the forest inventory of the State of Pará. ∘ SUDAM (Superintendência do Dèsenvolvimento da Amazônia): (1) Explanation of the purpose of survey. (2) Collection of information and data on the development scheme and its actual situation in the Amazon Region. (3) Collection of information and data on activities of SUDAM in the field of forestry. ∘ EIDAI DO BRASIL MADEIRAS S.A. : Field survey at a nursery, man-made forests and a mill, etc. ∘ SANTA MADEIRAS S.A. : Collection of information and data on the actual condition.
15~18	(Belém→Breves→ Portel→Belém)	∘ SANTA MADEIRAS S.A. : A man-made forest (Breves). ∘ Saw Mills in the Suburbs of Breves : A proposed site for planting (Piarim River Basin). ∘ CIA. AMAZONAS S.A. : Field survey at a man-made forest. (Portel), etc.
19~20	Belém	∘ SANTA IZABEL S.A. : Observation of a man-made forest. ∘ PRODEPEF (Projeto de Desenvolvimento e Pesouisa Florestal) : Explanation given on the silvicultural experiments through slide projection.
21~23	(Belém→Santarém→ Curua Una→Santarém)	∘ CTM (Centro de Technologia Madeireira) : Observation of activities of SUDAM on the forest development, research and study. Visit to the Timber Industry Training and Research Institute (Santarém) and the Forest Operations Center (Curua Una). ∘ National Natural Forest : Field survey on the preservation of virgin forest and the experimentation on natural forest operation, etc.
24~25	(Santarém→Manaos)	∘ INPA (Instituto Nacional de Pesquisas da Amazônia) : Observation of the actual situation of experiment and research works on forestry. ∘ INPA man-made forests : Survey.
26~28	(Manaos→Belém)	∘ SUDAM : (1) Report of the result of survey. (2) Exchange of views on the forestry cooperation between both countries.
29~ December 1	(Belém→São Paulo)	∘ Forestry Bureau of the State of São Paulo : Discussion on the cooperation for the Paraiba River Basin Planting Program.
2~3	(São Paulo→Brasilia)	∘ IBDF : (1) Report of the result of survey. (2) Exchange of views on the forestry cooperation between both countries. ∘ IBDF-FAO Forest Experiment Station : Observation.
4~7	(Brasilia→Tokyo)	

(1. 6.) Before going further to make a summary of the outline of survey results in the following pages, the Team wishes to express its heartfelt gratitude to, in the first instance, the President of the Brazilian Forest Development Board and the Director of the Resources Bureau of SUDAM as well as all officials concerned of INPA, the State Government of Pará and local offices of IBDF, and further Dr. J. L. C. Dubios, a FAO expert, and many others, who extended warm hospitality and cooperation for the success of this survey. It also earnestly hopes that the cooperative relation between the Federative Republic of Brazil and Japan be strengthened further in the future through the founding of the forestry cooperation originated in this survey.

II. SIGNIFICANCE OF THE AMAZON REGION (AMAZÔNIA) MAINLY FROM THE VIEWPOINT OF ITS FOREST RESOURCES

(2. 1.) With the remarkable progress of the Federative Republic of Brazil in the 1960's, the importance of the development of the Amazon Region had gained its momentum year by year. During this period, an administrative organization for the development of Amazônia had also been consolidated gradually and "Superintendência do Plano de Valorização Econômica da Amazônia (SPVEA)" was reorganized into "Superintendência do Desenvolvimento da Amazônia (SUDAM)", as a result. And the question of how much the Amazon Region could be developed in the future started to be considered to hold the key to the progress of The Federative Republic of Brazil as a whole.

(2. 2.) The importance of the Amazon Region lies, above all, in its immeasurable abundance in various natural resources. And what attracts our attention as the present key object is its resources of tropical broad-leaved forest with the highest substance on earth in both quality and quantity, in addition to the vast land, abundant water and unsurveyed underground resources.

(2. 3.) How to deal with this forest resources seems to have an extremely far-reaching influence on the future progress of not only the Amazon Region itself but also the entire country mainly from the following points of view.

(2. 3. 1.) From the viewpoint of the rational land use :

Viewing the present situation of the land use and the regional development all over the country, it is understood that the Southeastern Brazil has been always ahead in the course of progress in respective fields, while a considerable part of the Midwestern Brazil belongs to the cerrado zone and the Northeastern Brazil is densely populated, with the soil productivity being relatively low. On the other hand, most of the land in the Northern Brazil, especially in the Amazon Region, still remains

undeveloped. In particular, a plateau called "TERRA FIRMA" excels comparatively in soil condition, covering an area of more than 250, 000, 000 ha.

The Federal Government, aiming at the development of the Amazon Region, is going to divert the forest to farm land or grass land : At present, the development of the Amazon Region is under way based on the program of PROAMAZONIA in which the system of key-point development originated in 1974 is adopted, and the appropriate implementation of this program is truly an important problem of the region.

(2. 3. 2.) From the viewpoint of the domestic timber demand and supply in Brazil :

The major source of timber supply in Brazil has been mainly the forest of ARAUCARIA ANGUSTIFOLIA in the Southern Brazil so far. As a result, however, of the successive felling in the past, the volume of resources diminished rapidly and it is going to be very difficult to maintain the past annual yield. At present, various measures to regulate such felling or to restrict the exportation are in practice. On the other hand, in anticipation of the future increase in timber demand with the progress of the national economy, the afforestation of such fast growing species as gum trees (EUCALYPTUS) and pines is under way mainly in the Southern Brazil. However, a considerable portion of the domestic timber supply will have to depend on the forest in the Amazon Region at least until such efforts of afforestation take effect in Southern Brazil.

(2. 3. 3.) From the viewpoint of the primary products for export :

The world demand for the forest products from tropical broad-leaved trees is basically in the expansive trend in a long run. Meanwhile, as the forest management systems in the tropics are improved more and more and consumption of forest products increases year by year, we have to forecast that the amount of surplus timber in these areas will rather decrese. Under such circumstances, since the tropical rain forest in the Amazon Region, covering an area of 260, 000, 000 ha and retaining the growing stock of more than 45, 700, 000, 000 m^3, not only satisties the domestic demand but even keeps a reserve capacity for export to a

considerable extent, it is quite probable that the contribution of this forest to the Brazilian foreign trade will increase furthermore in the future. However, on account of the fact that the forest in the Amazon Region involves various problems such as ; 1) it is composed of motley tree species, exceeding 4,000, and 2) most of the resources lies in an undeveloped area where the development is beset by great difficulties, it seems necessary to promote urgently the development of related industries in the region or the improvement of infrastructure for the effective utilization of those forest resources. Besides timber production, a great importance can be placed on the forest in Amazônia as a producing center of such precious products as perfumed oil and various fruits.

(2. 3. 4.) From the viewpoint of the conservation of precious environmental resources :

Forests, as long as treated rationally, function essentially as environmental conservation resources, but in the tropics forests rarely receive such a treatment. This is substantiated by the fact that in a vast range of the tropics except a part of West Africa and Southeast Asia the transformation phenomenon into a savanna or a grass land is in progress here and there. In this respect, the forest in the Amazon River Basin as a whole has not yet been victimized by such fatal destructive activities. If the forest development is undertaken in the future from those viewpoints mentioned previously in (2. 3. 1.), (2. 3. 2.) or (2. 3. 3.), on the basis of the system of natural forest treatment which has been studied and examined for nearly 20 years so far, the conservation of water and soil that are indispensable for the progress in any and every field will be secured together with the continuous supply of timber.

III. CHARACTERISTICS AND PROBLEMS OF FOREST RESOURCES, FORESTRY AND TIMBER INDUSTRY

(3. 1.) Forest Inventory

A systematic inventory of forest resources was first conducted by SPVEA - FAO in 1951 in the limited areas of the lower Amazon and along the Route BR 153, etc. Later on, as to the forest in-between Xingu and the Tapajos River, a detailed plot inventory on the ground was carried out by a FAO mission. In recent years, conducted were such as a forest inventory along the trunk roads by IBDF-GOA and a forest inventory of the State of Pará in the Marajo Island and so forth by the IDESP. The total number of areas where forest inventories were projected or are under consideration amounts ot approximately 20. On the other hand, partly with the advance of radar detection under the program of RADAM, the outline of forest such as its location and topography is being made clearer. Yet, various surveys made so far are by themselves insufficient for the establishment of an appropriate management plan for a sustained yield, it is of an extremely pressing necessity to make an inventory (assesstment of growing stock) and a detailed survey on the forest soils and vegetation covering the whole region, in combination of the ground survey with the aerial photogrammetry.

The volume of resources announced officially is as follows.

Classification of Forest	Area (10, 000 ha)	Growing Stock Per Hectare (m^3)	Growing Stock (10, 000 m^3)	Volume of Lumber Transacted Commercially Per Hectare (m^3)	Total Volume of the item on the left (10, 000 m^3)
TERRA	25, 350	178	4, 512, 300	60	1, 521, 000
VARZEA	650	90	58, 500	30	19, 500
Total	26, 000	(more than 25 cm in diameter)	4, 570, 800	(more than 45 cm in diameter)	1, 540, 500

(3. 2.) Wood Utilization

(3. 2. 1.) Although the forest in Amazônia is composed of a great variety of tree species, amounting to 4, 000, those species in actual use now are quite limited in number. For instance, according to the 1974 data, 38% of the logs converted into lumber is held by VIROLA, and 6 species including MOGNO, ANDIROBA, LOURO - INHAMULI, CEDRO, and ANDIROBA JAREWA in addition to VIROLA account for 68. 5% of the total amount. As regards logs for plywood, the range of species applicable is more limited, with VIROLA accounting for 58%, MUIRATINGA for 24% and SUMAUMA 9% respectively. Other species applicable amount only to 9.

(3. 2. 2.) Utilizable species vary according to the location of stand for cutting, the density of specific species per stand, and physico-chemical properties of wood and so on, and they are also variable in accordance with the demand from market side. In the Amazon Region, the tree species that can be utilized are very limited owing to ; for example, 1) rivers are used in most cases for transportation of timber, 2) motley species grow mixedly in a complicated way, and 3) the elucidation of the physico-chemical properties of wood is still on the way. Therefore, after all, only those useful species are felled and utilized by single tree from the existing forest, with other species left abandoned. By this kind of felling system, we can neither expect the sure regeneration of cut-over areas, nor avoid the growing inaccessibility to object forest area for harvesting. Accordingly, it is quite wasteful from the aspect of resource utilization and an increase in the burden of enterprises is feared.

(3. 3.) Wood Processing Industry

(3. 3. 1.) The number of saw mills in the Amazon Region has increased for the past 15 years from 49 up to its fivefold (253). The increar has been especially remarkable since 1968. However, as many as 237 saw mills(83% of the total number) are situated in the three districts, i, e. Belém, Marajo and Manaos, characterizing their high concentration. The scale of saw mills differs according to the area where they are situated, but many of them are on an extremely small scale in general. The most

prevailing are those saw mills that consume 26 to 50 m^3 of logs per diem, accounting for 28% of the total number, followed by those consuming 6 to 10 m^3 (20%) and then those consuming 1 to 5 m^3 (16%). Saw mills in Manaos are slightly larger in scale, compared to other areas. In 1972, the lumber production stood at 1,234,000 m^3 and the log consumption at 2,311,000 m^3.

(3. 3. 2.) As to plywood plants, 5 in total exist in Manaos, Macapa, Belém and Portel. The production of plywood board amounted to 121,000 m^3 and the log consumption to 394,000 m^3 in 1972.

(3. 3. 3.) With respect to the procurement of log, though trunk roads in this region are being improved rapidly under the Amazon Development Program, the transportation of logs by land is next to impossible except for a certain project area and in most cases rivers and brooks scattering over the region are used as the only way of hauling logs. Because of this, each enterprise is placed under the situation where it is difficult to undertake a satisfactory collection in both quality and quantity and is forced to procure logs little by little and irregularly from an extremely vast range of the region. This constitutes an impeding factor against the advancement of enterprises related to timber in this region in spite of abundance of natural forest in Amazônia.

(3. 3. 4.) As a result, it is an important task for each enterprise to procure wood of good quality constantly and in large quantities. Therefore, in such areas as Belém, and Marajo where enterprises are concentrated it would be quite natural that more and more emphasis is put on the procurement of logs in the future. Thus the afforestation of useful species is strongly longed for in the vicinity of those areas.

(3. 3. 5.) In addition, it is said that not only in the main stream of the Amazon River but also in its tributaries the rafting and the shipping by river are attended with considerable danger due to the conditions of the river (ebb and flow, wind and waves, etc.). Improvement of canals and harbors is requisite together with the development of transportation by land.

(3. 4.) The Tree Species and Methods of Afforestation

(3. 4. 1.) Regarding the achievement of afforestation in the Amazon Region, 155, 000 ha had been registered in IBDF from February 1970 to July 1974. These were the results of the compulsory afforestation to log consumers, and the afforestation in this case was mainly performed with an object at those grass lands, cultivation cut areas, secondary stands and so on that were relatively close to the location of related enterprises. Afforestation species mainly consist of such introduced species as PINUS-CARIBAEA, GMELINA - ARBOREA and EUCALYPTUS, standing on an outcome of the afforestation experiment in Curua Una, for instance, and further with reference to various studies in Africa or Australia. However, the afforestation of local species such as AÇAI, UCUUBA, ANDIROBA, MOROTOTO, MARUPÁ, MOGNO, CEDRO, CAPUIBA, PAU - ROSA and VIROLA is also attempted actively.

(3. 4. 2.) As to the afforestation method in the region, large-scale planting is generally adopted over the cultivated and grass lands as well as the cut-over areas resulting from intensive exploitation of natural stands. In this method, site preparation is undertaken after prescribed burning, then the site is planted to the suitable species for a bare land. And it is quite common that the exotic fast-growing species are planted for the purpose of pulpwood production. In consideration of the reduction of silviculture costs, also undertaken are the afforestation by line planting and Anderson's group method using mainly those local species that require the shade at young ages. In such cases, residual trees are to be gradually removed by girdling.

(3. 4. 3.) On the other hand, judging from the composition of the natural forest in Amazônia, the natural regeneration is said to be extremely difficult especially in anticipation of the regeneration of a certain objective species. In other words, it may be due to the scarcity in accessible areas of the natural forests with such concentration of marketable species as to make exploitation economically feasible and the regeneration by natural seeding practicable with ease. However, the experimental stand for the natural regeneration in Curua Una which the Team visited is a natural

regeneration stand with a main use of VOCHYSIA MAXIMA (QUARUBA), and here the Team could take a glance at the rare possibility of adopting the natural regeneration method. From this it is said that on the premise of appropriate management there is a possibility for the natural regeneration in some inaccessible forests where CUARUBA, GOUPIAGLABAA (CUPIUBA) and QUALEA HOMOSEPALA (MANDIOTUEIRAS) are prevailing and the mould as well as the clayey soil are common.

(3. 4. 4.) The afforestation technique in the tropical rain forest of Amazônia still involves many unsolved problems for the establishment of a system on either method mentioned above, and much is expected to an outcome of the experiment and research works in the future :

Some of such problems are, as was also observed through the present survey, those of disease and insect damage like the die-back, the root-fungi, the heart-rot, the shoot-borers and the defoliatugant (sauvas). In addition, as the planted land expands in the future, the outbreak of new disease and insect damage can be expected, the further research and control measure are needful. Also, with the increase in the area of artificial regeneration with local species, the quantitative securing of seeds has come to be an important problem.

Furthermore, as a basic problem on the regeneration it is worthy of repeating that, only a very limited number of species are in use as profitable products out of such a complicated natural forest, and as long as this kind of logging method continues, the regeneration of cut-over area will be very difficult in terms of silvicultural costs.

(3. 5.) Experiment and Research

A systematic study of forest in Amazônia was first started in 1958 by SPVEA - FAO at the afforestation research institute set up in the lower Amazon. At present, studies of the composition of forest, the regeneration method and the wood processing are going on at CTM (Santarém and Curua Una) of SUDAM, INPA (Manaos) and PRODEPEF (Belém). With regard to the landuse classification for Lower Amazon, by Dr. J. L. C. Dubious to classify the forest in Amazônia into four types ; i. e. Mangrove, Varzia,

Igapo and Upland-forest. In addition, those four types are subdivided into sub-types and facies and the direction of utilization and afforestation in each forest type is presented on the basis of the past studies. Also at the forest products research institute of IBDF - FAO in Brazilia, for instance, the analysis of physico-chemical properties of 100 major species is being rushed and on 16 species out of them the result of research will soon be made public.

Nevertheless, there still exist many unsolved points in respects to the forest in Amazônia and it is needful to reinforce researchers and research facilities so as to promote the experiment and research works.

IV. CHARACTERISTICS AND PROBLEMS OF PRIORITY POLICY ON FORESTRY

(4. 1.) The followings are what the Team understood as the main objectives of the Brazilian policy on the forestry in the Amazon Region :

(1) To serve for the domestic timber demand and supply by the development of forest resources, and

(2) To utilize the forest resources in Amazônia under a rational conservation program.

(4. 2.) More concretely ;

(1) To avoid the tendency of concentrated exploitation in the river side of lower Amazon as well as the degradation of forest resources, both caused by the partiality in the past for selecting object species for the development and the utilization,

(2) · To accelerate the elucidation of physico-chemical properties of those unexploited species so as to increase the number of species in use,

(3) To ensure the establishment of an industrial plantation in order to enable the concentrated utilization in large quantities. For this purpose, afforestation duties are to be assigned so as to counterbalance the amount of lumber produced from natural forest (planting of 4 trees per cubic meter). Also, special favors in tax system are to be continued as requested,

(4) To ensure the development of lumber industry in the Amazon Region with a help of the regulation on log export, to promote the wide utilization of species for local consumption and, in this connection, to facilitate furthermore the implementation of afforestation,

(5) To expand the transportation by land in connection with the program of PROAMAZONIA as well as to place emphasis on the implementation of projects for the future forestry development under the program of PROAMAZONIA, and

(6) To strengthen the survey activities for those policies mentioned above, since all of them are based on the grasp of forest resources.

(4. 3.) Although those priority policies stated above can be considered to be of great importance and indispensable for the future progress of Amazonia, it is desirable to point out several problems thereof.

(1) It is needful to draw up a comprehensive and long-term forest plan, consisting of the plans for the conservation and enrichment of forest resources, the upbringing of forest industries, the securing of environmental function of forest, the improvement of related infrastructures and so forth.

(2) It is required to establish a technological system on timber production, regeneration of forests, and the utilization of trees.

(3) As regard the compulsory afforestation resulting from the utilization of lumber, it sometimes happens that the acquisition of an object land for the execution of afforestation is difficult, or even if a land for the afforestation is available, necessity occurs to make a basic research anew therein for its execution. There seems to be a room for consideration on the present execution system of afforestation which entirely relies on the private sector.

(4) Although SUDAM, IBDEF, INPA and other organizations are now shouldering complicatedly their respective share in the plan of operation, the implementation, the supervision or the experiment and research, the coordination will be needed for the more rational execution of the undertaking in the future.

(5) The demand for Amazônia lumber is still unstable and is quite susceptible to the economic fluctuation, therefore it is necessary to bring up and promote the timber industry which can cope with it.

V. PROPOSED DIRECTIONS OF BRAZIL - JAPAN FORESTRY COOPERATION IN AMAZÔNIA

As has been explained so far, considerable difficulty exists in the future progress of forestry in Amazônia in spite of its keen necessity. However, it is true that since the establishment of SUDAM, and particularly in recent years, the tempo of progress has been accelerated to a great extent. In the course of this survey, the Team confirmed that the close cooperation between FAO and Brazil in particular has played an important role and will continue to be useful for the progress of Amazônia forest in virtue of the complicatedness that forest contains. Accordingly the team is of the opinion that, based on the achievements of the above cooperation, it is necessary to have a forestry cooperation between the Republic of Brazil and Japan in order to further contribute to the development of forestry and timber industry that may secure the conservation of the forest resources in Amazônia which are so valuable for Brazil. With this in view, we can consider the following as basic directions of the cooperation.

(5. 1.) Cooperation in Forest Inventory

In order that the existing aerial photographs of forested areas may be utilized much more for the establishment of proper management of the forests, cooperation in the field of forest inventory including photo-interpretation and ground survey etc. seems to be quite appropriate.

(5. 2.) Cooperation in Experiment 4 Research and Technical Training on Forestry and Timber Industry

It appears that there is still some room to add, in financial and personnel aspects, to the present activities of research and technical training in the field of afforestation and timber utilization, especially in the lower Amazon (the Delta Area). The cooperation in this field also seems promissing.

(5. 3.) Cooperation through Japanese Private Enterprises

Some Brazilian - Japanese joint enterprises are in operation in the lower Amazon, but they are surrounded by various seven conditions. Considering that smooth and rational development of Amazônia is indispensable for Brazil, it is necessary for the Government of Japan to back up those joint enterprises in order that their activities may further contribute to the development of Brazil. That is ;

(1) Financial assistance for the afforestation including the infrastructural sector,

(2) Dispatching Japanese experts, to cooperate in the development of forestry techniques that may require the elucidation.

Meanwhile, in case such a juridical person as organized by the immigrants to Tomeas engages in an afforestation project, it may be needful to study the possibility of JICA's assistance.

(5. 4.) Promotion of Mutual Understanding on Forestry between Brazil and Japan

To make the Brazil - Japan forestry cooperation fruitful for both countries, it seems essencial, at first, to cultivate the mutual understanding of the actual conditions of forestry and forest industry in both countries as well as other general matters. What is more, the future Brazilian forestry and forest industry are expected to have quite diverse and probably very difficult tasks such as the development of the Great Amazônia Forest and the enhancement of productivity in the Great Cerrado Zone. And also, an afforestation undertaking for pulp wood has already been under way between Brazil and Japan. Therefore, it will be worth-while, for instance, to have opportunities for exchanging views regularly amoung those concerned of both countries in order to make the Brazil - Japan forestry cooperation more effective in the future.

APPENDIX : OUTLINE OF SURVEYED AREAS

1. EIDAI DO BRASIL MADEIRAS S.A. (Belém)

This is a joint enterprise between Japan (Eidai Sangyo Co., Ltd. and Mitsubishi Trading Co., Ltd.) and Brazil (CAMPANIA MADEIREIRA SÃO MIGUELS S.A.). Its plywood/saw mill founded in 1973 is located in the suburbs of Belém and has about 700 employees. The production in 1974 stood at about 17,000 m^3 and is expected to amount to approximately 50,000 m^3 in 1975. A planting land of about 116.7 ha (of which 61.4 ha were already planted) has been reclaimed from the grass lands around the mill and the aptitude test of such local species as VIROLA, MACACAUBA and ANDIROBA as well as such exotic species as MELINA, PINUSCARIBAEA and CRYPTOMERIA JAPONICA is in pracitice. The future of a processing plant, however, may depend on the demand and market conditions of the product.

2. The Planting Land of SANTA MADEIRAS S.A. (Breves)

The company was set up in 1972 in partnership with a Japanese firm (Tomen Co., Ltd.), and has a saw mill in the Santa Ana Island near Acapa. In Breves, it owns a land of about 1,000 ha and is establishing at present a plantation of 200 ha. 2,500 trees of VIROLA (50 ha) were planted per hectare (2 m × 2 m), after the overall clear cutting and site preparation, and the direct seeding inside a natural stand (the strip weeding 2 m in width was conducted in the form of 10 m × 10 m latice, followed by planting at an interval of 1 m) was applied to ANDIROBA (150 ha). The irregularity is noticeable to a considerable extent among the present achievement of plantation.

3. Saw Mills in the Vicinity of Breves

(1) INSA (a joint enterprise in partnership with an American firm)

(2) NASCIMEHTO (domestic capital)

(3) CAS DE MADEIRA (domestic capital)

Above (1) is a large-scale mill equipped with modernized facilities, but is not in operation now affected by the depression of the market. (2) and (3) are both limited in facilities in comparison to the former, but are in operation now adapting themselves well to the depression.

4. The Proposed Land for Afforestation of MARACACUERA FLORESTAL S.A. (Portel)

This is a brother company of EIDAI DO BRASIL MADEIRAS S.A. and is situated about 80 km west of Portel. It acquired a forest of 20,000 ha in the river basin of Rio Piarim and engages in afforestation business. At the time of the present survey, the construction of roads and office buildings as well as site preparation were under way. The plan in the future is to plant 40,000 trees of PINUS-CARIBAEA (16 ha) and 80,000 trees of VIROLA. 2,500 trees of PINUS-CARIBAEA per hectare are planned to be planted after clear cutting and prescribed burning, while VIROLA is planned to be planted inside a natural forest by the line planting method.

5. The Plantation of CIA. AMAZONAS S.A. (Portel)

The plantation belongs to the plywood company with American partnership in Portel, and PINUS-CARIBAEA and VIROLA are planted. Those trees of PINUS-CARIBAEA that were planted on the land near the plant, where the soil condition is comparatively favorable, are growing satisfactorily, but those planted in the campo (field) are not. The planting under the tree was applied to VIROLA. Foxtail was partially observed in the planted trees of PINUS-CARIBAEA.

6. The Planting Land of SANTA IZABEL AGRO-FLORESTAL LTD (Belém)

The company was established in 1971 and specializes in afforestation. 1,100,000 trees of PINUS-CARIBAEA have been planted so far. In addition to PINUS-CARIBAEA, the experimental planting of such local species as CERDO, MOGNO, PARAPARA, MOROTOTO, MARUPÁ and CUMARU as well as of EUCALYPTUS, is in practice.

7. CENTRO DE TECHNOLOGIA MADEIREIRA (CTM)

(Center of Lumber Technology)

CTM is under the jurisdiction of SUDAM and is conducting research works on the forest in Amazônia as well as the training of technicians. The following two centers are attached to CTM.

(1) CENTRO DE PESQUISA E TREINAMENTO EM INDUSTRIA MADEIREIRA

(Lumber Industry Research and Training Center) (Santarém)

This center is conducting research works on the aptitude of species, the wood processing and so on, as well as the training in sawmilling, woodworking, and adjusting work of saw, etc. It seems that an increase of instructors and the further enrichment of training content will ensure greater effect.

(2) CENTRO DE OPERAÇÕES FLORESTALS

(Forest Operations Center) (Curua Una)

This center engages in research and training on the felling machine, and the lumber felled here are transported to CENTRO DE PESQUISA E TREINAMENTO EM INDUSTRIA MADEIRERA in Santarém and utilized. In addition, this center has been conducting continuosly the afforestation experiment (including planting methods under the tree and natural regeneration) originated in 1957 in cooperation with FAO. More than 100 species are the object of study, including such local species as MOGNO, CEDRO, PARA-CHESTNUT, VIROLA, ANDIROBA and MOROTOTO as well as introduced species like PINES and ECALYPTUSES. An experimental stand of 6 ha for natural regeneration, combined with those experiments mentioned above, will provide a guiding principle for the proper management of the wet forest in Amazônia.

8. National Natural Forest (Santarém)

A forest of about 600,000 ha has been secured at Tapajos in the suburbs of Santarém for the purpose of preserving virgin forests. In a certain part of it (35 ha), an experimental forest for the natural stand treatment under the system of natural regeneration by selective cutting was set up.

Experiments are under way in full consideration of the conservation of fauna and flora. This example is quite instructive for the future treatment of Amazônia forest.

9. INSTITUTO NACIONAL DE PESQUISAS DA AMAZÔNIA (INPA) (National Research Institute of Amazônia) (Manaos)

INPA is a national research institute concerning Amazônia and is directly connected to the office of the President. Here, a comprehensive study on forestry is being carried out in the fields of tree classification, silviculture, forest survey, forest management and wood processing.

The experimental stand of afforestation is situated about 100 km inland of Manaos, where the topography is comparatively steep. It started the planting three years ago and owns a plantation of 14 ha composed of such local species as SUMAUMA, MOROTOTO, MARUPÁ and CUMARU.