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SOCIALIST REPUBLIC OF THE UNION OF BURMA

MINISTRY OF AGRICULTURE AND FORESTS

NOTES ON FORESTRY

IN

BURMA

Dated the 1st January 1986

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NOTES ON FORESTRY IN BURMA

Introduction

1. Department of Forestry and Timber Corporation are the two departments responsible for the development of Forestry Sector in Burma. Burma is endowed with a wealth of forest resources. These forests play the vital role of conservation of soil and water which is enormously helpful to the country's agriculture, and they also provide a large quantity of timbers both for domestic consumption and export. The notes that follow give the essential features of forestry in the country.

Topography and Climate

2. Burma is situated between the latitudes 10° and 29° north and longitudes 92° and 101° east. It is roughly diamond shaped and is about 1,300 miles (2092 km) from north to south and about 580 miles (933 km) broad from east to west. It has an area of 261,228 square miles (676,577 square km) of which 149,889 square miles (388,210 square km) or 57 per cent is covered by forests.

3. The country is traversed by a number of rivers all flowing from north to south. The most important of them is the Irrawaddy which is navigable for 965 miles (1,553 km) north-ward from Rangoon. Next is the Chindwin river which is navigable for 520 miles (837 km) above its confluence with the Irrawaddy. The Salween river rises in China and flows through rocky gorges along the eastern part of the country till it joins the Ataran and Gyaing rivers before reaching the sea. It is navigable by small crafts only for a short distance above Moulmein. Between the Irrawaddy and Salween lie the Rangoon and Sittang rivers. The rivers of Burma with their vast net-work of feeder streams make possible the economical extraction, sometimes over distances of 1,200 miles (1,921 km) and more, of teak and other timbers to the saw milling and shipping centres of Rangoon and Moulmein.

4. The elevation of the land surface of Burma varies from sea level along the coastal section to 20,000 feet (6,096 m) on the mountains bordering China. On the Rakhine *yoma*, which forms a divide between the Irrawaddy basin and the Bay of Bengal altitudes in places run to over 10,000 feet (3,048 m). The hills of the Pegu *yoma*, which lie between the Irrawaddy and Sittang plains and which contian some of the most extensive and finest teak forests in Burma, do not exceed 3,000 feet (914 m).

5. There is a wide variety in climatic conditions corresponding to atitudes and altitudes as is illustrated by the following table of rainfall land temperature at reading stations :—

Station	Average Annual					
	Rainfall		Temperature			
			Maximum		Minimum	
	Inches	Centi-meters	F	C	F	C
1	2	3	4	5	6	7
Myitkyina ...	83	210	84	29	65	19
Loikaw ...	49	125	82	28	61	16
Pa-an ...	170	431	88	31	73	23
Falam ...	61	154	73	23	62	16
Monywa ...	31	79	92	33	71	22
Tavoy ...	211	536	88	31	72	22
Pegu ...	131	332	91	33	71	22
Minbu ...	33	84	91	33	71	22
Mandalay ...	33	83	91	33	70	21
Moulmein ...	187	476	86	30	73	23
Akyab ...	186	472	86	30	71	22
Kabaaye ...	103	261	89	32	73	23
Taungyi ...	59	151	77	25	75	24
Bassein ...	116	294	88	31	73	23

6. The dry zone, lying in the central part of Burma, extending roughly from Yamethin to Shwebo, and is bounded by the foothills of the mountain massifs on the east and west, has an annual rainfall of under 45 inches (114 cm) and a range of temperature from about 50° F to 105° F (10° C to 41° C).

7. As soil is conditioned largely by climate, that of Burma shows considerable variation often within relatively confinedlocalities.

DEPARTMENT OF FORESTRY

History

1. Scientific forestry in Burma began with the arrival of British forester, Dr. Brandis in the year 1856. He was appointed to the charge of the forests and he was the first scientifically trained forester to come to the country. He remained in direct charge of the forests until 1862 and held the post of Inspector-General of Forests for both Burma and India from 1864 to 1881. In Burma he initiated linear valuation surveys of the forests by which estimates were prepared of the stocking of teak trees by certain girth classes. From the results of these and estimates of the rate of growth, he estimated the annual yield of the forests in terms of trees of exploitable girth and thus inaugurated the first Forest Working Plan for Burma. He put into operation measures to protect the forests from injury by man, which included the control of the shifting cultivation otherwise locally called as *taungya*, by forest fires and from natural causes.

2. He convinced the then Government, the importance of administering the forest on the principle of a sustained yield and of the necessity for entrusting their management to a trained Forest Service of the highest quality. The work so well founded by Brandis was carried on by successive generations of forest officers and the development and systematic organization of Forestry in Burma over the period 1856 to 1942 will bear comparison with that in any country in the world.

Forest Policy, Law and Administration

3. In a long range subject like Forestry, continuity of policy unaffected by political and other changes is essential. A forest policy for both Burma and India was enunciated in 1894 which prescribed the general principles on which forests should be administered. It recognized four main classes of forests *viz.* : (1) Protection forests—which are essential on climatic or physical grounds, (2) Commercial forests which afford a supply of valuable timber for commercial purposes, (3) Local Supply forests—the use of which is to provide the local people with essential needs in respect of timber, firewood etc., and (4) Nature reserves, sanctuaries and national parks. It was a sound and carefully considered statement and basically it remained the accepted forest policy ever since with slight modifications.

4. Special legislation is necessary to give effect to forest policy. The Burma Forest Act became law in 1881. It was enacted again in 1902. Thereafter amendments have been made from time to time to suit changing conditions. It included provision for the constitution of reserved forests and powers, rights and duties therein, the general protection of forests and forest produce, the control of forest produce in transit, penalties and procedure, and the investiture of forest officers with special powers.

5. An administrative machinery is necessary to give effect to the Burma Forest Act and the Forest Deparment is such a body to carry out the provisions contained therein. The head of the department is the Director-General who is responsible to the Ministry of Agriculture and Forests. The sanctioned strength of the department is as shown in the following table :—

Statement showing the sanctioned strength of the department

Serial No.	Rank	Permanent	Temporary	Total
1	2	3	4	5
1	Director General	1	...	1
2	Director	6	3	9
3	State and Division Forest Officer...	14	...	14
4	Research Branch Head Officer	...	8	8
5	Deputy Director/Senior Research Officer.	46	29	75
6	Assistant Director/Township Forest Officers/Research Officer.	147	211	358
7	Deputy Township Forest Officer/ Research Assistant/Demonstrator (BFS)/Photo Interpretor.	169	55	224
8	Assistant Township Forest Officer/ Plantation Assistant/Inventory Crewleader.	461	915	1376
9	Inventory Crew Assistant ...		180	180
10	Forester	1623	1660	3283
11	Other Support ...	3913	1184	5097
	Total ...	6380	4245	10625

Type of Forests

6. Forest vegetation is dependent mainly on temperature, rainfall and soil. The following forest types occur in the country:—

1. *Tidal forests.*
2. *Beach and dune forests.*
3. *Swamp forests.*
4. *Tropical evergreen forests.*
5. *Mixed deciduous forests*—
   (*a*) Moist upper mixed deciduous forests.
   (*b*) Dry upper mixed deciduous forests.
   (*c*) Lower mixed deciduous forests.
6. *Dry forests—Than-dahat and Thorn forests.*
7. *Deciduous Dipterocarp forests or Indaing.*
8. *Sub-tropical and Temperate Evergreen forests.*

7. Of all the above types mixed deciduous forests are economically the most important as they occur most extensively throughout the country and contain a large number of commercially important species. These forests are found usually where the rainfall varies from 40 to 120 inches (102 cm to 305 cm). There are three main forms of mixed deciduous forests as listed above and in these forests are abound the valuable species such as teak (*Tectona grandis*), *pyinkado* (*Xylia dolabriformis*), *padauk* (*Pterocarpus macrocarpus*), *hnaw* (*Adina cordifolia*), *ingyin* (*Pentacme siamensis*), *thitya* (*Shorea oblongifolia*), *yon* (*Anogeissus acuminata*), *and sit* (*Albizzia procera*).

8. Next in economic importance are tropical evergreen forests. They predominate in localities where the rainfall exceeds 120 inches (305 cm). They occur also in shady valleys and places with moist cool aspect with a rainfall ranging from 60 to 120 inches (152 cm to 305 cm).

9. These forests provide a number of species of commercial importance such as *Kanyin* (*Dipterocarpus alatus*, D. *turbinatus*, *etc.*), *thingan* (*Hopea odorata*), *thingadu* (*Parashorea stellata*), *pyinma* (*Lagerstroemia speciosa*), *thitka* (*Pentace burmanica*), *taungthayet* (*Swintonia floribunda*), and *baing* (*Tetrameles nudiflora*).

10. Deciduous Dipterocarp forests or *indaing* are a characteristic feature of the forest vegetation of Burma. They occur on sandy gravelly and lateritic soils up to an altitude of about 2,500 feet (762 m). The main species in this type are *in* (*Dipterocarpus tuberculatus*), *ingyin* (*Pentacme siamensis*), *thitya* (*Shorea oblongifolia*). These forests, occur throughout the country, but the largest tracts, several thousand square miles in area, are found between the Irrawaddy and Chindwin rivers. They are also commercially important.

11. Tidal forests are found along the coasts of Rakhine, Irrawaddy delta and Tenasserim. Tree species occurring in these forests are *kanazo* (*Heritiera fomes*), *tayaw* (*Excoecaria agallocha*), *byuchidauk* (*Rhizophora* spp.), *kabaing* (*Ceriopsroxburghiana*) and *kyana* (*Xylocarpus moluccensis*). These forests are important mainly as sources of fuel supply and tanning material.

Bamboo Forests

12. Bamboos grow in mixture with other tree species throughout Burma except in some areas in Rakhine and Tenasserim.

13. In Rakhine there is a single patch where bamboo of the species *Mellocanna bambusoides* grows in pure stands stretching over about 3,000 square miles (7,770 square km). Estimates on growing stock of this bamboo show a volume of around 21 million tons (21.34 million metric tons). On the basis of a felling cycle of 10 years, the annual yeild would amount to 2 million tons (2.03 million metric tons) or the equivalent of about 820,000 tons (833,158 metric tons) of bamboo pulp annually.

14. In the Tenasserim, though bamboos are found mixed with other tree species in most places, there are also sizable patches where they are found in pure stands. The growing stock is estimated at about 6 millon tons (6.096 million metric tons) over an area of about 0.46 millon acres (1,862 square km). On a cutting cycle of 10 years the annual yield would be about 600,000 tons (609,628 metric tons) or the equivalent of about 240,000 tons (243,851 metric tons) of bamboo pulp. Thus, there is an enormous industrial potential should these areas are developed.

Classification of Forests

15. As stated earlier, 57 per cent or 149,889 square miles (388,210 square km) of the total area of the country are under forests. These forests fall into two broad categories, namely reserved forests and unreserved forests or unclassed forests. The reserved forests so far amount to 38,666 square miles (100,145 square km) in extent and the rest 111,223 quare miles (288,065 square km) are unclassed forests.

16. The reserved forests are state-owned and permanantly dedicated to forestry under the Burma Forest Act. They are scientifically managed under forest working plans for the benefit of the entire country. As for the unclassed forests, though most of them are under forest working plans, and certain provision of the Burma Forest Act apply to them, they are very lightly managed and control measures are not as strict as in the reserved forests.

17. Reservation of forests in the national interests has been going on since 1862 and as aforesaid, it has reached the extent of 38,666 square miles (100,145 square km) or about 14.8 per cent of the total area of the country. With the type of topography and the high rainfall the country is subject to, it is the general consensus that further reservation is desirable up to the extent of about 25 per cent of the area of the country.

Wild Life Sanctuaries

18. Wild life are priceless national heritage. They are part of the natural environment. They contribute to the beautification of the surroundings and thus useful for recreational purposes. They afford scientific studies in the national interest. For these reasons, they are preserved and looked after all over the world for posterity.

19. In Burma wild life sanctuaries have been constituted since 1918, and so far there are 16 sanctuaries distributed throughout the country extending over 2,073 square miles (5,369 square km).

Forest Surveys

20. Good topographical maps are essential to all accurate forest works. Several forest surveys were conducted before the Second World War and topographic maps made from them are as follows :—

Scale	Coverage in Square km
1	2
1 : 15840 4" = 1 mile ...	38,233
1 : 21120 3" = 1 mile ...	2,735
1 : 31680 2" = 1 mile ...	21,727
1 : 63360 1" = 1 mile ...	2,97,310
1 : 126720 ½" = 1 mile ...	676,577
1 : 253440 ¼" = 1 mile ...	676,577

21. Topographic maps, made by the Survey Department from the aerial surveys, will have to be used in the forest works.

Forest Inventories

22. Knowledge of the growing stock of forests by species and by girth classes is a prerequisite for the preparation of forest working plans. Forest working plans drawn on sound scientific lines are necessary to ensure maximum production in the national interest. At such forest inventories using different methods have been conducted since the dawn of scientific forestry management in 1856. Linear valuation surveys were first carried out in 1856 to get the growing stock of teak.

23. Later on with the advance of time subjective samplings were carried out in the nineteen-twenties and thirties to determine the growing stock of forest. Based on these data forest working plans were formulated.

24. Beginning from about 1935, enumeration of teak has been carried out cent per cent in conjunction with girdling. In the nineteen-fifties enumeration of commercial hardwood species cent per cent have been initiated in conjunction with selection marking of hardwoods.

25. With the advent of statistical methods in the field of inventory, statistically sound methods of sampling were tried during the years 1963-64 to 1974-75 with the object of developing inventory methods suitable for different forest types prevailing in the country with acceptable precision of the required data and the minimum of costs. These trials have been promising so far and the data so obtained have been very useful in the calculation of annual yields and preparation of forest working plans. In continuation of forest inventory work, National Forest Survey and Inventroy Project was initiated in 1981. About 18.9 million acres (7.7 million ha) of forest area in Pegu Division, Mandalay Division, Rakhine State, Rangoon Division and Irrawaddy Division have been already surveyed up to 1984-85. The project is scheduled to survey about 26.6 million acres (10.8 million ha) during the project period from 1981-82 to 1985-86.

Forest Working Plans

26. Before the Forest Department was reorganized in 1983, there were thirty six territorial forest divisions in the country.

27. For every one of the thirty five divisions, except Dry Zone Forest Division, there is a forest working plan. Each plan covers a period of generally 10 years and when that period expires the plan is revised in comformity with the requirements of that particular Forest Division. In near future, in accordance with the reorganization of the Forest Department, the existing 35 working plans will be revised and consolidated to form fourteen state and division working plans.

28. Each plan has a number of working circles depending on the type of forests, nature of forest produce available and the accessibility of these forests. The working circles common to the working plans are :—

1. Teak Selection working circle,
2. Hardwoods Selection working circle and
3. Local Supply working circle.

29. The Teak Selection working circle is formed for the production of teak for domestic consumption and export. As Burma provides 75 per cent of the world's teak, this working circle is economically the most important.

30. As teak grows mixed with other species and it constitutes about 12 per cent of the total growing stock, the method of treatment adopted has been the "Burma Selection System" whereby trees of the fixed girth are harvested on a thirty-year felling cycle. Regeneration of teak is by natural means. Improvement fellings for the benefit of teak are carried out during girdling and if possible half-way during the felling cycle.

31. The Hardwoods Selection working circle is constituted for the production of hardwoods other than teak. As stated earlier the forests of Burma are mixed and contian a bewildering number of species. There are about 1,200 tree species and 780 small tree species so far recorded. Of them only about forty-five tree species are hitherto harvested.

32. Therefore, the method of treatment adopted in this working circle is also "Burma Selection System" by which trees of the fixed girth are harvested on a thirty-year felling cycle. Regeneration is by natural means. Here also, improvement measures are taken for the benefit of commercial tree species.

33. Local Supply working circle is formed to meet the requirements of small timber, posts, poles and firewood of the peasants living in the neighbourhood of the forests. Here the method of treatment is generally "Coppice with Standards" system.

34. There are also special working circles such as Matchwood Supply working circle and Cutch working circle which are formed for the production of matchwood and cutch. But they are few and confined to a few divisions only.

Artificial Regeneration

35. Though natural regeneration has been depended upon the "Burma Selection System" for the regeneration of teak and other valuable hardwood species, commercial plantations are also being formed.

36. There are also areas in Local Supply working circle that are depleted of growing stock. In the dry zone especially, where the demand for firewood, poles, and posts is very acute and the weather conditions are severe, it is an urgent necessity to regenerate these areas by artificial means with fast-growing tree species. In such areas village supply plantations are being formed.

37. Over the last ten years from 1975 to 1984 average annual acreage planted comes to about 34263 acres (13872 ha.). In the local supply areas of the dry zone mainly indigenous and fast-growing exotic species have been used. In other local supply areas outside the dry zone the indigenous species have been planted. The main species planted in the commercial supply areas have been teak, pyinkado and paduak. Planting has also been done in the catchment areas.

Potential Yield

38. Annual potential yield of teak and other hardwoods in round tons is as below :—

Teak ... 335,000 Hoppus tons (603,000 cubic metres)
Other hardwoods ... 2,260,000 Hoppus tons (4,068,000 cubic metres)

Harvesting of the Forests

39. *Timber*—Revenue and Expenditure—The following statement shows the annual royalty from teak and other timbers compared with the expenditure incurred annually by the Forest Department for the last 10 years from 1975-76 to 1984-85.

Royalty received and expenditure incurred annually by the Forest Department is as follows :—

Year	In thousand		Expenditure Royalty per cent
	Royalty (Kyats)	Expenditure (Kyats)	
1	2	3	4
1975-76	65,284	22,551	35
1976-77	42,793	29,132	68
1977-78	69,849	32,891	47
1978-79	96,732	33,870	35
1979-80	70,937	43,373	61
1980-81	89,408	52,562	59
1981-82	101,206	61,353	61
1982-83	84,582	64,478	76
1983-84	151,732	65,928	43
1984-85 ...	141,992	80,755	57

NOTE.—1. Expenditure does not include capital expenditure.

40. The harvesting and sale of timber is carried out solely by the Timber Corporation but the selection of areas, marking of girdling or trees, the collection of royalty on timber and forest produce and the control of all forest works remain the responsibility of the Forest Department.

41. Prior to the harvesting of teak trees, a preliminary operation known as girdling is carried out by the Forests Department. The operation consists in taking out a ring of sapwood as close as practicable to the ground, to expose a continuous surface of the darker coloured heart-wood. This causes the death of the tree by preventing the ascent of sap from the ground *via* the sapwood. In the course of two to three years, the girdled tree loses its moisture and the timber becomes sufficiently light to float. The drying-out process is of value also because it results in timber becoming partially seasoned before it is removed from the forests. All teak trees in a particular area that have reached the prescribed girth at breast height (4′6″ = 137.16 cm) above ground are girdled.

42. In the process of girdling, all teak trees that are 4′0″ (121.92 cm) and above in girth at breast height are enumerated for purpose of calculation to determine the number of trees to be taken out at the next cycle which comes after an interval of 30 years. Also in the process, an operation known as "Improvement Felling" is carried out by the Forest Department. This operation consists mainly of removing unwanted trees that are either interfering or likely to interfere with the favoured tree species.

43. For trees other than teak, "Selection Marking" is a prerequisite to harvesting. It is a process whereby commercial tree species that have reached a certain girth limit at breast height (4′6″ = 137.16 cm) above ground are marked for felling. Along with the marking trees that have reached one foot below the prescribed girth are also recorded for purpose of working out the number of trees that would become available at the next selection marking after an interval of 30 years. Improvement Felling work, similar to that of teak girdling operation, is also done.

44. *Minor Forest Products.*—The forests of Burma are capable of yielding a very wide range of useful minor products. Roughly, there

are about twenty seven different kinds and the total royalty realized from them annually is in the region of Kyat 9,000,000. Of these, the more important ones are :—

(1) Fuelwood is still in great demand for domestic use, the railways and the brick kilns. The annual production is about 14,000,000 tons (19,826,000 cubic metres).

(2) Charcoal too is in great demand mainly for domestic purpose and its yearly production is about 700,000 tons (991,000 cubic metres).

(3) Bamboo is by far the most important among the minor forest products. Its uses are so innumerable and pervasive particularly in the day-to-day life of the rural people, that one just cannot imagine what it would be like to be without bamboo. There are about 90 different species of bamboo to be found, of which about half a dozen can be considered to be of major economic significance because of their occurrence in quantity. Annually about 780 million pieces are taken out. There is an enormous area of pure bamboo forest in the Rakhine occurring in a single block of about 3,000 square miles (7,770 square km). In the Tenasserim, bamboo is found growing mixed with other tropical hardwoods but there are also areas where they are found pure. The estimate of the total bamboo growing area in the Tenasserim is 725 square miles (1,878 square km). With so much bamboo occurring in the country it is obvious that this potential offers very good prospects for the large scale production of pulp and or paper.

(4) Canes belong to the palm family and are found throughout Burma in most forests of the plains and lower hills. They are used mainly in the rafting of timber, wickerwork, and the furniture industry. There are about 30 different species of canes to be found of which only a few are of economic importance. Annually, about 60 million pieces are taken out from various parts of the country for trade purposes.

(5) Cutch is a water extract of the wood of *sha* (*Acacia catechu*). It is a tan as well as a dye and its value lies mainly in its preservative qualities for tanning and dyeing fishing nets, canvas, tarpaulins and leather. The production of cutch forms an important local industry in central Burma. The annual production is around 285,000 viss (165,000 kg).

(6) Tan-bark is the most important tanning material found in commercial quantity although tans may also be obtained from leaves and fruits but they are not significant in the trade. Among the bark tans, mangrove bark is the most important and annually about 300,000 viss (490,000 kg) of different kinds of tan-bark are extracted for trade purposes.

(7) Lac is a complex resinous substance excreted by a minute insect called *Laccifer lacca* which forms large settlement on host trees. The refining of lac produces shellac which is in large demand for vernishers, polishes, sealing wax and many other products. The annual production is about 25,000 viss (41,000 kg).

Projects

45. In addition to the forest works mentioned above, the following projects are also being undertaken by the Forest Department.

(i) *Forest Research Institute Project.*—The objective is to provide technical information on a variety of forestry aspects whereby to conserve, use and further develop the forest of the country for the welfare of the nation. The project is undertaken with the grant from UNDP.

(ii) *National Forest Inventory Project.*—The objectives are (*a*) to design a national forest inventory system which should be used for continuous inventories so as to obtain up-to-date estimates on changing forest conditions and (*b*) to establish a competent organizational structure that will conduct inventories to obtain the data on a continuous basis. The project is carried out with the assistance of the UNDP.

(iii) *ADB Forestry II Project (Plantation Component).*—Formation of forest plantations is one of the main project components and the proposed project includes the establishment of 22,000 acres (8,800 ha.) of tree plantation comprising 15,500 acres (6,200 ha.) of teak and 6,500 acres (2,600 ha.) of indigenous pine. The project is implemented with a loan from the Asian Development Bank.

(iv) *Technical and Vocational Forestry and Forest Industries Training Project.*—The objectives are to review, reorganize and extend the existing training programmes and facilities at technical and vocational level of the Forest Department and Timber Corporation. Thereby, to ensure that effective training can be provided to meet the trained manpower requirements of these organization and thus increase Burma's capacity to utilize its forest resources. The project is carried out with the assistance of the UNDP.

TIMBER CORPORATION

History

1. Prior to 1942, a large majority of teak forests of Burma were worked under renewable long-term leases, by the five big European firms, namely, Messrs Bombay Burma Trading Corporation Ltd., Messrs Steel Bros. Co. Ltd., Messrs Macgregor and Co. Ltd., Messrs. Foucar Co. Ltd. and T.D. Finlay and Sons Ltd.. A lesser extent of teak forests were extracted by indigenous timber traders like U Po Dan and Son, Daw Kyu, U Thin Maung, etc. Hardwoods were extracted under long-term contracts by such indigenous timber traders like U Ba Oh and Co., Saw Tha Dwe and under license by other indigenous timber traders. Minor forest produce were extratced under lisence and permits by indigenous traders.

2. During the war period in 1942—45, the teak forests of the big European Firms were worked by Nippon Burma Timber Union. There was no noteworthy extraction of hardwoods and minor forest produce during this period.

3. In 1948, the Government of the newly independent Union of Burma formed the State Timber Board for the expressed purpose of taking over the assets and liabilities of the Teak Consortium and the Timber Project Board. Thence all teak extraction became the sole responsibility of the State Timber Board.

4. In 1952, the State Timber Board became a statutory board under the State Timber Board Act of 1950.

5. In 1962, the Socialist Economic System was introduced in the country and under that system the government nationalised the hardwood marketing sector in October 1963 and the sawmills in December 1965 and empowered the State Timber Board to manage them.

6. In 1964, the State Timber Board extracted some minor forest produce and distributed them in certain towns.

7. In 1972, with the reorganisation of all Ministries by the Revolutionary Council, the Ministry of Agriculture and Forests reorganised State Timber Board into Timber Corporation.

Organization and Functions

8. The main duties and responsibilities of the Timber Corporation may be enumerated as follows :

Extraction Department

(*a*) Proper exploitation of forest resources in full accord with the directives laid down by the Burma Socialist Programme Party and the guidelines drawn up by the Ministry of Agriculture and Forests.

(*b*) Felling of trees in the jungles in accordance with Forest Rules and Regulations.

(*c*) Transportation of logs from forests to log depots and mills at minimum costs.

(*d*) Stepping up production in sawmills, factories and round-log sale depots, and enhancement of product quality.

(*e*) Marketing of timber and timber products locally as well as export.

(*f*) Endeavouring to minimize expenditure and optimize earnings within the frame-work of operating ratios prescribed by the Ministry of Agriculture and Forests.

9. In order to facilitate the effective discharge of its duties the Timber Corporation has, apart from the Office of the Managing Director, four main departments and seven projects.

These are :—

(*a*) Extraction Department.

(*b*) Marketing and Milling Department.

(*c*) Engineering Department.

(*d*) Accounts Department.

(*e*) Forestry Projects I (IDA).

(*f*) Forestry Project I (ADB).

(*g*) Forestry Project II (IDA)

(*h*) Wood Industries Project I (IDA)

(*i*) Equipment Improvement Project for the Forestry Technique Development (JICA)

(*j*) Forestry Project II (ADB)

(*k*) Wood Industries Project II (IDA)

10. The Managing Director, being the Chairman of the Board of Management, together with the Heads of the various departments and projects, formulates, directs and supervises in the execution of the administration and management of the Timber Corporation.

11. The General Managers and the Project Directors, being heads of departments and projects, are directly responsible to the Managing Director in the execution of the administration, management and supervision of the respective departments and projects.

Office of the Managing Director

12. The Office of the Managing Director, operating under the supervision of the General Manager (*Planning*) on behalf of the Managing Director, executes the administration of the departments in accordance with the policy and guidance laid down by the Ministry of Agriculture and Forests.

Extraction Department

13. The Extraction Department is responsible for the planning and implementation of the operations relating to the extraction, rafting and transportation of highly-valued teak and hardwoods from the forests to depots, mills and wood-based factories under the Marketing and Milling Department. Its main duty consists of drawing up short-term and long-term plans, and implementation of the targets set in accordance with the objectives of the Twenty-Year Plan.

14. The Extraction Department has branch offices in the seven States and seven Divisions. These branch offices are responsible to the General Manager (*Extraction*) in the execution of the administration, management and supervision of thirty-eight Extraction and Rafting Agencies. These Agencies, which have been organized in

accordance with the functional and geographical requirements, are responsible for accomplishing the 'plan targets set' for them. Each Agency is divided into working ranges depending upon the topography of the forests.

Marketing and Milling Department

15. This Department is mainly responsible for wood processing and marketing of timber and timber products, both in the domestic and export markets. It receives teak and hardwood logs transferred by the Extraction Department, and processes them into sawnwood and other value-added wood products.

16. The organization of this department is based on the functional requirements in the field of wood-processing and marketing of timber and timber products. At present it has 23 teak sawnmills, 97 state-owned and 58 hired hardwood saw mills, 4 veneer and plywood factories, 3 furniture factories and 3 rosin factories in the milling sector. In the marketing sector a number of sections and timber shops, with specific functions, work towards catering to the needs of the export and domestic markets.

Engineering Department

17. This department is mainly responsible for the construction of new factories and sawmills, buildings, and for maintenance and repairs of machinery and equipment. It is also responsible for the procurement of stores, machinery and equipment, and storage and distributions of them. Though the functions of the department are directly related to the main departments of the Timber Corporation it also has the responsibilities to advise, co-operate and co-ordinate the projects in technical maters relating to the field of engineering.

Accounts Department

18. The Accounts Department is responsible for the preparation of accounts of the Corporation, maintaining Profit and Loss Accounts and Balance Sheet. It also oversees, on behalf of the Managing Director, that the various departments of the Corporation adhere to the respective Acts, Rules, Regulations, Notifications, Sanctions, Departmental Instructions and Circulars regarding financial matters, as may be prescribed by the Government and the Corporation from time to time.

PROJECTS

At present there are (7) projects being implemented, namely :—

(*a*) *Forestry Project I (IDA)* undertaken with a loan from the World Bank. The main objectives or the project are to increase the country's foreign exchange earning by stepping up the rate of extraction of teak and other mechanical logging methods. In the fiscal year of 1981-82, the project has been incorporated into the Timber Corporation as a divisional unit, but it functions the same as a continuing project.

(*b*) *Forestry Project I (ADB)* underaken with a loan from the Asian Development Bank. The objectives of this project are similar to the above though teak and hardwood processing and preservation components are added.

(*c*) *Forestry Project II (IDA)* undertaken with a loan from the World Bank. The main objectives are similar to those of Burma Forestry Project (Prome) together with compensatory plantations to augment teak supplies, selection of suitable fast growing species and establishment of land clearing technique for future large scale plantations.

(*d*) *Wood Industries Project I (IDA)*.—This project is under taken with a loan from the International Development Agency of the World Bank and also with a grant from the Government of Finland. The main objective of this project is to improve efficiency and product quality of the export-oriented teak processing industries through modernization and rehabilitation of the existing mills and factories. The tenure of the project is four years commencing from 1981-82. The headquarters of the project is in Rangoon.

(*e*) *Equipment Improvement Project for the Forestry Technique Development*.—This is the supplementary project of the Cable Logging Project undertaken with a grant from the Government of Japan. The objectives of the project are to help spread the application of the modern harvesting techinques, including cable logging methods, to other extraction agencies having a resemblance to the areas of this project

in geographical and functional nature, and also to improve efficiency and skill in handling extraction machinery and equipment. The headquarters of the project is in Bassein.

(*f*) *Forestry Project II (ADB)*.—This Project is undertaken with a loan from the Asian Development Bank. The Project aims at improving the use of forest resources by increasing timber extraction to a level permitted by prudent silvicultural practices, increasing road, railway and river transport capacity, and also improving recovery and replensishing resources through forest plantations.

(*g*) *Wood Industries Project II (IDA)*.—This project is a second phase of modernization of the Forest Industry programme in accordance with the Government's policy to improve wood industry in Burma. The objectives of the project are similar to those of Wood Industries Project I, the first phase of the programme. The components of the project comprise the establishments of mobile sawmills close to clear-felled reafforestration areas using wood waste gasification plants as the source of power. And introduction of blockboard production supplementing the new plymill at Monywa, renovation and construction of teak sawmills. The tenure of the project is five years and this phase of the project will be concluded in March, 1989.

PERFORMANCE

(a) Extraction

Logs			Input		Arrival	
			Cubic Ton Hoppus	Cubic Metres (M^3)	Cubic Ton Hoppus	Cubic Metres (M^3)
1			2	3	4	5
1981-82	Teak	...	516886	932979	435592	786244
	Hardwood	...	624043	1126398	579858	1046644
1982-83	Teak	...	488977	882603	422884	763306
	Hardwood	...	589245	1063587	569249	1027494
1983-84	Teak	...	296681	535509	366477	661491
	Hardwood	...	396314	715347	449163	810739
1984-85	Teak	...	369796	667482	384416	693871
(P. Actual)	Hardwood	...	583962	1054051	572137	1032707
1985-86	Teak	...	431000	777955	433000	781565
(Target)	Hardwood	...	830000	1498150	830000	1498150

(b) Sawmilling

Logs			Through put		Outturn	
			Cubic Ton Hoppus	Cubic Metres (M^3)	Sawn Ton Hoppus	Cubic Metres (M^3)
1			2	3	4	5
1981-82	Teak	...	297565	537105	125104	177147
	Hardwood	...	496506	896193	261744	370629
1982-83	Teak	...	312643	564321	129794	183788
	Hardwood	...	501591	905372	264943	375158
1983-84	Teak	...	327948	591946	134923	191051
	Hardwood	...	449752	811802	233068	330024
1984-85	Teak	...	296069	534405	122118	172919
(P. Actual)	Hardwood	...	433941	783263	229805	325404
1985-86	Teak	...	293000	528865	117200	165955
(Target)	Hardwood	...	608520	1098379	334685	473914

1 Cubic ton of Log = 1.805 M^3

1 Cubic ton of Sawn timber = 1.416 M^3

(c) Export

Particulars	Volume			Value (Kyats in Thousand)
1	2			3
1981-82			**333966 M³**	**809820**
Teak Log ...	Hoppus ton ...	71739	129489 M³	387170
Hardwood Log ...	Hoppus ton ...	56299	101620 M³	62360
Teak Conversion ...	Sawn ton ...	72639	102857 M³	356310
Hardwood Conversion ...	Sawn ton ...	...	...	
Plywood, Veneer, Furniture Mosaic, Parquet and others.	Kyats (000) ...	...	...	3980
1982-83			**286693 M³**	**736373**
Teak Log	Hoppus ton ...	60820	109780 M³	340662
Hardwood Log ...	Hoppus ton ...	52918	95517 M³	63074
Teak Conversion ...	Sawn ton ...	57422	81310 M³	325578
Hardwood Conversion ...	Sawn ton ...	61	86 M³	328
Plywood, Veneer, Furniture Mosaic, Parquet and others.	Kyats (000) ...	...	...	6731
1983-84			**362583 M³**	**991688**
Teak Log ...	Hoppus ton...	112287	202678 M³	535040
Hardwood Log ...	Hoppus ton...	33320	60143 M³	54066
Teak Conversion ...	Sawn ton ...	69994	99111 M³	392019
Hardwood Conversion ...	Sawn ton ...	460	651 M³	1645
Plywood, Veneer, Furniture Mosaic, Parquet and others.	Kyats (000) ...	...		8918
1984-85 (P. Actual)			**345864 M³**	**1020401**
Teak Log ...	Hoppus ton....	120284	217113 M³	646886
Hardwood Log ...	Hoppus ton ...	23512	42439 M³	53242
Teak Conversion ...	Sawn ton ...	60602	85812 M³	315486
Hardwood Conversion	Sawn ton ...	353	500 M³	1001
Plywood, Veneer, Furniture Mosaic. Parquet and others.	Kyats (000) ...	...	...	3786
19856-86 (Target)			**445260 M³**	**1050000**
Teak Log ...	Hoppus-ton	110000	198550 M³	518600
Hardwood Log ...	Hoppus-ton	70000	126350 M³	84000
Teak Conversion ...	Sawn-ton	80000	113280 M³	407400
Hardwood Conversion	Sawn-ton	5000	7080 M³	10000
Plywood, Veneer, Furniture Mosaic, Parqust and Others.	Kyats (000)			30000

M³ = Cubic Metres.

(d) Local Sale

Particulars	Volume		Value (Kyats in Thousand)
1	2		3
1981-82		**589379 M^3**	**369324**
Teak Log	Hoppus ton ... 16168	29183 M^3	5696
Hardwood Log ...	Hoppus ton ... 50016	90279 M^3	8176
Teak Conversion ...	Sawn ton ... 66432	94068 M^3	87550
Hardwood Conversion ...	Sawn ton ... 265430	375849 M^3	214835
Plywood, Veneer, Furniture Mosaic, Parquet and others.	Kyats (000)	...	53067
1982-83		**618718 M^3**	**373609**
Teak Log	Hoppus ton ... 10977	19813 M^3	3819
Hardwood Log ...	Hoppus ton ... 52447	94667 M^3	9120
Teak Conversion ...	Sawn ton ... 89743	127076 M^3	100565
Hardwood Conversion ...	Sawn ton ... 266357	377162 M^3	208295
Plywood, Veneer, Furniture Mosaic, Parquet and others.	Kyats (000)	...	51810
1983-84		**506456 M^3**	**348912**
Teak Log ...	Hoppus ton ... 5493	9915 M^3	3185
Hardwood Log ...	Hoppus ton ... 29100	52525 M^3	4419
Teak Conversion ...	Sawn ton ... 73431	103978 M^3	101947
Hardwood Conversion ...	Sawn ton ... 240140	340038 M^3	193113
Plywood, Veneer, Furniture Mosaic, Parquet and others.	Kyats (000)	...	46248
1984-85 (P. Actual)		**460802 M^3**	**356750**
Teak Log ...	Hoppus ton ... 5266	9505 M^3	1999
Hardwood Log ...	Hoppus ton ... 29312	52908 M^3	6361
Teak Conversion ...	Sawn ton ... 61132	86563 M^3	86864
Hardwood Conversion ...	Sawn ton ... 220216	311826 M^3	197692
Plywood, Veneer, Furniture Mosaic, Parquet and others.	Kyats (000)	...	63834
198586 (Target)		**662936 M^3**	**440650**
Teak Log	Hoppus-ton 13000	23465 M^3	9685
Hardwood Log ...	Hoppus-ton 60000	108300 M^3	14540
Teak Conversion ...	Sawn-ton 55700	78871 M^3	102170
Hardwood Conversion	Sawnton 319421	452300 M^3	248161
Plywood, Venee, Furniture, Mosaic Parquet and others.	Kyats (000)		66094

M^3 = Cubic Metres.

Types of Forest

Types of Forest	Extent in percentage
1. Tidal	4
2. Beach and dune forest	
3. Swamp forest	
4. Evergreen forest	16
5. Mixed deciduous forest	39
6. Dry forest	10
7. Indaing forest (Dipterocarp.)	5
8. Hill forest	26
Total =	100

The forest policy :

(a) To assure continuity of adequate supply of forest products for local use and export.

(b) To increase forest plantation programme and to harvest, using latest technology.

(c) To coordinate and cooperate in the area of land use for optimum production.

In order to achieve the above-mentioned objectives of the forest policy, the following guidn lines were being laid down as long-term programme, by the Burma Socialist programme Party.

(a) Shifting cultivation, the major cause of Forest destruction, be replaced by terrace cultivation where ever possible through systamtic education.

(b) To step up the establishment of forest plantations, conservation of forests and expansion of reserved forest areas.

(c) To speed up the transportation of logs in source of extraction, neap logs and logs at main river depots and mills.

(d) To encourage the participation of the co-operative societies in forest conservation works, felling, extraction and rafting of timber.

(e) To increase the formation of the village forest plantations using fast growing species for local use and establishment of the industrial plantation for export market.

(f) Forest regeneration and conservation works should be done, giving priority to the Dry Zone area.

(g) Formation of Forest Plantation introducing selected valuable species for both domestic consumption and export market.

Production of Timber. The production of teak and hardwood by ownership is shown in the table below.

Production of Teak and Hardwood by Ownership

(Cubic ton)

Serial No.	Year	State		Private*		Total	
		Teak	Hardwood	Teak	Hardwood	Teak	Hardwood
1	2	3	4	5	6	7	8
1	1939/40			446730	478217	446730	478217
2	1947/48			259546	389108	259546	389108
3	1961/62	250185		12176	916008	262361	916008
4	1964/65	285600	594499		243000	285600	837499
5	1967/68	295964	614513		282000	295964	896513
6	1968/69	301249	613724		296000	301249	909724
7	1969/70	300519	612243		300000	300519	912243
8	1970/71	362099	622023		306000	362099	928023
9	1971/72	291247	716416		322000	291247	1038416
10	1972/73	307436	670074		337000	307436	1007074
11	1973/74	201312	447492		347000	201312	794492
12	1974/75	257806	501869		364000	257806	865869
13	1975/76	236834	381967		402000	236834	783967
14	1976/77	280177	360617		418484	280177	779101
15	1977/78	316209	368060		444450	316209	812510
16	1978/79	375584	480099		599640	375584	1079739
17	1979/80	394242	679310		452779	394242	1132089
18	1980/81	401332	682333		459654	401332	1141987
19	1981/82	435592	579858		498260	435592	1078118
20	1982/83	422784	569249		547803	422784	1117052
21	1983/84	366476	449163		534045	366476	983208
22	1984/85 (Provisional actual)	384416	572137		564450	384416	1136587
23	1985/86 (Provisional)	410000	700000		597820	410000	1297820

*Includes personal use.

Production of Fuelwood and Charcoal for the last 10 years

(1976-77 to 1985-86)

(From Report of the Pyithu Hluttaw 1986-87)

Year (1)	Fuelwood (Cubic tons) (2)	Charcoal (Cubic tons) (3)
1976-77	11,337,000	381,000
1977-78	11,678,000	378,000
1978-79	12,452,000	640,000
1979-80	12,545,000	529,000
1980-81	13,049,000	508,000
1981-82	13,608,000	617,000
1982-83	14,334,000	755,000
1983-84	15,045,000	719,000
1984-85 (Provisional Actual)	15,854,000	795,000
1985-86 (Provisional)	16,900,000	781,000

Production amount and price of charcoal and Fuelwood

for the past ten years

(Commercial)

Serial No. (1)	Year (2)	Fuelwood		Charcoal	
		Amount (Cubic ton in thousand) (3)	Price per 100 pieces (Kyats) (4)	Amount (Cubic ton in thousand) (5)	Price per bag (Kyats) (6)
1	1976-77	514	-	381	-
2	1977-78	487	-	378	-
3	1978-79	813	21.77	640	20.64
4	1979-80	440	23.17	529	22.78
5	1980-81	460	23.12	508	23.15
6	1981-82	516	24.76	617	25.59
7	1982-83	522	25.26	765	24.30
8	1983-84	473	25.39	719	24.01
9	1984-85	481	25.50	793	23.92
10	1985-86	681	25.90	781	24.87

Note:- Retail prices of selected commodities at Rangoon - Abstract from Selected Monthly Economic Indicators published by Central Statistical Organization, Rangoon (1983) and (1986).

Present situation of forestry for rural areas

Situation of forestry in rural areas is good in sparsely populated regions, but there is short of supply of small timber and fuelwood in densely populated regions. Current forest act allows the villagers to cut posts, poles and fuelwood of unreserved species in the unclassed forests within 20 miles of the village for domestic use.

Present situation of the dendro-energy

Demand for dendro-energy is high especially in the densely populated regions both for rural community and urban workers. There is steady increase in price due to the increase in demand and increase in transportation cost.

Present situation of agro-forestry

Proper technique of agro-forestry is still lacking except in areas where forest plantations are established allowing farmers to grow crops for the first and second year. There is shifting cultivation problem in the hilly regions and agro-forestry practice needs to be introduced urgently.

Existing forestry training facilities

There are two regular courses for the production of B.Sc.(Forestry) graduates and junior officers at the technical level by the faculty of forestry, Agriculture University, Yezin and Burma Forest School, Maymyo.

Special training courses namely Basic Forest Officer Course, Advanced Forest Officer Course and Forestry Induction Course are being held at the temporary training centres.

Forest Plantations Established Starting from Second Four-Year Economic Plan

(Acres)

Year (1)	Commercial		Others types of plantation (4)	Total (5)
	Teak (2)	Other Species (3)		
1974	2274	148	4865	7287
1975	2261	730	4769	7760
1976	2360	1000	4540	7900
1977	3430	1500	3895	8825
1978	4685	1000	5240	10925
1979	6403	1417	8928	16748
1980	15711	4671	15702	36084
1981	21145	6901	19119	47165
1982	25965	10272	23205	59442
1983	29183	11102	30676	70961
1984	29155	16597	33595	79347
1985	28550	13600	50750	92900 (37,597ha)

Forest Plantations Established During The Fourth Four-Year Economic Plan

(Acres)

Year (1)	Commercial			Fuel-wood (5)	Indus-trial (6)	Water-shed (7)	Wood-lot (8)	Total (9)
	Teak (2)	Pyinkado (3)	Others (4)					
1982	25965	5843	4429	8626	1300	8780	4499	59442
1983	29183	5434	5668	15407	1900	10634	2735	70961
1984	29155	9329	7268	17068	3541	9785	3201	79347
1985	28550	7950	5650	29975	6950	10450	3375	92900

Forest Plantations Established in 14 States and Divisions

(in 1982)

(Acres)

State/ Division (1)	Commercial			Fuel-wood (5)	Indus-trial (6)	Water-shed (7)	Wood-lot (8)	Total (9)
	Teak (2)	Pyin-kado (3)	Others (4)					
Kachin	300	100	-	-	-	-	-	400
Kayah	500	-	-	100	-	300	-	900
Karen	400	200	-	-	-	-	-	600
Chin	500	-	100	-	100	-	-	700
Sagaing	1395	2010	895	500	-	-	1000	5800
Tenasse-rim	-	400	100	-	-	-	-	500
Pegu	9813	1691	1137	-	300	-	-	12941
Magwe	3633	-	300	2655	-	1000	1300	8888
Mandalay	4950	137	1313	3100	300	2980	1600	14380
Mon	200	-	-	-	600	-	-	800
Rakhine	804	200	-	-	-	-	-	1004
Rangoon	1029	475	30	396	-	-	-	1930
Shan	1050	250	550	1450	-	4500	599	8399
Irrawaddy	1391	380	4	429	-	-	-	2200
Total	25965	5843	4429	8626	1300	8780	4499	59442

Forest Plantations Established in 14 States and Divisions

(in 1983)

(Acres)

State/ Division (1)	Commercial			Fuel-wood (5)	Indus-trial (6)	Water-shed (7)	Wood-lot (8)	Total (9)
	Teak (2)	Pyin-kado (3)	Others (4)					
Kachin	400	-	-	-	-	-	-	400
Kayah	500	-	-	100	-	400	-	1000
Karen	900	100	-	-	-	-	-	1000
Chin	500	-	100	100	100	-	-	800
Sagaing	2132	1337	1031	1170	-	-	330	6000
Tenasse-rim	-	500	100	-	-	-	-	600
Pegu	10484	2704	1451	1553	400	-	250	16842.
Magwe	3837	-	300	3594	-	1000	675	9406
Mandalay	4937	93	1411	4800	400	3484	830	15955
Mon	175	-	25	-	1000	-	-	1200
Rakhine	810	300	-	190	-	-	-	1300
Rangoon	1700	50	200	800	-	-	-	2750
Shan	1708	-	900	2200	-	5750	650	11208
Irrawaddy	1100	350	150	900	-	-	-	2500
Total	29183	5434	5568	15407	1900	10634	2736	70961

Forest Plantations Established in 14 States and Divisions

(in 1984)

(Acres)

State/ Division (1)	Commercial			Fuel-wood (5)	Indus-trial (6)	Water-shed (7)	Wood-lot (8)	Total (9)
	Teak (2)	Pyin-kado (3)	Others (4)					
Kachin	200	-	-	-	-	-	30	230
Kayah	-	-	-	100	-	500	200	800
Karen	600	400	-	-	-	-	-	1000
Chin	700	-	200	-	200	-	20	1120
Sagaing	1700	2575	802	900	-	185	500	6662
Tenasse-rim	-	400	200	-	-	-	50	650
Pegu	11439	4177	2575	2396	950	-	600	22117
Magwe	4295	100	500	3540	-	500	795	9730
Mandalay	5603	8	1341	4763	401	3600	347	16063
Mon	220	80	-	-	2010	-	40	2350
Rakhine	341	134	50	300	-	-	100	925
Rangoon	707	1105	-	1069	-	-	244	3125
Shan	2300	-	1600	2300	-	5000	175	11375
Irrawaddy	1050	350	-	1700	-	-	100	3200
Total	29155	9329	7268	17068	3541	9785	3201	79347

Forest Plantations Established in 14 States and Divisions

(in 1985)

(Acres)

State/ Division (1)	Commercial			Fuel-wood (5)	Indus-trial (6)	Water-shed (7)	Wood-lot (8)	Total (9)
	Teak (2)	Pyin-kado (3)	Others (4)					
Kachin	150	150	-	100	-	-	50	450
Kayah	-	-	-	200	-	500	50	750
Karen	-	-	-	-	-	-	50	50
Chin	1000	-	200	-	200	100	50	1550
Sagaing	1200	2750	1050	1400	-	500	800	7700
Tenasse-rim	-	400	200	-	-	-	50	650
Pegu	12100	3600	300	7650	1900	-	500	26050
Magwe	4000	200	300	3700	-	600	700	9500
Mandalay	7700	-	1200	5950	700	2700	550	18800
Mon	-	-	-	-	4000	-	50	4050
Rakhine	800	400	-	-	-	-	100	1300
Rangoon	-	-	-	7000	-	-	250	7250
Shan	500	-	2400	2575	-	6050	125	11650
Irrawaddy	1100	450	-	1400	150	-	50	3150
T o t a l	28550	7950	5650	29975	6950	10450	3375	92900

Forest plantations targets for the fifth four-year Economic Plan

(Acres)

Serial No.	Year	Commercial	Fuelwood	Industrial	Watershed	Total
1	2	3	4	5	6	7
1	1986	44200	21100	8300	6400	80000
2	1987	40000	20000	12000	8000	80000
3	1988	40000	20000	12000	8000	80000
4	1989	40000	20000	12000	8000	80000

Types of forest plantations and species used

In accordance with specific objectives, forest plantations are classified into 4 main types at present. It includes:

(a) Commercial plantation for export and internal consumption with such high - value species as Teak (Tectona grandis), Pyinkado (Xylia dolabriformis) and Padauk (Pterocarpus macrocarpus).

(b) Village supply plantation for fuelwood, post and poles with such fast growing species like Mezali (Cassia siamea), Sit (Albizzia procera), Bawzakaing (Leucaena leucocephala), Sha (Acacia catechu) and Paukpanpyu (Sesbania grandiflora).

(c) Industrial plantation for the paper mills with fast growing species like Eucalypts (E. camaldulensis and E. grandis) and Htinshu (Pinus kesiya).

(d) Watershed plantation for soil conservation in major watershed areas of dams and reservoirs constructed by the Irrigation Department.

Total Areas of Plantations Ending March 1986

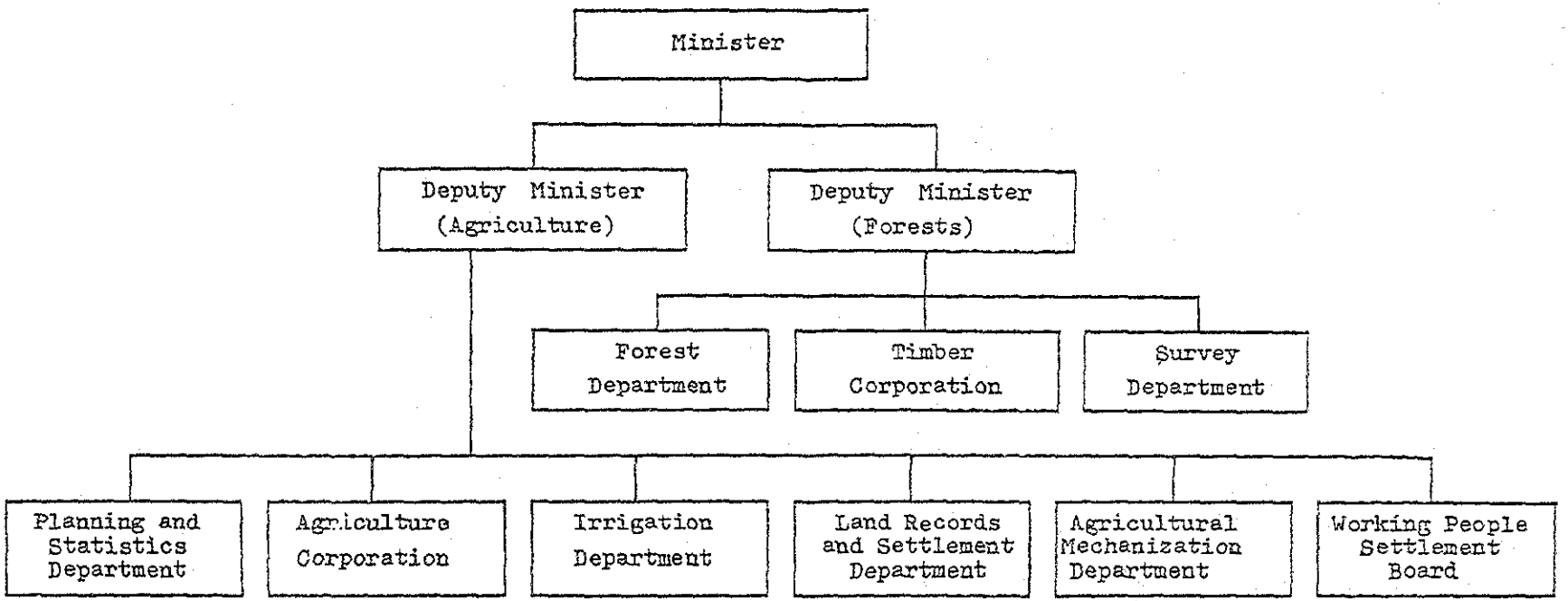
	Area in acres (in thousand)
Teak	317
Other Hardwoods	325
Total =	642

Total number of seedlings produced during the Fourth Four-Year Plan

(number in lakh)

Serial No. (1)	Year (2)	Commercial		Fuel-wood (5)	Industrial (6)	Water-shed (7)	Wood-lot (8)	Seedlings for distribution (9)	Total (10)
		Teak (3)	Others (4)						
1	1982	124	55	27	6	19	5	34	270
2	1983	185	70	54	11	22	8	34	384
3	1984	184	108	78	20	21	11	34	456
4	1985	170	122	200	45	22	9	45	613

Organization of Ministry of Agriculture and Forests



Activities of Forest Department and Timber Corporation

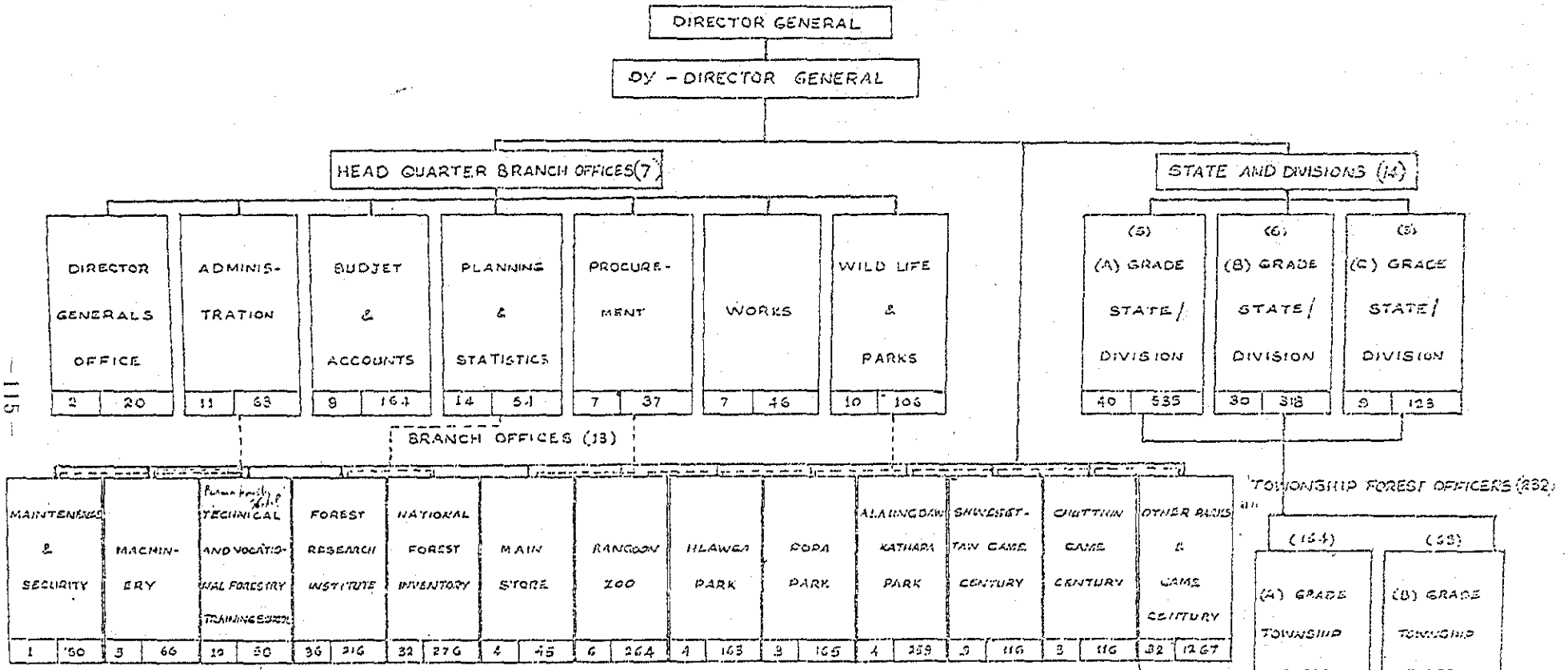
According to the present set up of institutions in the forestry sector, Forest Department and Timber Corporation are 2 main agencies responsible for the management and utilization of the forests.

Forest Department is mainly responsible for the establishment of forest plantations and management of all forest resources of the country. Normal activities include girdling of teak trees, selection marking of other hardwood trees, formation of various types of plantations, carrying out the cultural operation for timber standing improvement and protecting against all kinds of forest enemies such as forest fire, insects, etc. In other words, the Forest Department looks after the forest resources like a custodian from seed to tree stage.

Besides the Forest Department, Timber Corporation is another major institution, being responsible for extraction, milling and marketing of both teak and other hardwoods.

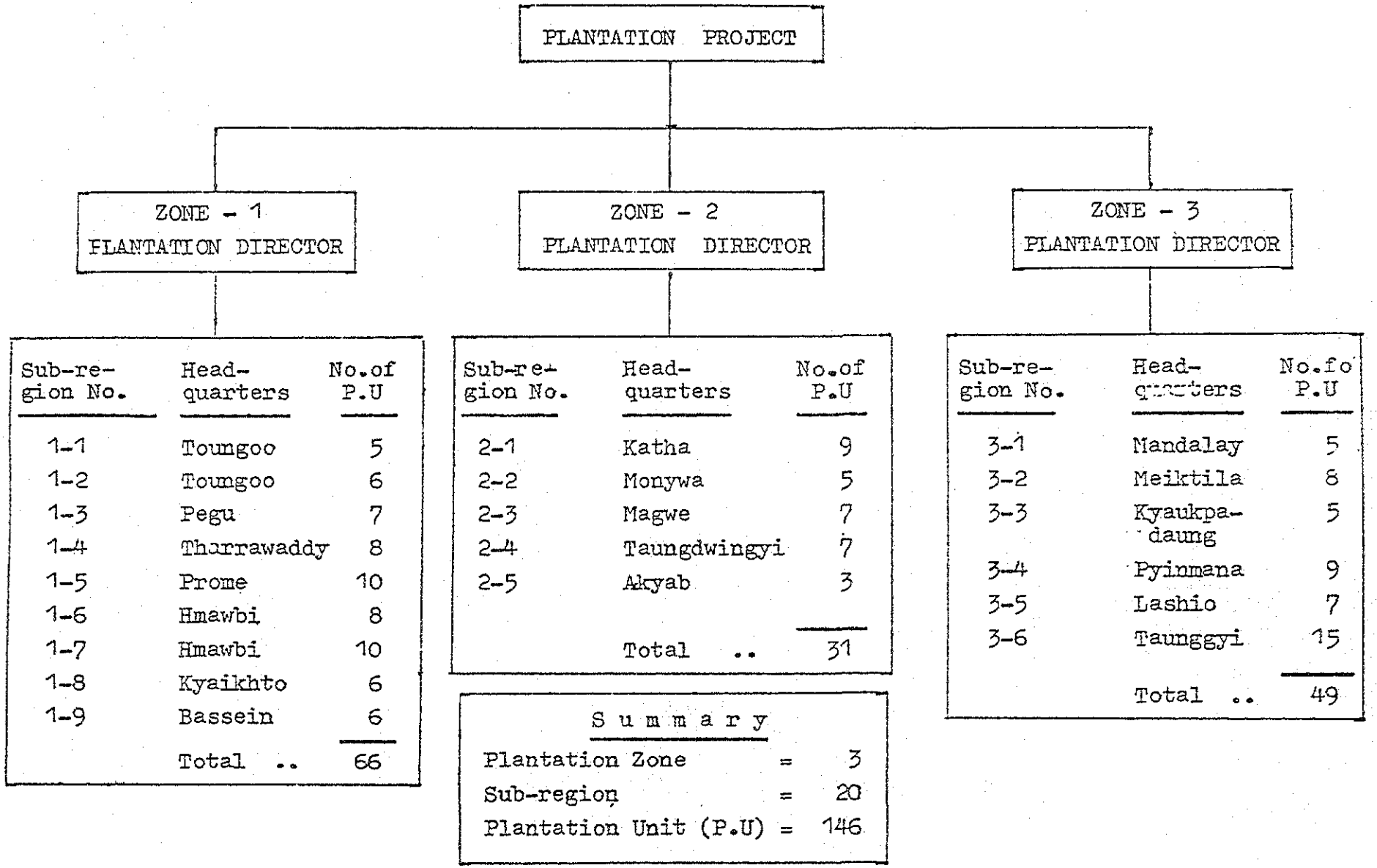
FOREST DEPARTMENT

PROPOSED ORGANIZATION CHART OF FOREST DEPARTMENT



SUMMARY

	OFFICER	OTHERS	TOTAL
HEAD QUATER	62	490	552
BRANCH OFFICES	141	3061	3202
STATE AND DIVISIONS	79	976	1055
TOWNSHIP FOREST	164	9778	9942
TOTAL	446	14305	14751



Sub-region No.	Head-quarters	No.of P.U
1-1	Toungoo	5
1-2	Toungoo	6
1-3	Pegu	7
1-4	Tharrawaddy	8
1-5	Prome	10
1-6	Hmawbi	8
1-7	Hmawbi	10
1-8	Kyaikhto	6
1-9	Bassein	6
	Total ..	66

Sub-region No.	Head-quarters	No.of P.U
2-1	Katha	9
2-2	Monywa	5
2-3	Magwe	7
2-4	Taungdwingyi	7
2-5	Akyab	3
	Total ..	31

Sub-region No.	Head-quarters	No.fo P.U
3-1	Mandalay	5
3-2	Meiktila	8
3-3	Kyaukpa-daung	5
3-4	Pyinmana	9
3-5	Lashio	7
3-6	Taunggyi	15
	Total ..	49

Summary

Plantation Zone	=	3
Sub-region	=	20
Plantation Unit (P.U)	=	146

Plantation Project Area

Plantation Zone (1)

(1)	Tenasserim	Division
(2)	Pegu	"
(3)	Mon	State
(4)	Rangoon	Division
(5)	Irrawaddy	"

Plantation Zone (2)

(6)	Karen	State
(7)	Chin	"
(8)	Sagaing	Division
(9)	Magwe	"
(10)	Rakhine	State

Plantation Zone (3)

(11)	Kachin	State
(12)	Kayah	"
(13)	Mandalay	Division
(14)	Shan	State

Seed and Seedling Centre, Hmawbi

1. Name - Seed and seedling centre, Hmawbi.

2. Location - It is situated in the compartment No.31, Hmawbi reserved forest and 35 miles away from Rangoon. It lies besides the Rangoon Prome Road.

Hmawbi reserved forest area is totally 1843 acres (737.2) H.A and it was reserved since 1875.

3. History - The nursery has been established in 1963-64 as silviculture section and intend to produce and distribute of teak seedlings and stumps and also experimented not only the indigenous tree species but also exotic as experimental plantation.

In 1984-85 forest Department is forming this as one of the seed and seedling centres to provide seeds and seedlings of good quality adequately to the plantations and other essential areas.

4. Organization - Present organization of the seed and seedling centre, Hmawbi is

(1) 1 senior officer (Senior Plantation Assistant/Assistant Director)

(2) 1 junior officer (Junior Plantation Assistant)

(3) 10 Foresters

and daily labourers according to the seasonal workload.

5. Major Objectives - This Centre has (5) major objectives:

(1) To serve as a Seed Centre for Collection, storage, testing and distribution of seeds of high value species and fast growing species.

(2) To explore the forests of Rangoon Division, Pegu Division and Irrawaddy Division for good seed stands and to maintain Seed Production Areas.

(3) To produce seedlings of various sizes, covering both native and exotic species for planting out in the nearby reserved forests and at public centres in the major cities in the form of instant trees.

(4) To serve as a Forestry Extension Centre to make the people tree-conciôus.

(5) To establish small woodlots and experimental plantations in Hmawbi Reserved Forests.

6. Activities - (a) Forming of Forest plantation as experimental plot both native and exotic species.

(b) Forming of seed producted area in Taikkyi Township and Okkan reserved forest for teak and pyinkado.

(c) Collection and distribution of seeds. Including the testing, rehydration, storaging.

(d) Production and distribution of seedlings.

(e) Protection the Hmawbi reserved forest and aim to extend plantation area to cover the whole reserved.

7. Budget -

Year	Current	Capital	Total
1982-83	550000.00	110000.00	660000.00
1983-84	594721.41	160000.00	754721.41
1984-85	550438.88	-	550438.88
1985-86	668585.35	328830.00	997415.35
Total	2363745.64	598830.00	2962575.64

8. Electrical - The power of electricity now using at nursery site is 25 K.V.A 11/0.4 K.V /400 Volts. and the township electricity is 33 K.V / 11.

9. Telephone - Just only trunk call and auto - dial system can be used only in exchange.

10. Water Supply - Tube well.

Seed and Seedling Centre, Mon-ywa

1. Name - Seed and Seedling Centre, Mon-ywa

2. Location and Area - Mon-ywa Township, Sagaing Division
50.25 ac. (20.1 ha.)

3. Orgainization - Assistant Director = 1
Plantation Assistant = 2
Supervisor = 1
Forester = 6

4. Activities - I. Collection and distribution of seeds
II. Producing and distribution of seedlings
III. Testing the germination of seeds
IV. Forming the species trial plots
V. Producing and distribution of stumps

Seed and Seedling Centre, Pa-thein-gyi

1. Name - Seed and Seedling Centre, Pa-thein-gyi

2. Location and Area - Pa-thein-gyi Township, Mandalay Division
31 ac. (12.4 ha.)

3. Organization - Assistant Director = 1
Plantation Assistant = 1
Supervisor = 2
Upper Division Clerk = 1
Forester = 8
Tractor Driver = 1

4. Activities - I. Collection and distribution of seeds
II. Producing and distribution of seedlings
III. Testing the germination of seeds

Seed and Seedling Centre, Ma-gwe

1. Name - Seed and Seedling Centre, Magwe Division

2. Location and Area - Magwe Township, Magwe Division
   7.18 ac. (2.87 ha.)

3. Organization - Assistant Director = 1
   Plantation Assistant = 1
   Forester = 5
   Driver Grade (2) = 1

4. Activities - I. Collection and distribution of seeds
   II. Producing and distribution of seedlings
   III. Testing the germination of seeds
   IV. Forming the species trial plots

Seed and Seedling Centre, Shwe-taung

1. Name - Seed and Seedling Centre, Shwe-taung

2. Location and Area - Shwe-taung Township, Pegu Division
   - 27.5 ac. (11 ha.)

3. Organization - Assistant Director = 1
   Plantation Assistant = 1
   Upper Division Clerk = 1
   Forester = 9
   Watchman = 1

4. Activities - I. Collection and distribution of seeds
   II Producing and distribution of seedlings
   III. Testing the germination of seeds
   IV. Forming the species trial plots
   V. Producing and distribution of stumps

Seed and Seedling Centre, Oak-twin

1. Name - Seed and Seedling Centre, Oak-twin

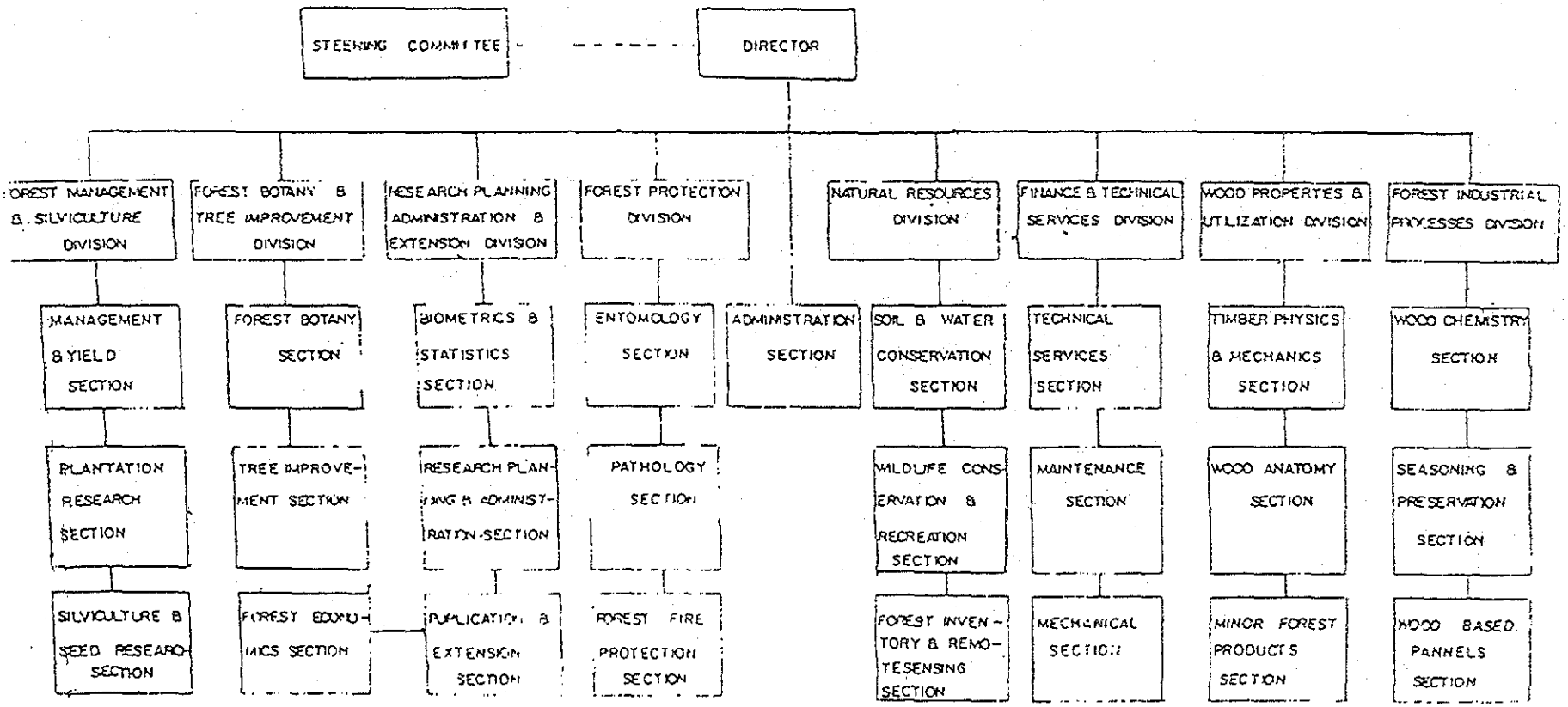
2. Location and Area - Oak-twin Township, Pegu Division
310 ac. (124 ha.)

3. Organization - Assistant Director = 1
Plantation Assistant = 3
Forester = 7

4. Activities - I. Collection and distribution of seeds
II. Producing and distribution of seedlings
III. Testing the germination of seeds
IV. Forming the species trial plots
V. Producing and distribution of stumps
VI. Planting trees for shade, woodlots and wind-brakes.
VII. Establish the seed production areas
VIII. Forming the seed orchards

Appendix (A)

FOREST RESEARCH INSTITUTE (PHASE II) ORGANIZATION CHART



Forestry Research Facilities

1. Name - Forest Research Institute.

2. Location - Yezin, Pyinmana Township, Mandalay Division.

3. History - In 1952 an agreement was reached between the Burma Economic aid Committee and the United States Technical Cooperation Agency to provide on economic and technical aid for forestry and training, resulting in the acquisition of equipment and technical services. In the following years of 1952, attempts were made to obtain assistance from FAO and other agencies for the development of a Forest Research Institute with no positive results. In 1963 a sub-committee for the development of the Forest Research Institute was formed which resulted in the initial planning for the construction of the Forest Research Institute at Yezin. The construction of building complex for the Institute began soon after an agreement was reached between the Burma Government and FAO in 1974. This then resulted in the execution of a project of four years duration starting in 1978. The project document made provisions for assistance by the FAO for the procurement of equipments, facilities for training and consultancies, while the Burma Government was to provide fund for the construction of buildings, and personnel to run the Institute.

The first phase of this project ended in 1983, and a further negotiation between the FAO and the Burma Government resulted in the commencement of the second phase of four years, which had started in June 1983.

The second phase project document had also made provisions for the procurement of equipments consultancies and training facilities.The Burma Government was to supply fund for the construction of needed residential and other buildings and provide personnel for research and support activities.

4. Organization and Staff - (a) Organization Chart, see appendix (A).

(b) Staff -

Rank	Pay Scale (Kyats)	Number
(1) Director	1300/-	1
(2) Head of Division	1000-50-1200/-	8
(3) Senior Research Officers	800-40-1000/-	6
(4) Junior Research Officers	450-25-700/-	18
(5) Other Officers	450-25-700/-	2
(6) Other Staffs	-	192
	Total Staff =	227

5. Facilities -(a)Laboratories: The following research laboratories are inside the F.R.I. campus.

(1) Wood Anatomy
(2) Timber Physics and Mechanics
(3) Forest Soils
(4) Forest Entomology
(5) Tree Improvement (Tissue Culture)
(6) Seed
(7) Pathology
(8) Inventory and Remote Sensing
(9) Biometrics and Statistics
(10)Wood Chemistry
(11)Wood Preservation
(12)Wood Industrial Processes.

(b) Others: The institute had a computer equipped Statistics and Biometrics processing facility which analyses data for the activities of the whole institute. A library with microfiche readers, a herbarium, a saw mill, a central store depot, and an electrical generator are some of the facilities available which greatly help in the execution of research activities.

There is a nursery school, an out patient dispensary, a cooperative society, a golf course, a tennis court, a football field and facilities for various sports.

6. Activities - (a) Research Stations: At present there are five research stations as follows -

(1) Petsut in Katha Township
(2) Sanpwint in Kyaukpadaung Township
(3) Taunglelon in Taunggyi Township
(4) Moswe in Pyinmana Township
(5) Ahmatgyigon in Yedashe Township

Another research station in Bogalay Township is under construction.

(b) Research Works : The Institute had completed research works as follows -

(1) Number of research projects completed: 64
(2) Number of research paper produced: 66
(3) Number of Technical Documents produced 23

Forestry Training Facilities

1. Name - Burma Forest School.

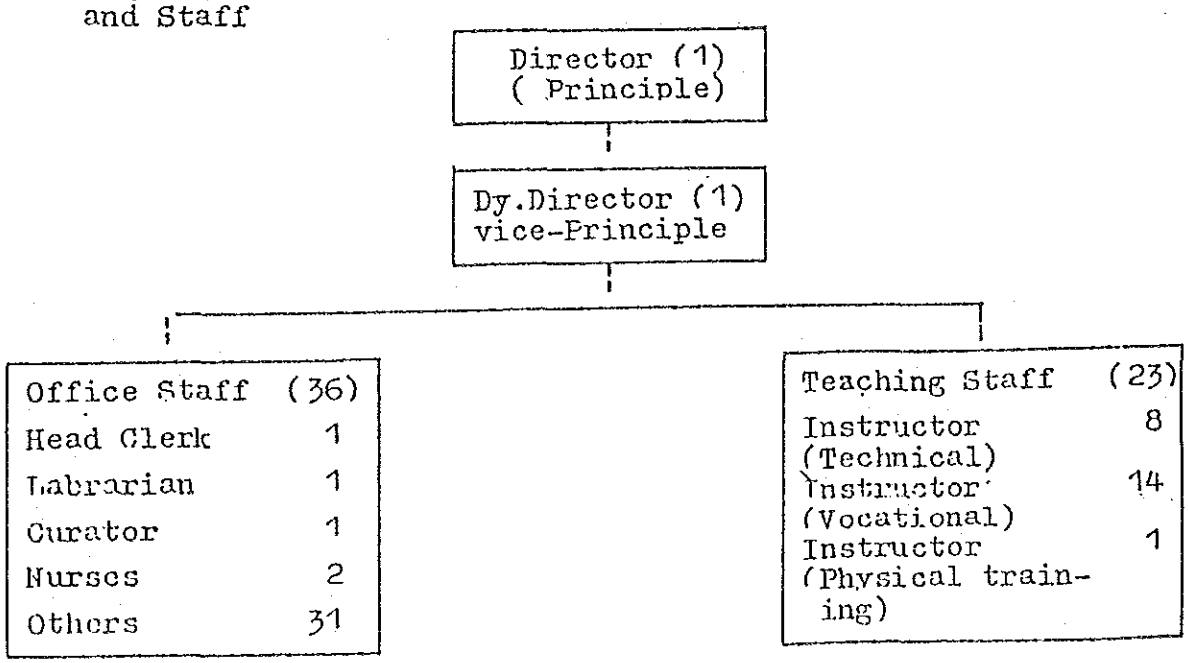
2. Location - Maymyo, Mandaly Division.

3. History - The Burma Forest School is the only training institution conducting course in forestry at the technical level. The school was first established in 1898 at Tharrawaddy and then moved to Pyinmana in 1910. After the second world war, it was re-opened at Insein in 1950, but shifted again to the present site in Maymyo in 1953.

   Previously the school has conducted two grades of classes namely the Senior grade for Rangers and the Junior grade for Deputy Rangers. Duration of both courses is two years. From the year 1984 , to cope with ,the new situation the training programme was expanded to provide three levels of training as follows :

   1. Forestry Induction Course (8 weeks)
   2. Technical Course (2 years)
   3. Basic Forest Officers Course (8 weeks)

4. Organization and Staff



5. Annual Burdget (Current expenditure)

Salaries	=	0.43	Million Kyats
Travelling	=	0.30	" "
Training	=	0.20	" "
Maintenance	=	0.31	" "
Wages	=	0.25	" "
Material	=	0.20	" "
Others	=	0.30	" "
Total	=	1.99	Million Kyats

6. Activities

A. Number of staff graduated from 1898-1984 -

Period	Senior Course	Junior Course	Total
1898-1910	56	82	138
1911-1942	171	460	631
1945-1968	197	515	712
1969-1984	107	473	580
Total	531	1530	2061

B. Number of staff completed the training courses during 1984 to 1986

Name of Course	Duration	Nos. of times	Nos. of trainees
1. Technical level	2 yrs	1	100
2. Forestry Induction	8 weeks	7	1363
3. Instructor training	3 "	2	24
4. Basic Forest Officer	8 "	3	219
5. Advance Forest Officer	12 "	2	159

7. Training programme for 1986-87

Name of Course	Duration	Nos.of times	Nos. of Trainees
1. Technical level	2 yrs.	2nd yr.	100
2. Technical level	2 "	1st yr.	100
3.Forestry Induction	8 weeks	4	800
4. Basic Forest Officer	8 "	1	120
5. Advance Forest Officer	12 "	1	100

8 Technical Level Subject Groups

The subjects offered are organized into 5 groups each of which has a number of closely related subjects.

(1) GENERAL
1. Political Science
2. English
3. First Aid

(2) FOREST BIOLOGY
1. Forest Botany
2. Forest Ecology
3. Geology and Soil Science

(3) FOREST SCIENCE
1. Silviculture
2. Forest Mensuration
3. Forest Management
4. Forest Utilization
5. Forest Economics
6. Forest Protection
7. Agro-Forestry & Local Community Development

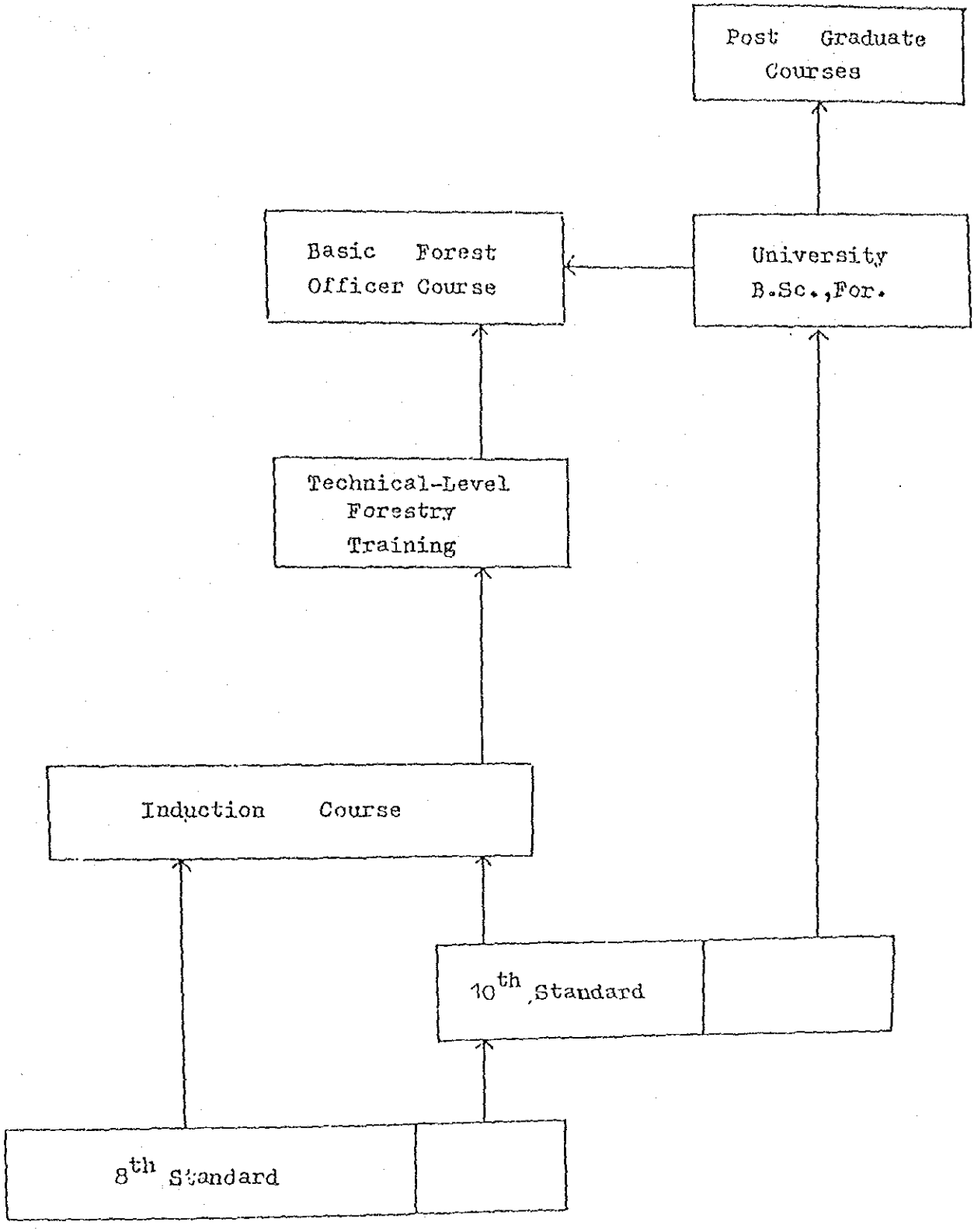
(4) FOREST ENGINEERING
1. Survey and Drawing
2. Forest Engineering
3.

(5) FOREST ADMINISTRATION
1. Forest Policy and Law
2. Forest Department Organization and Office Procedures
3. Organization, Management, Planning and Extension Methods.

9 Technical Level Forestry Training Allocation of Time (Hours) for Individual Subjects Lectures

Serial No. (1)	SUBJECT (2)	1st Year			2nd Year			GRAND TOTAL (9)
		1st SEM (3)	2nd SEM (4)	Total (5)	1st (6)	2nd (7)	Total (8)	
1	Political Science	36	-	36	20	-	20	56
2	English	40	8	48	40	4	44	92
3	Botany	38	8	46	40	6	46	92
4	Ecology	-	-	-	40	4	44	44
5	Geology/Soils	38	14	52	-	-	-	52
6	Silviculture	38	14	52	40	-	40	92
7	Mensuration	57	5	62	-	-	-	62
8	Forest Management	19	7	26	40	8	48	74
9	Utilization	19	8	27	19	-	19	46
10	Economics	38	6	44	-	-	-	44
11	Protection	38	6	44	20	16	36	80
12	Agro-Forestry	-	-	-	20	32	52	52
13	Survey/Drawing	38	12	50	20	-	20	70
14	Engineering	19	4	23	60	11	71	94
15	Policy/Law	-	-	-	40	12	52	52
16	Organization	19	4	23	40	7	47	70
17	Management/Planning	38	2	40	40	-	40	80
18	First Aid	-	-	-	20	-	20	20
19	Reserve	-	2	2	1	-	1	3
	T o t a l	475	100	575	500	100	600	1175

10 TRAINING PROGRAMME



Statement Showing the Sanctioned Strength of the Forest Department

A.	**Professional Staff**	
1.	Director General	1
2.	Deputy Director General	1
3.	Director	14
4.	Deputy Director (Grade 1)	26
5.	Deputy Director (Grade 2) - Plantation Deputy Director	88
6.	Assistant Director (Grade 1)	13
7.	Assistant Director (Grade 2)- Plantation Officer	303
	Sub-total	446
8.	Township Forest Officer (Category)- Plantation Officer	758
9.	Deputy Township Forest Officer (Category)- Supervisor, Plantation Assistant	2249
10.	Deputy Supervisors	4468
11.	Forester / Forest Guard	928
	Sub-total	8403
	Professional Staff Total	8849
B.	Other Support	5902
	GRAND TOTAL =	14751

Classification of the Professional Staff of the Forest Department

Serial No. (1)	Rank (2)	After-graduate (3)	B.F.S. (4)	Others (5)	Total (6)
1	Director General	1	-	-	1
2	Dy. Director General	1	-	-	1
3	Director	14	-	-	14
4	Dy. Director	113	1	-	114
5	Assistant Director				
(a)	Assistant Director (Grade 1)	13	-	-	13
(b)	Assistant Director (Grade 2)	139	-	-	139
(c)	Township Forest Officer (Grade A)	124	40	-	164
6	Township Forest Officer (Grade B)/ Plantation Officer	442	316	-	758
7	Supervisor				
(a)	Township Forest Office	-	755	294	1049
(b)	Plantation Unit	-	1200	-	1200
8	Dy. Supervisor				
(a)	Township Forest Office	-	1768	600	2368
(b)	Plantation Unit	-	1600	500	2100
9	Forester				
(a)	Township Forest Office	-	-	928	928
(b)	Plantation Unit	-	-	-	-
Total		847	5680	2322	8849

Royalty and Expenditure of Forest Department

(Kyats in thousand)

Year (1)	Royalty (2)	Expenditure		
		Current (3)	Capital (4)	Total (5)
1975-76	65284	22551	4208	26759
1976-77	42793	29132	5060	34192
1977-78	69849	32891	2958	35849
1978-79	96732	33870	16808	50678
1979-80	70937	43373	27095	70468
1980-81	89408	52562	23026	75588
1981-82	101206	61353	34928	96281
1982-83	84582	64478	66998	131476
1983-84	151732	65928	69496	135424
1984-85	141992	80755	67233	147988
1985-86	99545	92286	70533	162819

Note:- 1. Royalty received for the production of teak and other timbers

2. Current expenditure includes salaries, cost of travel, labour wages, materials, etc.

3. Capital expenditure includes building, machinery, vehicle, plantation cost and project cost, etc.

Source:- Budget and Accounts, Forest Department.

On-going Forestry Projects

1. National Forest Survey and Inventory Project

Investment	-	UNDP Aid = 4.03 million US
Implementation-period		1981 to 1986
Objective	-	To get fresh information about the condition of the forests over the entire country which is essential in planning many aspects of forestry.
Output	-	Ground survey will cover about 26.7 million acres of economically important forests of the country and aerial photography about 75 million acres.

2. Asian Development Bank, Second Forestry Project (Plantation Component)

Investment	-	ADB Loan = 2.3 million US $
Implementation-period		1982 to 1988
Objective	-	To provide better supply of sawn wood in the domestic market and increase the export of surplus logs and sawn timber.
Output	-	15,500 acres of teak plantation and 6,500 acres of pine plantation will be established.

3. Strengthening the Forest Research Institute

Investment	-	UNDP grant = 1.45 million US$
Implementation-period		1983 to 1987
Objective	-	To provide technical services and information on a variety of forestry aspects

whereby the conserve, use and further develop the forest resources of Burma for the welfare of the nation.

Output - Better use of lesser known species
- Research into the most suitable raw material required by the wood-based industries.
- Improve techniques of raising plantation.
- More efficient methods of managing valuable natural forest for sustained production.

4. Technical and Vocational Forestry Training Project.

Investment - UNDP grant = 0.38 million US $ = 60.800 ~~40~~

Implementation-period - 1983 to 1986

Objective. - To review, recoguisn and extend the existing training programmes and facilities of technical and vocational of Forest Department and provide the training to meet the trained manpower requirement of organization.

Output - Trained personnel of Forest Department in
(1) Forest Induction course (8 weeks)
(2) Technical course (2 years)
(3) Basic Forest Officers course (8 weeks)

The existing computer and the maker, capacity and how utilized it is -

The specifications of the computer

Model	Maker	Capicity	Utilization
VAX 11-750	Digital USA	32 - bit 3 mb	Processing of Inventory data

The softwares of the computer

(1) Fortran compiler
(2) Cobol compiler and
(3) GLIM Package.

Staffs to existing computer

Seven senior officers and thirty nine other technical staffs.

Training system of computer

Some of the staffs are sent to Universities computer centre to undergo regular basic training and diploma courses on data processing. A short courses on basic computer sciences, programming, algorithm studies and the statistical analyses are also given to the technical staff from time to time.

Statistics of existing computer utilization

The computer is fully utilized in the processing to the backlog of field inventory data collected during 1981-82 to 1985-86.

Number of trainees of the past courses up to November 1986

Regular Courses

Course No.	Year	No. of trainees	Remarks
A. Basic Forest Officer			
1	1984 (8 weeks)	50	Average 90 p.c.
2	1985 (8 weeks)	101	
3	1986 (8 weeks)	120	
B. Advanced Forest Officer			
1	1984 (12 weeks)	56	Average 92 p.c.
2	1985 (12 weeks)	100	
3	1986 (12 weeks)	120	
C. Forestry in duction			
1st. to 9th. Courses		1790	
Average per course (p.c.)		199	

Establishment of the Central Forestry Development Training Centre Project

Name of training course	Level of trainees	Duration (weeks)	Number of trainees per batch	Number of courses per year	Total number of trainees per year
1	2	3	4	5	6
1. In-service training courses					
A. Regular courses					
(1) Basic forest officer course	B.Sc.(For.) new recruits	8	50	1	50
(2) Advanced forest officer course	T.F.O./Dy. TFO/PO/PA	12	50	2	100
(3) Forestry induction course	Dy. Supervisors and Foresters	8	100	2	200
B. Special courses					
(1) Plantation techniques	T.F.O./Dy. T.F.O.,PO & PA	8	50	2	100
(2) Nursery practices	-"-	4	30	2	60
(3) Forest protection	PA & Supervisors	6	30	2	60
(4) Forest roads	- -	4	30	2	60
(5) Forestry machinery	T.F.O./Dy. T.F.O., PO & PA	8	20	2	40
(6) Forestry extension & utilization	Dy.T.F.O. & Supervisors	8	50	2	100
(7) Forest resource administration	Dy.Director	2	15	2	30
2. Public training courses					
A. Regular courses					
(1) Forestry for local community development		2	30	4	120
B. Special courses					
(1) Agro-forestry		2	30	4	120
(2) Dendro-energy production		2	30	2	60
			Grand Total		1,100

T.F.O. = Township Forest Officer. PO = Plantation Officer
PA = Plantation Assistant

1. In-service training courses

A. Regular courses

(1) Basic forest officers course

Objectives :-

* To introduce and make orientation with the activities of the Forest Department.
* To become familiar with the basic procedures rules and regulation of the Forest Department.
* To learn the effective way of implementation of the economic plan in forestry sector.

Training :-

* Management and administration
* Forest policy and laws
* Budget and accounts
* Office procedure
* Basic forestry operations
* Ergonomics - Handling of tools and equipments

Note : * Field practices and study tours will be carried out in all training courses.

(2) Advanced forest officers course

Objectives :-

* To learn the latest policy and guidlines of the Ministry of Agriculture and Forests and office of the Director General.
* To acquaint with the practical application of the forest procedure, forest policy and law, forest revenue works and accounting procedure.
* To learn the proper and effective ways of executing of the annual plan of operation.
* To know how to organize and educate the forest workers for better efficiency.
* To learn the technique of man management and supervision.

Training :-

* Forest policy and law
* Office procedure
* Organization and management
* Forestry planning
* Forest revenue
* Budget and accounts
* Forest procedure requiring major forest operations
* Government service rules and regulations

(3) Forestry induction course

Objectives :-

* To introduce and make orientation with
* the basic field operation
* To become familiar with the Government service rules and regulations
* To get acquainted with the handling of forestry implements and equipments

Training :-

* Forest policy and law
* Office procedure
* Forest mensuration
* Silviculture
* Forest survey
* Forest engineering
* Forest protection
* Forest botany
* First aid

B. Special courses

(1) Plantation techniques

Objectives :-

* To implement different types of forest plantations with different objectives more successfully.

Training :-

* Site selection and survey
* Soil
* Climatic study
* Types of plantations
* Choice of species
* Sowing and planting
* Weeding and soil working
* Thinning and pruning
* Growth and yield study
* Protection
* Recruitment of workers
* Selection and handling of equipments and machinery
* Organization
* Cost analysis
* Maintenance of records
* Monitoring and reporting.

(2) Nursery practices

Objectives :-

* To learn the best mathod of establishing forest nursery and production of seedlings for the plantations.

Training :-

* Choice of nursery site
* Site preparation
* Design and layout
* Seeds collection, storage, testing, germination and distribution
* Water supply and irrigation
* Soil, compost and fertilizer
* Sowing, transplanting, tending and culling
* Protection
* Organization
* Cost analysis
* Maintenance of records
* Monitoring and reporting.

(3) Forest protection

Objectives :-

* To protect natural forest resources, forest plantations and wild life effectively on long term basis.

Training :-

* Protection against fire
* Protection against insects
* Protection against fungus
* Protection against cattles and wild animals
* Protection against man.

(4) Forest road

Objectives :-

* To construct modern forest roads of all types for better management of the forest resources including plantations.

Training :-

* Planning and design
* Road alignment
* Road construction
* Road maintenance
* Use of modern road making machineries and equipments
* Cost estimate and material estimate
* Organization
* Maintenance of records
* Monitoring and reporting

(5) Forestry machinery

Objectives:-

* To get acquainted with selection, operation and maintenance of forest machinery to suit the need of various forest operations.

Training :-

* Choice of forestry machinery
* Handling and operation
* Maintenance
* Store keeping of spare parts
* Maintenance of records including log-books etc.

(6) Forestry extension & utilization

Objectives:-

* To learn the technique of educating the public to get their cooperation in forest conservation, plantations and utilization.

Training:-

* Forestry education
* Coordination with Government and non-Government organizations
* Technique of forestry extension
* Use of audio-visual equipments both in classrooms and in the fields.

* Efficient utilization of lesser known species, bamboos, canes etc. to improve the standard of living of peasants and workers.

(7) Forest resource administration

Objectives:-

* To learn latest policy and guidelines of the Government concerning the forestry sector and to be knowledgeable with the latest research findings and forestry situation abroad.

Training:-

* Latest policy and guidelines
* Research findings of forest research institute and its application in the field
* Up to date forestry situation abroad by sharing the experiences of forest officers returned from abroad
* To be in touch with the latest international publication.
* To study the systems and facilities of CFDTC

2. Public training courses

A. Regular courses

(1) Forestry for local community development

Objectives:-

* To promote the standard of living and welfare of local community through forestry.

Training:-

* Conservation and Management of existing woodlots around the villages
* Creation of new fuelwood resources by establishing village-owned fuelwood plantations, private-owned trees around the farmland and in private compound, etc.
* Introduction of efficient wood stoves, etc.
* Production of minor forest products like gums, resins, oils, mushrooms, medicinal plants, etc.
* Handicrafts and household commodity using bamboos, canes and fancy-woods.

B. Special courses

(1) Agro-forestry

Objectives:-

* To promote the concepts of combined land use for agriculture and forestry in densely populated areas and undeveloped hilly regions.

Training:-

* Integrating forestry and agriculture for rural community development
* Choice of multiple-use tree species for fodder, fuelwood, green manure and small timber to suit local conditions
* Agro-silvicultural practices for prevention of hillside erosion and for better crop production by growing wind-breaks and shelter-belts, etc.
* Transformation of shifting cultivation system to permanent agriculture using bench terraces, orchard tarraces and hillside ditches.

(2) Dendro-energy production

Objectives:-

* To solve rural energy problem and to better conserve the commercial forests against overcutting for fuelwood.

Training:-

* Establishment of dendro-energy plantations
* Choice of species to suit the local conditions and objectives
* Production of fuelwood, charcoal and bio-gas
* Introduction of efficient wood stove
* Cost analysis and justification
* Use of wood gasifier

Bar chart showing annual plan of training courses

Name of training course	Annual Programme												Number of trainees per year
	J	F	M	A	M	J	J	A	S	O	N	D	
1. In-service training courses													
A. Regular courses													
(1) Basic forest officers course	50												50
(2) Advanced forest officers course				50					50				100
(3) Forestry induction course						100					100		200
B. Special courses													
(1) Plantation techniques	50							50					100
(2) Nursery practices			30							30			60
(3) Forest protection	30						30						60
(4) Forest roads			30							30			60
(5) Forestry machinery				20							20		40
(6) Forestry extension and utilisation				50					50				100
(7) Forest resource administration	15					15							30
2. Public training courses													
A. Regular courses													
(1) Forestry for local community development			30			30			30			30	120
B. Special courses													
(1) Agro-forestry		30			30			30			30		120
(2) Bendso-energy production				30			30						60
Total number of trainees during the month	145	160	140	150	150	145	160	160	180	160	150	150	1,100

Location and climatic condition of project site

Location : Hmawbi, Township, Rangoon Division,
Lat. 17°06' N, Long. 96°04'E.
Elevation 28 metres

Monthly Agroclimatic Factors Based On Records For Period 1961-1980 Incl.

Month	Rain mm	Rainy Days	Min °C	Max °C	V.P. MBS	Wind km/day 2 M	Sun Hrs/day	Energy Cal/sq-cm/day	Pet mm/day
Jan	7	1	15.9	31.2	18.5	82	9.2	422	3.5
Feb	5	0	17.0	34.3	19.7	101	9.7	493	4.8
Mar	9	0	20.0	36.7	23.1	138	8.8	508	6.1
Apr	18	1	23.2	38.0	26.3	179	9.5	547	7.1
May	305	13	24.5	34.0	31.6	157	3.1	317	3.1
Jun	490	24	24.3	30.3	31.6	157	3.1	317	3.1
Jul	578	22	24.1	29.5	31.3	160	2.3	283	2.7
Aug	591	24	23.9	29.2	31.3	145	2.7	297	2.7
Sep	348	17	24.0	30.3	32.1	97	4.1	338	2.9
Oct	192	9	23.4	31.3	31.1	75	6.9	389	3.1
Nov	33	3	21.2	31.7	27.7	75	8.0	373	2.9
Dec	11	1	17.5	30.7	22.7	78	8.4	367	2.7
Total/ Ave.	2587	115	21.6	32.1	27.1	121	6.6	397	3.9

Simple Monthly Soil Water Balance

(Soil Water Capacity = 100 mm)

Month	Rain	Pet	Aet	Soil Water		
		mm/Month		Storage	Deficit	Surplus
Jan	7	109	7	0	102	0
Feb	5	134	5	0	129	0
Mar	9	189	9	0	180	0
Apr	18	213	18	0	195	0
May	305	149	149	100	0	56
Jun	490	93	93	100	0	397
Jul	578	84	84	100	0	494
Aug	591	84	84	100	0	507
Sep	348	87	87	100	0	261
Oct	192	96	96	100	0	96
Nov	33	87	87	46	0	0
Dec	11	84	57	0	27	0
Total	2587	1409	776	-	633	1811

V.P = Vapour pressure in millibars (mbs)
Pet = Potential Evapotranspiration
Aet = Actual

資料Ⅲ　その他の入手資料

" Report to the Pyithu Hluttaw" (1986, Ministry of Planning and Finance)等より

〔保存林の面積〕
1　Reserved Forest Area

〔木材の生産・販売〕
2　Production and Distribution of Timber

〔その他の林産物の生産〕
3　Other Forest Products

〔有用樹種の植林地〕
4　Teak Plantation
5　Hardwood Plantation

〔森林の管理〕
6　Conservation of Forests

〔農民協会〕
7　Pesants - a Vital Force

資料Ⅲ　その他の入手資料

(3) " Report to the Pyithu Hluttaw" (1986, Ministry of Planning and Finance) 等による。

1　Reserved Forest Area

(Square miles)

Sr. No.	Year	Reserved area at the beginning of the year	Extension of reserved forest area during the year	Reserved area at the end of the year
1	2	3	4	5
1	1961/62	34725		34725
2	1964/65	34717		34717
3	1967/68	34717		34717
4	1968/69	34717	152	34869
5	1969/70	34869	68	34937
6	1970/71	34937	222	35159
7	1971/72	35159	668	35827
8	1972/73	35827	1236	37063
9	1973/74	37063	371	37434
10	1974/75	37434	221	37655
11	1975/76	37655	220	37875
12	1976/77	37875	220	38095
13	1977/78	38095	220	38315
14	1978/79	38315		38315
15	1979/80	38315	55	38370
16	1980/81	38370		38370
17	1981/82	38370	33	38403
18	1982/83	38403		38403
19	1983/84	38403	15	38418
20	1984/85 (Provisional actual)	38418	248	38666
21	1985/86 (Provisional)	38666	365	39031

2 Production and Distribution of Timber

(Cubic ton)

Sr. No.	Particulars	1981/82	1982/83	1983/84	1984/85 (Provisional actual	1985/86 (Provisional)
1	2	3	4	5	6	7
1	Teak (logs)					
1	Production	375872	442278	329306	379716	413000
1	Arrival at mills during the year*	435592	422784	366476	384416	410000
2	Corrected net stock**	(-)59720	(+)19494	(-)37170	(-) 4700	(+) 3000
2	Distribution during the year	385472	384440	445728	421619	409000
1	Saw mills	297565	312643	327948	296069	286000
2	Local sales	16168	10977	5493	5266	13000
3	Export	71739	60820	112287	120284	110000
3	Stock adjustment	(-) 9600	(+)57838	(-)116422	(-)41903	(+) 4000
2	Hardwood (Logs)					
1	Production	525879	561635	448574	573237	700016
1	Arrival at mills during the year*	579858	569249	449163	572137	700000
2	Corrected net stock**	(-)53979	(-) 7614	(-) 589	(+) 1100	(+) 16
2	Distribution during the year	602821	506956	512172	486765	647510
1	Saw mills	496506	401591	449752	433941	517510
2	Local sales	50016	52447	29100	29312	60000
3	Export	56299	52918	33320	23512	70000
3	Stock adjustment	(-)76942	(+)54679	(-)63598	(+)86472	(+)52506

* Saw mills include terminal depots.

** Includes logs gain or loss on remeasurement, inter and intra-regional transfer, logs under investigation, and loss and wastages.

3 Other Forest Products

(In thousand)

Sr. No.	Particulars	Unit	1961/62	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85 (Provisional actual)	1985/86 (Provisional)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Teak and hardwood post	Nos	44	13	20	49	26	34	31	54	35	36	29	39	35
2	Teak and hardwood pole	"	52	921	1283	700	481	640	1107	1024	1009	1215	1433	1070	1337
3	Firewood	Cubic ton	7877	10490	10873	11337	11678	12452	12545	13049	13608	14334	15045	15854	16900
4	Charcoal	"	184	235	283	381	378	640	529	608	617	765	719	791	781
5	Bamboo	Nos thousand	349	652	619	628	644	666	687	697	757	782	860	914	962
6	Cane	"	36	41	46	36	53	39	35	37	50	51	57	58	59
7	Cutch	Viss	268	47	99	351	238	202	99	199	272	400	344	272	337
8	Bark	"	796	490	380	471	275	359	226	322	330	436	318	512	287
9	Shaw	"	192	218	201	196	197	212	207	212	244	255	266	219	254
10	Kalamet	"	24	56	57	88	73	53	95	150	127	40	21	56	30
11	Indwe-pwenyet	"	228	454	746	777	550	553	551	286	401	646	533	475	447
12	Thanakha	"	237	107	120	111	180	104	177	149	135	174	93	128	120
13	Cardamon	"	20	22	36	16	4	2	1	3	9	7	5	14	5
14	Kanyin resin	"	13	7	4	6	8	2	3	6	20	23	4	5	*
15	Pine resin	"	208	90	84	30	32	145	227	267	192	175	231	105	194
16	Roofing material	Nos thousand	384	518	542	581	608	617	652	688	748	825	837	861	919
17	Te	Viss	2	42	163	30	31	79	39	50	63	21	20	19	20
18	Honey	"	5	16	32	25	36	18	38	29	19	36	47	26	36
19	Bee-wax	"	3	3	3	2	3	7	3	4	3	4	10	3	4
20	Bat guano	"	12	116	263	218	197	156	255	221	155	196	254	215	275
21	Orchids (Plants)	Nos		16	49	5	6	9	15	7	4	9	11	10	10
22	Thitse	Viss	80	52	55	42	42	50	57	31	15	52	41	39	32
23	Bommayaza	"		21	5	42	70	1	1		*	3			
24	Birds nest	"		1	*	*	1	*	1	1	1	1	1	1	1
25	Lac	"		9	5	25	37	9	38	25	17	25	59	146	14
26	Branch wood	Cubic ton				24	55	59	48	28	31	16	28	16	13

* Less than one thousand viss.

4 Plantation of Teak Trees

Sr. No.		Particulars	Unit	1981/82	1982/83	1983/84	1984/85 (Provi-sional actual)	1985/86 (Provi-sional)
1		2	3	4	5	6	7	8
1		Area and trees at the beginning of the year						
	1	Number of trees	Nos. thousand	8236	9187	10356	11669	12981
	2	Area	Acre	183019	204164	230129	259312	288467
2		Area and trees planted during the year						
	1	Number of trees	Nos. thousand	951	1169	1313	1312	1285
	2	Area	Acre	21145	25965	29183	29155	28550
3		Area and trees planted at the end of the year						
	1	Number of trees	Nos. thousand	9187	10356	11669	12981	14266
	2	Area	Acre	204164	230129	259312	288467	317017
4		Thinnings made during the year	Acre	4059	3820	4900	4599	4735
5		Teak girdling *	Nos. thousand	192	182	157	173	172

* Teak girdling includes green teak markings.

5 Plantation of Hardwood Trees

Sr. No.		Particulars	Unit	1981/82	1982/83	1983/84	1984/85 (Provi-sional actual)	1985/86 (Provi-sional)
1		2	3	4	5	6	7	8
1		Area and trees at the beginning of the year						
	1	Number of trees	Nos, thousand	4931	6102	7608	9488	11747
	2	Area	Acre	109587	135607	169084	210862	261054
2		Area and trees planted during the year						
	1	Number of trees	Nos, thousand	1171	1506	1880	2259	2896
	2	Area.	Acre	26020	33477	41778	50192	64350
3		Area and trees planted at the end of the year						
	1	Number of trees	Nos, thousand	6102	7608	9488	11747	14643
	2	Area	Acre	135607	169084	210862	261054	325404
4		Thinnings made during the year	Acre	4962	4669	5988	5621	5787
5		Selection felling markings	Nos, thousand	755	763	639	572	860

6 Conservation of Forests

Sr. No.	Particulars	Unit	1981/82	1982/83	1983/84	1984/85 (Provisional actual)	1985/86 (Provisional)
1	2	3	4	5	6	7	8
1	Artificial regeneration	Acre	47165	59442	70961	79347	92900
2	Natural regeneration	"	15540	9800	10000	10100	10000
3	Improvement fellings	"	35518	27533	21847	21355	21760
4	Weedings	"	174707	295581	366047	435935	429252
5	Thinnings	"	9021	8489	10886	10220	10522
6	Climber cutting	Acre thousand	680	476	422	369	408
7	Repairs of forest road	Mile	1492	1471	1536	1588	1575
8	Repairs of reserve boundary	"	1118	1110	1055	1070	1100
9	Repairs of compartment boundary	"	2118	1704	1419	1357	1360
10	Fire protection	Acre thousand	446	549	627	683	698
11	Terrace farming	Acre	500	500	500	500	500

(Concld.)

(Cubic ton)

Sr. No.	Particulars	1981/82	1982/83	1983/84	1984/85 (Provisional actual)	1985/86 (Provisional)
1	2	3	4	5	6	7
3	Teak (Sawn timber)					
1	Production	113600	163515	134557	121921	115900
1	Sawn timber during the year	125104	129794	134923	122118	114400
2	Corrected net stock**	(-)11504	(+)33721	(-) 366	(-) 197	(+) 1500
2	Distribution during the year	139071	147165	143425	121734	135700
1	Local sales	66432	89743	73431	61132	55700
2	Export	72639	57422	69994	60602	80000
3	Stock adjustment	(-)25471	(+)16350	(-) 8868	(+) 187	(-)19800
4	Hardwood (Sawn timber)					
1	Production	257062	283627	232988	226823	288330
1	Sawn timber during the year	261744	264942	233068	229805	284630
2	Corrected net stock**	(-) 4682	(+)18695	(-) 80	(-) 2972	(+) 3700
2	Distribution during the year	265430	266418	240600	220569	324420
1	Local sales	265430	266357	240140	220216	319420
2	Export		61	460	353	5000
3	Stock adjustment	(-) 8368	(+)17219	(-) 7612	(+) 6264	(-)36090

** Includes logs gain or loss on remeasurement, inter and intra-regional transfer, logs under investigation, and loss and wastages.

Peasants—a vital force

THE second meeting of the Peasants Asiayone Central Body is to be held in Rangoon tomorrow. The meeting is to review the work implemented in the previous year and discuss and co-ordinate programmes of work to be carried out in the coming year.

The peasants making up the majority of the country's population under the organization of the Peasants Asiayone at different levels and under the leadership of the Burma Socialist Programme Party have been carrying out production tasks in the agricultural sector. However, we will have to make sure that the strength of the peasant masses is systematically and effectively utilized. This could only be achieved when all the peasants are under the fold of the Peasants Asiayone. Furthermore, all the Peasants Asiayone members should become Party members so that they will come to be imbued with identical ideological concepts, political consciousness and outlooks and organizational skills in carrying out the tasks of the different levels of the Peasants Asiayone.

During the tenure of the Second Peasants Asiayone Conference there were 272 Township Peasants Asiayones, seven Township Peasants Organizing Committees and 13,192 Ward and Village-tract Peasants Asiayones with a membership of more than 7.5 million. Of the Asiayone members, some 900,000 were Party members and over 700,000 were Lanzin Youth (rural) members. The ratio is still not satisfactory. Hence, intensive organizational work must be carried out among the Peasants Asiayone members to get them join the Party.

Since the success in the agricultural sector also depends on the active participation and individual abilities of the peasants, training courses are being held to enable them to acquire better knowledge in the application of modern methods of farming and livestock breeding. Party members among the peasants will have to provide leadership in the endeavour to raise productivity and increase production. As they are always in close contact with the peasants, they will be able to win over the peasant masses by setting good examples in production work as well as in social and regional development activities.

1986年11月19日付け
"Working People's Dail"
社説

JICA