

JICA
122
88
FDD
LIBRARY

JICA LIBRARY



1099806 (0)

2409

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

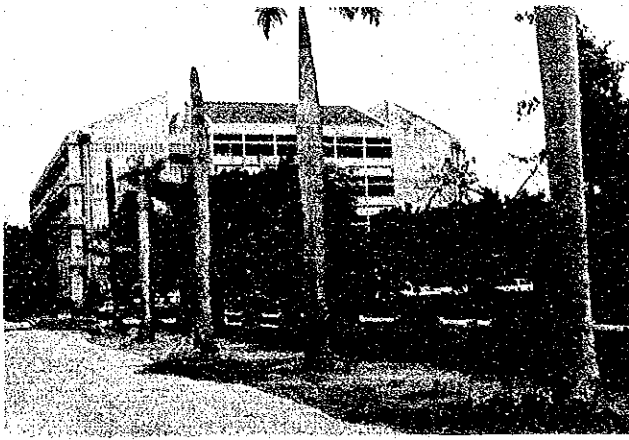
**DEVELOPMENT OF HUMAN RESOURCES
FOR
THE TROPICAL FOREST MANAGEMENT
(STRATEGY FOR THAILAND)**

JULY 1992

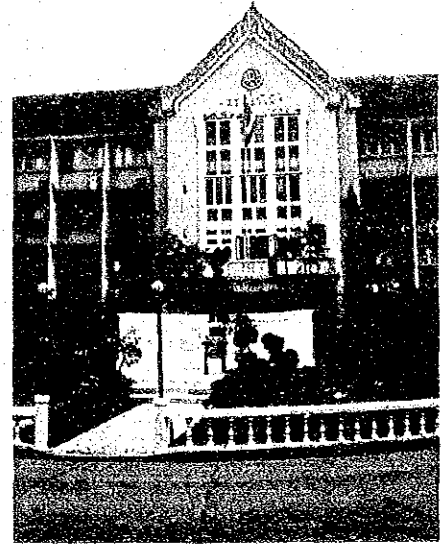
**JAPAN OVERSEAS FORESTRY CONSULTANTS ASSOCIATION
(JOFCA)**

国際協力事業団

24109



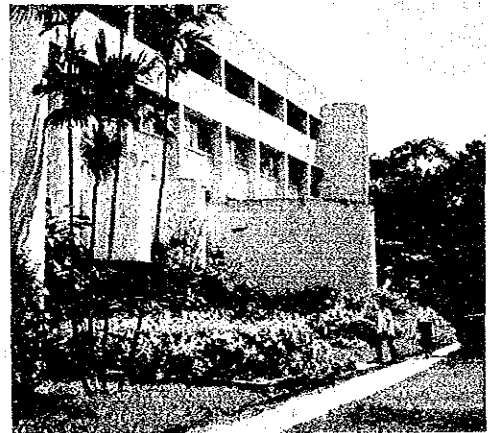
Research and Training in
Re-afforestation Project. Thailand



RFD Main Building



The same: From the garden



Kasetsart University
Faculty of Forestry



The same: Seminar on-going



FAO Regional Office, Bangkok



Teak trees for demonstration



Teak seedlings. Teak is an important forestry species.



Bad shape teak trees. They teach us the importance of forest tree breeding.



Teak seedlings for test

Contents

1.	Introduction	1
2.	Current Situation of Forests	2
3.	Forestry Policies	3
4.	Organization of Forest Management	9
5.	Forestry Education	17
6.	Training of Forestry Technicians	20
7.	Proposals	21

1. Introduction

The current rapid decrease and deterioration of tropical forests are posing a grave threat to human beings, and the settlement of this problem has drawn world-wide attention.

Such a decrease in tropical forests has exerted a serious influence on the social economy of developing nations that depend on agriculture, livestock farming and forestry. In addition, the decrease has also become the subject of discussion relating to the whole world, and allows no time for delay in settlement to protect the global environment from the extinction of living species in tropical forests, global warming, and other difficulties.

In order to resolve the problem, diversified measures are required, and steps for the protection of forests and afforestation in developing nations are fundamental. However, it is an undeniable fact that in taking such steps, developing nations are short of local forestry officials, qualitatively and quantitatively, for forest management and afforestation.

Based on the recognition of problems mentioned above, this study aims at preparing and proposing, by nation, guidelines and method for training tropical-forest management officials.

The study was conducted in Thailand in May, 1992.

2. Current Situation of Forests

Thailand has a total area of 51.4 million hectares (ha), of which 28% or 14.34 million ha is covered by forests. Looking at the past trends in the area of forests, it is found that the area decreased from 27.3 million ha (58%) in 1961 to 14.38 million ha (28%) in 1988. They are in an impending situation which cannot be overlooked.

Forests in Thailand are as a rule state-owned. In 1985, it was stated in the "National Forestry Policy" that the percentage of forests should be raised to 40%, and this level should be maintained. The number of 40% can be divided into two, namely protection forests (15%), including national parks and sanctuaries, and production forests (25%) to product timber and other forest products. In the latter, sustainable production is promoted, and reforestation is authorized. The cutting cycle is 30 years.

In Thailand, 80% of the population live on agriculture. The demand for farmland is on the rise, and sustainable agriculture as a conventional system is becoming difficult to continue.

3. Forestry Policies

New Policies announced on October 1, 1991 are as follows:

(1) Forest Land Use Plan

In response to the determination by the Council of Ministers, forest areas will be classified into three category, namely conservation, forestry (economic zone) and agriculture zones, in October, 1991. This classification is conducive to smooth management without disputes between the authorities, private companies and local inhabitants, and also smooth administration of various types of resources development.

(2) Opening Ruin Reserve Forests to Inhabitants

Although production forests should be essentially used as reserve forests for sustainable production, ruin reserve forests among them will be opened to the poor for their livelihood. This policy will be carried out in five years from 1991 to 1995 by cooperation with:

- i) National Security management Division
- ii) Forest Reservation Section
- iii) Land for People Management Section.

(3) Public Relations

The Royal Forest Department (RFD) will seek for cooperation in planting trees through mass media, the general public, private enterprises, and various associations. It will also make a request for cooperation to international organizations.

(4) Environment

Reserve forests are nowadays destroyed across the country, and such destruction results in imbalance of the natural environment, flood, the greenhouse effect, etc. To cope with this situation, the RFD determined a Forest Management Plan (FMP). It aims at forest protection, fire prevention, and improvement in forest condition.

(5) Forest Protection

- a) Forests including national parks, riverheads, sanctuaries, and mangroves will be conserved and protected.
- b) Technologies for efficient communications, including artificial satellites will be utilized.
- c) Immigrants will be prevented from invading forests by cooperation with the authorities concerned.
- d) Local inhabitants who claim rights will be investigated and registered.
- e) Boundaries of reserve forests will be clearly determined.
- f) Establishing an effective and mobilizing organization for forest fire fighting.
- g) Favorable function of forests will be publicized to the groups concerned.
- h) Forest education will be given to children.
- i) Cooperative projects will be promoted with the people concerned for protecting forests.
- j) Cooperative projects will be systematized.

(6) Reforestation and Expanded Afforestation

- a) As 25% of the national land is designated as production forests, ruin reserve forests will promptly be reforested to achieve 7% of the national land.
- b) The general public will be encouraged to plant trees. Encouraging measures include the creation of watershed forests, botanical gardens, parks and private gardens, technical guidance, and the supply of seedlings.

(7) Mangrove Forests

- a) An appropriate management system will swiftly be adopted to improve the condition of mangrove forests in five years. It will cover a forest area of 40,000 ha.
- b) Land use and other matters will be determined by consulting the navy, the Ministry of Fisheries, relevant agencies, and local inhabitants.

(8) Study and Research

- a) Forestry research will be supported.
- b) The situation of land use will be regularly studied by aerial photograph.
- c) Afforested areas will be efficiently surveyed.

(9) Manpower Management

- a) The RFD personnel will perform their duties sincerely and fairly.
- b) They will be properly rewarded for performance. They will be encouraged to make more contributions to local areas.

(10) International Cooperation

International cooperation will be introduced into unprofitable academic fields.

(Reference) National Forest Policy (1985)

The National Forest Policy declared in 1985 will be outlined in the following.

To achieve a long term national forest administration and for better understanding between state and private sectors, it is hereby declared as a national forest policy that:

- (1) Long term guidelines for forest management and development shall be established to maximize national social and economic benefits and national security, with sufficient measures provided for environmental protection. Emphasis shall be placed on harmonized utilization of forest resources and other natural resources.
- (2) Role and responsibility sharing among various government agencies and the private sector in forest management and development shall be promoted.
- (3) National forest administration shall be reorganized in line with the changing quality and quantity of forest resources and environment.
- (4) Forty percent of the country area shall be kept under forests. The forest area shall be divided as follows:
 - a) Protected forest: 15 percent of the country area shall be kept as protection forests for nature conservation, recreation and environmental quality protection.
 - b) Production forest: 25 percent of the country area shall be designated as production forest to produce timber and other forest products.
- (5) Public and private sectors together shall develop and manage the forest area to achieve the sustainable management.
- (6) With science and technology the efficiency of agricultural production shall be enhanced to reduce the forest conversion to agricultural land.
- (7) The state shall establish a forest development plan as part of the natural resources development plan in the National Social and Economic Development plan to harmonize a mutual utilization action between forest resources and other natural resources.
- (8) Efficiency in timber production shall be increased through appropriate forest management techniques using both selection and clear cutting systems. In the clear cutting system, the cleared

area shall be replanted immediately.

- (9) To conserve and protect natural environment, the State shall accelerate the city planning process and designate specific area for forest, residential, rural and agricultural areas in each province to prevent forest land encroachment.
- (10) National Forest Policy Committee shall be established under the Forest Acts for policy formulation, supervision and management of national forest resources.
- (11) The State shall undertake extension programs to create public awareness of useful forest function and unfavorable effects created by the destruction of forests.
- (12) The State shall promote reforestation by the public and private sectors for domestic industrial consumption. Export of wood and wood products shall be encouraged. Community forestry such as reforestation on public land by private sector, tree planting on marginal agricultural land and establishment of forest woodlot for household consumption shall also be promoted.
- (13) The state shall encourage integrated wood using and pulp and paper industries to realize the whole-tree utilization concept.
- (14) Amendment of forest acts shall be made to support efficient forest resources conservation and utilization.
- (15) Forest research shall be carried out in collaboration with universities and educational institutions concerned.
- (16) Wood energy as a substitute of fossil energy shall be promoted through energy plantations.
- (17) Any land with the slope of 35 percent or more on an average shall be designated as forest land. No land use certificate under the Land Acts shall be issued for the land of this category.

- (18) Explicit guidelines shall be established to deal with various forest degradation problems e.g. shifting agriculture, forest fires, forest clearing by the hill tribe minorities, etc. Measures on enforcement of law and penalty codes shall be specified and respective due processes shall be established. Regional Forestry Law Enforcement Centre shall be established. Measures shall also be devised to penalize corrupted government official and influential person.
- (19) Incentive systems shall be established to promote reforestation by the private sector.
- (20) Human resources and rural settlement planning must be in conformity with natural resources management and conservation plans.

4. Organization of Forest Management

- (1) The RFD (Royal Forest Department) is in charge of national forest management under the Ministry of Agriculture and Associations.

It has a staff of 15,900, of which 55% are forest officers, and 45% are permanent employees. In addition, there are many daily workers.

University/college graduates account for about 25% of all forest officers (Fig. 1, and Tables 2 and 3).

Fig. 1 is a chart of the Thai forest management system. Sheriffs are dispatched by the RFD to supervise provincial forest administration. Amphur Forest Offices locally supervise and give guidance to persons concerned with forestry.

Table 1 shows the RFD's staff by year. Whereas upper years are based on the Thai calendar, lower ones are dominical years.

Table 2 shows the RFD's staff by specialty.

Table 3 shows the RFD's staff by level.

(2) Local Organization of Forest Management

- a) There are 72 Provincial Forest Offices (PFOs) throughout the country, and one sheriff is assigned to each office. PFOs will:

- i. Assist Provincial Governors and also give advice to the latter; and
- ii. Perform administrative duties in connection with the management, use and protection of forests in each province, approval for and supervision over logging, the collection of forest incomes, and the transportation of forest products (Fig. 1).

- b) There are 670 Amphur Forest Office across the country, which assist and give advice to district chiefs. They also perform administrative duties concerning forests and forestry in each

district (Fig. 1).

- (3) The FIO (Forest Industry Organization) became independent of the RFD in 1948. It is currently a national enterprise, but managed like private enterprises. This organization undertakes afforestation as well as logging national forests and processing their products. As logging operations are now reduced, afforestation and care are gradually holding a high share in FIO's business. Nevertheless, the area of forests made by FIO is still about one sixteenth of that by the RFD.

The organization uses the "agri-silvicultural system"*¹ with emphasis on the resettlement of shifting cultivators to create forests villages*² in mountainous areas and improvement in the life of local inhabitants.

The FIO has a staff of 3,800, of which 600 are engaged in the forest village project (see Fig. 2 and Reference).

*1 The agri-silvicultural system, being designed to combine agricultural and forest products, leads agroforestry.

*2 These villages are created for shifting cultivators to resettle mainly in the northern part of Thailand. They are almost the same whether they are created by the FRD or the FIO. Both agencies make a contribution to the stable livelihood of inhabitants while playing a major role in promoting teak plantation by Taungya.

Fig. 1 Forest Management System in Thailand

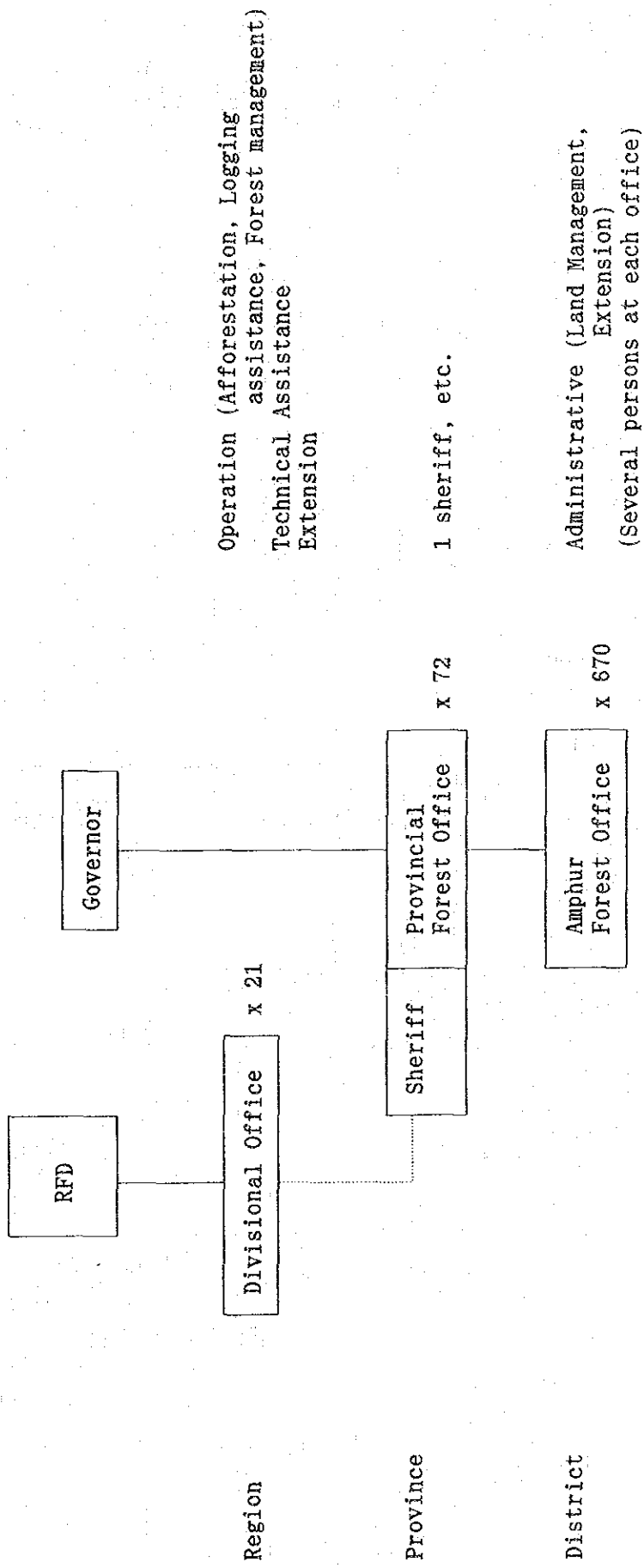


Table 1 Number of Forest Officers and Permanent Employees

Level	2529 1986	2530 1987	2531 1988	2532 1989	2533 * 1990
10	1	1	1	2	2
9	3	3	3	4	4
8	40	40	44	43	47
7	302	321	357	371	387
6	721	913	1,381	974	1,637
5	1,710	1,679	1,377	1,892	1,329
4	1,546	1,588	1,744	1,689	
3	1,304	1,258	1,183	1,897	5,412
2	1,379	1,459	1,385	904	
1	208	228	169	108	
TOTAL	7,214	7,490	7,644	7,884	8,818
PERMANENT EMPLOYEES	4,339	4,450	4,718	5,957	7,178
GRAND TOTAL	11,553	11,940	12,362	13,841	15,996

* Thai calendar year and ordinary calendar year

Table 2 RFD Officials and Permanent Employees (As of October 1991)

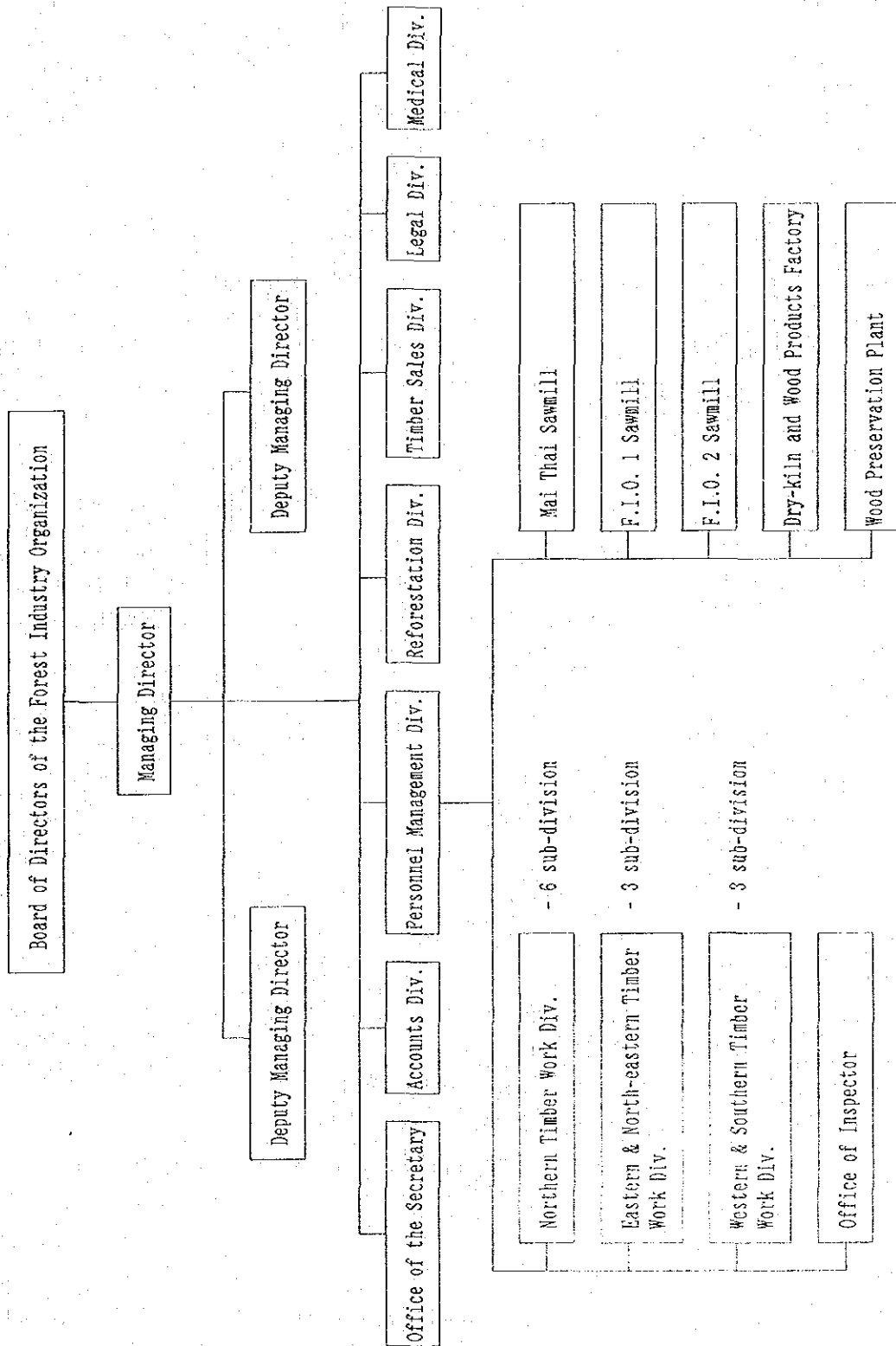
Offices	Government Officials	Permanent Employees	Total
General Administration	9	-	9
Internal Auditing	11	-	11
Office of RFD Secretary	56	21	77
Personnel Division	87	71	158
Forestry School	39	-	39
Finance Division	72	170	242
Forest Control Division	106	62	168
Forest Management Division	188	177	365
Silviculture Division	232	468	700
Forest Products Research Division	83	80	163
National Parks Division	327	1,090	1,417
Wildlife Conservation Division	320	866	1,186
Watershed Management Division	367	306	673
National Forest Land Mgmt Division	321	265	586
Legal Affairs Division	30	6	36
Planning Division	56	8	64
Regional Forest Offices (21)	4,276	3,045	7,321
Provincial Forest Offices (72)	2,238	543	2,781
Total	8,818	7,178	15,996

Table 3 Qualification of RFD Officials (As of October 1991)

Qualification	Forestry		Non Forestry		Total	
	No. of staff	%	No. of staff	%	No. of staff	%
1. Ph.D	8	0.09	3	0.03	11	0.12
2. M.S.	240	2.72	47	0.53	287	3.25
3. B.S.	1,841	20.88	428	4.85	2,269	25.73
4. Cert. in Forestry	4,687	53.15	-	-	4,687	53.15
5. Cert. In Education	-	-	19	0.22	19	0.22
- High Certificate	-	-	35	0.40	35	0.40
- Standard Certificate	-	-	-	-	-	-
6. Cert. in Vocational Education	-	-	257	2.92	257	2.92
- High Certificate	-	-	640	7.26	640	7.26
- Standard Certificate	-	-	-	-	-	-
7. School Certificate	-	-	186	2.11	186	2.11
- High School	-	-	427	4.84	427	4.84
- Secondary School	-	-	-	-	-	-
	6,776	76.84	2,042	23.16	8,818	100

Fig. 2

Organization Chart of F.I.O.



(There are 10 or more logging camps in every operation site.)

Reference Table Number of Personnel by Division

(As of October 1981)

	Staff	Workers	Total
1. Northern Timber Work Div.	289	1,559	1,848
2. Eastern & North-Eastern Timber Work Div.	135	235	370
3. Western & Southern Timber Work Div.	117	112	229
4. Reforestation Div.	197	178	375
5. Timber Sales Div.	49	156	205
6. Mai Thai Sawmill	83	171	244
7. FIO 1 Sawmill	74	167	241
8. FIO 2 Sawmill	42	110	152
9. Dry-Kiln and Wood Products Factory	23	57	80
10. Wood preservation Plant	28	59	87
11. Accounts Division	63	9	72
12. Office of the Secretary	31	20	51
13. Office of the Inspector	10	3	13
14. Personnel management Div.	19	21	40
15. Legal Div.	8	2	10
16. Medical Div.	10	4	14
TOTAL	1,178	2,863	4,041

5. Forestry Education

In Thailand, Kasetsart University is the only university that has the faculty of forestry. Some other university have silvicultural courses, which are, however, not independent departments or sections.

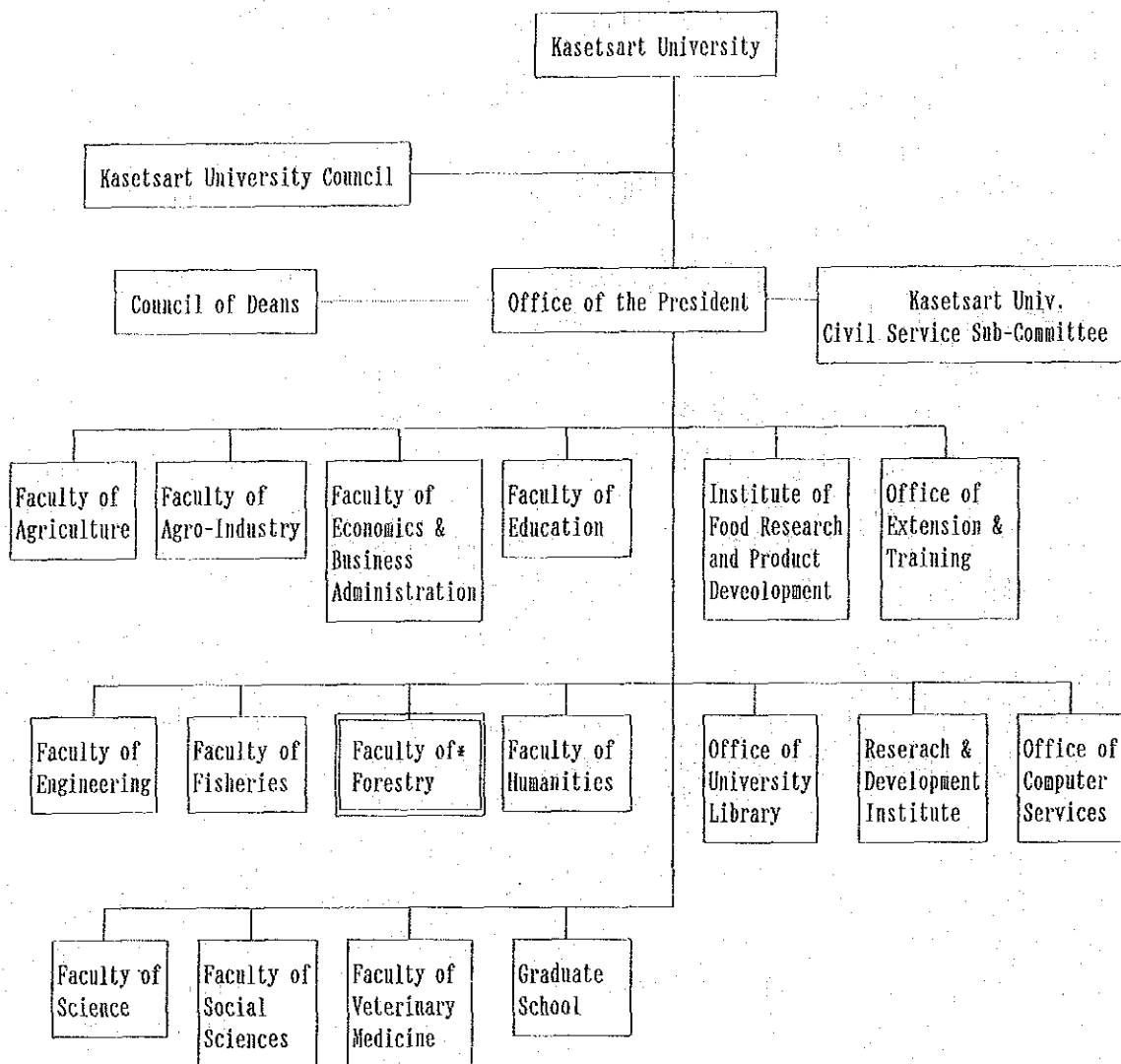
Kasetsart University was founded in 1943 during World War II. As shown in Fig. 3, the university consists of eleven faculties, and has many research facilities, a library, and an administrative office. It was initially located at Bangkhen in Bangkok, and subsequently some of its facilities were moved to Kamphaengsaen 100 km west of Bangkok when the campus was crowded. The Bangkhen campus has an area of 145 ha, including about 60 buildings, while the Kamphaengsaen campus has an area of 1,460 ha, including about 50 buildings. The number of students is about 10,000 in 1990, of which 9,000 study in Bangkhen, and 1,000 study at Kamphaengsaen.

The Faculty of Forestry has a longer history than Kasetsart University itself, and originates from a forestry school which the Royal Forest Department (RFD) established in 1936 at Phrae in the northern part of Thailand. At that time, the school had a two-year course of study mainly designed to train the staff of the RFD, and took on around 25 students. In 1944, the most part of the school was incorporated in Kasetsart University. The forest school at Phrae was, however, separately maintained on a small scale. In 1957, a doctoral course was made available, and the present system was established.

The present Faculty of Forestry consists of six departments and the secretariat as shown in Fig. 3. The number of freshmen is about 170 per year, of which 140 are male, and 30 are female. An annual average of about 100 students can graduate from the faculty. The university has a staff of 63, of which 33 have doctorates, and 28 have master's degrees.

Various types of research in the faculty of Forestry are under way in close cooperation with the RFD, forest industries and other organizations.

The doctor's course in forestry takes four years, and basic sciences and general forestry are studied in the first two years. In the third year, special subjects will begin to be studied in the above-mentioned



FACULTY OF FORESTRY*

1. Office of the Secretary
2. Department of Forest Management
3. Department of Forest Biology
4. Department of Forest Products
5. Department of Silviculture
6. Department of Forest Engineering
7. Department of Conservation

Fig. 3 Organization of Kasetsart University

six departments.

There are master's courses in forest management, forest biology, and forest products, afforestation, and hydrological management. Besides these, a course in environmental science is also available in cooperation with the Land Conservation Department.

Some 80% of all graduates are employed by the RFD and other government agencies, while others are employed by forest industries, land developers, universities and colleges.

The above-mentioned forestry school at Phrae under the RFD's direct jurisdiction also educates a lower level of personnel. Qualifications for entrance include graduation from ordinary senior high schools and success in the RFD's examination. The age of applicants is limited to 17 - 30 years. The RFD's examination requires applicants to be physically so strong as to complete a marathon of 20 km in three hours. The number of freshmen is about 200 per year. Of them, 5 to 10 excellent students are annually recommended by the RFD to Kasetsart University.

6. Training of Forestry Technicians

The RFD (Royal Forest Department) trains its staff in its own facilities and local branches in cooperation with other agencies. The JICA also cooperate with the RFD in the training program by giving financial support and dispatching short-term experts under the JICA's project for Research and Training in Re-afforestation. The program also has relation to The ASEAN-Canada Forest Tree Seed Center to which Canadian International Development Agency (CIDA), a Canadian assisting organization, gives financial aid.

Under the training program, on-the-job training is mainly given to the RFD personnel. The program is focused on (1) forest administration, (2) forest protection and conservation, (3) forestry research and development, and (4) forest extension. Seminars and workshops are also held. Training periods and trainees by subject, annual frequency of training, and the level of trainees are shown in Table 4.

Of the above-mentioned fields of study, Items (1) and (2) related to development of forestry communities have recently become more important. trainees from ASEAN countries as well as RFD regional offices also participated in the program (for third countries). They were trained in Chiang Mai for one month every year from 1987 to 1991. Training of this type is mainly undertaken by the Regional Community Forestry Training Center (RECOFTC) established with the support of Asian Development Bank and Swiss government agencies. This center is located on the campus of Kasetsart University, and technically supported by American Southeast Consortium for International Development. Subjects of study by year are:

1987	Small-scale Wood-base Industry
1988	Community Plantation
1989	Community Forestry and Agroforestry
1990	Community Forestry and Extension
1991	Planning and Management

Table 4 Summary of Forestry Training at the RFO

Course	Period (days)	No. of Trainees	Year					Qualification	
			1987	1988	1989	1990	1991		TOTAL
1. FOREST ADMINISTRATION PROGRAM									
1.1 FOREST ADMINISTRATION FOR SENIOR FOREST OFFICER	10	593	2	2	4	4	3	15	6-7
1.2 ORIENTATION COURSE FOR FOREST OFFICERS	1	1,448	1	1	3	2	1	8	2 (NEW RECRUIT-MENT)
1.3 CIVIL SERVICE DISCIPLINARY	12	243	1	1	1	2	2	7	6-7
1.4 COURSE FOR AMPUR FOREST OFFICER									4-5
1.5 TEACHING TECHNIQUE FOR PHRAE FORESTRY SCHOOL INSTRUCTORS	5	29	1					1	PHRAE FORESTRY SCHOOL TEACHERS
1.6 OFFICE ADMINISTRATION AND CORRESPONDENCE	5	60							1-5
1.7 FOREST PLANNING	12	66				1	1	2	6-7
1.8 LOCAL ADMINISTRATION									
1.9 FOREST ADMINISTRATION COURSE FOR CHIEFS OF WILDLIFE CONSERVATIONS	12	82				1	1	2	4-5
1.10 CIVIL SERVICE MERIT	1	50					1	1	RFD OFFICIAL

Table 4 (continued)

2. FOREST PROTECTION AND CONSERVATION PROGRAM																				ASEAN TECHNICAL FOREST OFFICER
2.1 WORKSHOP ON ASEAN WATERSHED MANAGEMENT	5	17	1							1										1
2.2 FOREST FIRE CONTROL	21	21	1							1										1
2.3 REGIONAL TRAINING IN FORESTRY COMMUNITY DEVELOPMENT TECHNIQUES	30		1	1	1	1				1										5
2.4 WATERSHED ANALYSIS																				
2.5 FOREST PROTECTION	12	135	1	1	1	1				1										4
2.6 FOREST RESOURCES CONSERVATION	3	149	2																	4
2.7 FOREST PROTECTION FOR OFFICER IN CHARGE OF FOREST LAW ENFORCEMENT																				
2.8 FOREST LAW ENFORCEMENT AND INVESTIGATION	10	568	1	1	2	2				1										9
2.9 WOOD IDENTIFICATION	26	273	2	1	1	1				1										7
2.10 MANGROVE FOREST LAND ZONING	8	64		1																1
2.11 FOREST FIRE DISTINGUISH OFFICER	3	65		1	1															2
2.12 FOREST RANGER	12	682	2	2	2	7				2										13
2.13 TECHNIQUES FOR SPECIALIST OF WOOD IDENTIFICATION	9	27				1														1
2.14 FOREST MANGROVE MANAGEMENT AND CONSERVATION	7	68				1														2

Table 4 (continued)

2.15 WILDLIFE CONSERVATION	3	35				1	1	1	POLICEMAN OF BANGKOK
2.16 FOREST GUARD	20	338				2	2	6	FOREST GUARD
2.17 RADIO COMMUNICATION UTILIZATION OF RFD	5	1,259				2	6	8	
2.18 FOREST PATHOLOGY AND ENTOMOLOGY	10	50					1	2	3-5
3. TRAINING ON FORESTRY RESEARCH AND DEVELOPMENT									
o 3.1 APPLICATION OF MICRO COMPUTER FOR FORESTRY MONITORING	10	249	2	2	2			6	1-5
3.2 INVESTIGATION AND SURVEY	19	35	1					1	
o 3.3 AGRO-FORESTRY PLANTATION	12	157	2	2	1			5	5 AND UP
o 3.4 FOREST PLANTATION	12	33	1					1	"
3.5 FORESTRY COMMUNITY FOR RFD OFFICER	5	37	1					1	3-5
3.6 FOREST TREE SEED TESTING AND MANAGEMENT	11	16	1					1	3-6
o 3.7 NURSERY TECHNIQUES	12	270	1	4	3			8	2-4
o 3.8 FOREST ROAD CONSTRUCTION AND MACHINERY	11	26	1					1	3-4
3.9 FOREST EXTENSION	15	88		2	1			3	3-5
o 3.10 FOREST STATICS	12	62		1	1			2	

Table 4 (continued)

o 3.11 SOIL AND FERTILIZER RELATED TO FOREST PLANTATION	12	34			1		1	3-5
3.12 REMOTE SENSING	12	23			1		1	3-6
3.13 FOREST RESOURCES SURVEY	14	46			2		2	3-5
3.14 FOREST EXPERIMENT PLOT MANAGEMENT	10	40				1	2	3-5
o 3.15 PLANTATION TECHNIQUES AND AGRO-FORESTRY	10	40				1	2	3-5
3.16 DATA PROCESSING FOR RESOURCES SURVEY	5	21				1	1	2-5
o 3.17 PLANTATION TECHNIQUES IN MANGROVE FOREST MANAGEMENT	12	30				1	2	3-5
o 3.18 ESTIMATION OF BIOMASS AND NET PRODUCTION IN FOREST ECOSYSTEM	12	30				1	2	3-6
o 3.19 FOREST SOIL SURVEY AND ANALYSIS	12	40				1	2	3-6
4. FOREST EXTENSION COURSES								
4.1 MEDIA UTILIZATION FOR PUBLIC RELATIONS	5	39	1					4-6
4.2 FOREST EXTENSION OFFICER (FEO)	19	34		1				2-6
4.3 AGRO-FORESTRY FOR AGRICULTURAL EXTENSION OFFICER	8	100			3			4-6
4.4 PUBLIC RELATIONS COURSE FOR FORESTERS	21	86				1	2	3-5

Table 4 (continued)

SEMINAR												
1. WORKSHOP ON WATERSHED MANAGEMENT	4	40	1							1	RFD OFFICER AND OUTSIDE	5-7
2. SEMINAR ON FOREST CONCESSION MONITORY	4	255	1							1		6-7
3. WORKSHOP ON WATERSHED MANAGEMENT AT PHU-WIANG	3	35	1							1		5-7
4. WORKSHOP ON SILVICULTURE	5	64		1						1		5-7
5. SEMINAR ON PRIVATE FOREST PLANTATION	3	29		1						1		
6. WORKSHOP ON SMALL FOREST INDUSTRY	3	67			2					2	COMPANY, OUTSIDE	
7. SEMINAR ON FOREST NURSERY MANAGEMENT	5	60				1				1		5-6
8. SEMINAR ON FOREST FIRE CONTROL	3	30								1		3-6
CONFERENCE												
1. ANNUAL FORESTRY CONFERENCE	5	1,522	1	1	1	1	1	1	1	6		6-8

Note: Circle mark: Under the JICA project.
 Triangle mark: Training in a third country.

7. Proposals

(1) Urgent Measures

The Thai government is urgently required to take appropriate forestry measures for (a) maintaining the present forest ratio of 28%, and further raising it to 40%; (b) achieving sustainable management which is prevailing all over the world; and (c) training the people involved in introducing advanced technology required in forestry and forest industries (including tree breeding, tissue culture, remote sensing, and processing).

(2) Forest Ownership and Concession

A minimum requirement for protecting forests is to define ownership. Areas where nothing is done, or nobody lives, are often invaded by local people, who illegally start cultivating, grazing or logging there. By contrast, areas whose boundaries are clearly marked and always monitored by guards are seldom invaded by others. Illegal activities can be effectively prevented by marking boundaries and patrol. In areas where some people illegally do something, we cannot but make efforts to resolve the problem persistently and peacefully.

(3) Forest Patrol

Rangers should be constantly stationed for continuous patrol in important areas and enlightenment on the importance of forest protection.

One official can cover an area of 3,000 to 4,000 ha, and therefore a group of two or three officials will manage 6,000 to 12,000 ha.

Patrol should be started in especially important areas because it cannot be simultaneously started in all parts of the country.

For example, to patrol important areas accounting for 10% of all forests across the country, some 3,000 officials ($14,300,000 \text{ ha} \times 1/10 \times 1/4000 \text{ ha per person} = 3,575$) will be needed for the time being. Besides persons already positioned, as many present

employees as possible should be assigned to this duty, and also recruits should be trained to make up the shortage.

(4) Training Extension Workers

Thailand has made desperate efforts to prevent illegal cutting and shifting cultivation by mobilizing the police and army. Nevertheless, these efforts have not achieved a sufficient result, but left much concern about forest management for future.

One possible countermeasure is to earnestly educate local inhabitants through extension workers to promote their understanding and cooperation. Two key points should be noted here. One is to make all people understand that sustainable agriculture is impossible in tropical zones unless forests and farmland are compatible. This could be easily achieved by introducing various cases of success in other countries to them. The other is to encourage inhabitants and private enterprises to participate in forestry. In areas where inhabitants vigorously perform activities, forests could be more easily protected by the participation of inhabitants and private enterprises. Using people's power is the best way to success.

(5) Fire Prevention

It is not always possible to prevent forest fires anywhere. If a large area is fired in the dry season, it will be difficult to completely prevent the fire from spreading to forests. In particular, natural forests are too large to protect against spread of fire in many cases.

In man-made forests, on the other hand, fires must be prevented by all means. The private sector may hesitate to invest money in afforestation unless forest fires are completely prevented.

Despite being difficult, fire prevention is possible if an appropriate measure is taken. If they learn lessons from cases of advanced countries, you will find it possible.

There are some cases of international or bilateral cooperation in

fire prevention. It is recommended that international cooperation should be actively introduced into training for prevention in the future.

(6) Cooperation with Inhabitants

People's cooperation is indispensable to preventing forests from disappearing. Inhabitants are, however, often reluctant to cooperate with us. To gain their cooperation, social forestry by their participation is the most promising option.

That is, in areas where shifting cultivation is often made, inhabitants cannot be easily driven away. Accordingly, a possible measure is to grant the security of tenure for agriculture to them on some conditions, one of which is to oblige them to create a certain area of forest. In this case, they will be taught forestry to earn cash incomes. In forests made in this way, cutting should be permitted only when a prudent harvesting system is used, so that the whole of watershed areas will be prevented from deteriorating.

Since there are various systems of social forestry across the country as well as the rest of the world, a more successful system should be selected by studying them and stabilized in each region.

(7) Sustainable Management

There are three approaches to sustainable management.

- i) Preventing forests from decreasing
- ii) Expanding man-made forests
- iii) Utilizing forest products by better ways

With respect to i), we have already referred to relevant matters in (2) and (3) above. Some additional comments will be made in the following.

Efforts should be made to gain cooperation from inhabitants by making them understanding consequences of the destruction of forests. For instance, if forests are completely destroyed, it will make it impossible to conserve water and soil, and consequently

devastate the national land. Agriculture and live-stock farming will also become impossible. A subsequent occurrence of natural disasters will frequently inhibit people from living in safety. Fuelwood and other daily necessities will not be easily supplied, either. Inhabitants should be enlightened on these effects of the destruction of forests on their life.

(8) Spreading Afforestation

Silvicultural techniques and tree breeding are essential to expanding man-made forests. Moreover, afforestation is a project for infrastructure, and therefore it should be studied how to procure funds. In addition to public funds, (a) private participation and (b) overseas funds should be studied.

(9) Utilizing Forest Products

To utilize forest products, improvement should be made in (a) bucking efficiency, (b) processing efficiency, and (c) durable use.

Improvement in bucking efficiency has various aspects which will lead incomes to increase. Cases of advanced countries should be reviewed.

Processing efficiency is related to markets, and therefore should be improved in such a way as to be accepted by markets. As sophisticated techniques are required for improvement in many cases, steady efforts should be made toward an increase in profits.

Durable use could be improved by preservation, insect control and recycling.

(10) Advanced Technology for Forestry and Forest Industries

Transfer of advanced technology for forestry and forest industries (tree breeding, tissue culture, remote sensing, etc.) is strongly requested by educational institutions, including universities.

Although educational institutions cannot undertake all aspects of research, education and extension, the above-mentioned request could

be satisfied to some extent by training instructors outside Thailand and dispatching experts to Thailand.

Moreover, it could be achieved if instructors and researchers study abroad, or if technical tie-up is made with private enterprises. International cooperation in a form of project should also be considered.

