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JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

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

JULY 1992

JAPAN OVERSEAS FORESTRY CONSULTANTS ASSOCIATION
(JOFCA)

国際協力事業団
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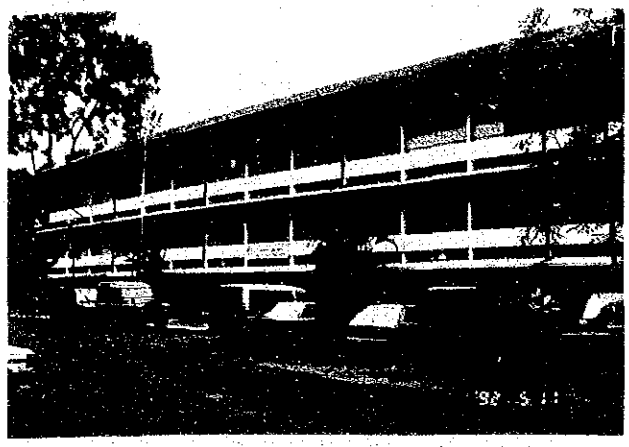


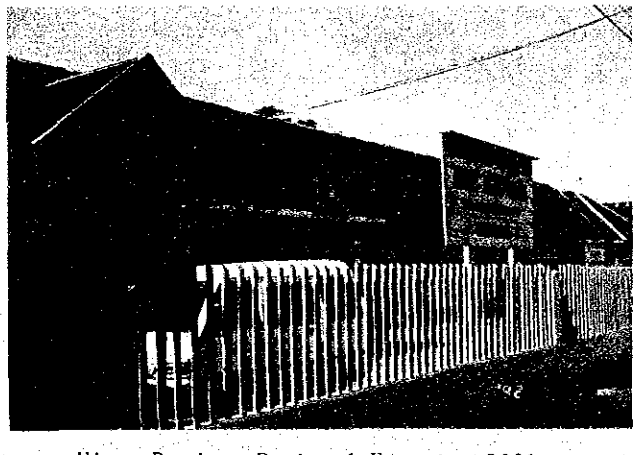
Darmaga Campus, Faculty of Forestry,
Bogor Agricutural University

Dean, Faculty of Forestry,
IPB (3rd from the right)
The right side is Prof. Koswara.

Forestry Senior High School, Bogor

Agency for Forestdry Research
and Development, Bogor

A herbarium at Hasanuddin University

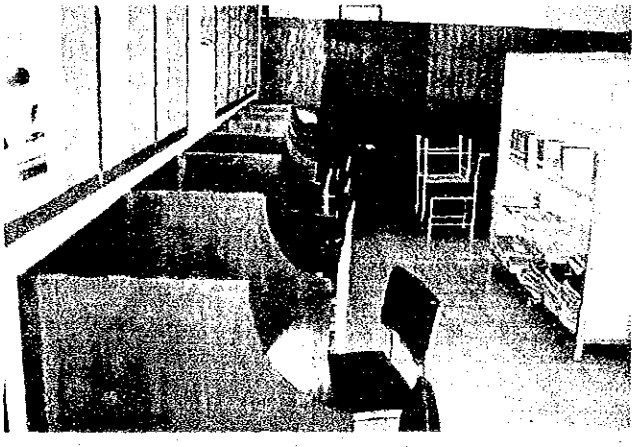


Ujung Pandang Regional Forestry Office

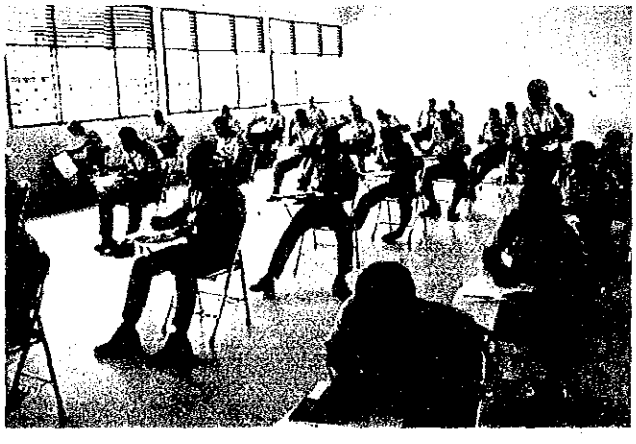
The achievement of the project training

The office of Watershed Management Technoiogy Development Project in South Sulawesi

A fence made of stone.
(It gives us such information as a feeding damage by live stock, forest fires, poor soil, wood shortage, ・・・) South Sulawesi



A library at Forestry Training Center, Ujung Pandang



Forestry Senior High School, Ujung Pandang.
When the graduation near, long-hair prohibited. It is a kind of discipline.

Contents

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 Indonesia in May, 1992.

2. Current Situation of Forests

Indonesia has a total area of 193 million hectares (ha), of which 144 million ha is covered by forests, accounting for 75% of the total.

Forests are classified by usage as follows:

1) Reservation Forests	19 million ha	National parks, sanctuaries, etc.
2) Protection Forests	30 million ha	Soil and water protection, etc.
3) Limited Production Forests	30 million ha	Limited production with soil protection
4) Production Forests	34 million ha	Sustainable production
5) Converted Forests	31 million ha	Conversion to farmland

Tropical forests in Indonesia occupy the second largest area to Brazilian Amazon in the world, providing a treasury of genetic resources, medical plants and industrial raw materials. It is reported that 10,000 tree species, 500 mammalian species, 1,500 bird species, and 2,000 to 3,000 fish species exist in tropical forests.

3. Forestry Policies

In January, 1992, the Policy Paper on Forestry Development was prepared. Main policies presented in the paper will be outlined in the following.

(1) National Forestry Policies

In commemoration of the World Environment Day of June 3, 1989, President of the Republic of Indonesia presented the following policies. Indonesia will:

1) Create an environment to facilitate industrial development by using science and technology without overemphasizing the development of natural resources.

2) Determine properly export and import taxes to enhance the value of exported products, while reducing pressure on natural resources as raw materials.

3) Encourage people to take care of the natural environment by promoting eco-tourism, while improving welfare of inhabitants in forests.

4) Appeal to people all over the world for expanding afforestation/ reforestation. Indonesia will continuously invest US$300 million per year in a plantation of 300,000 ha/year in sixty-five years. If every country positively afforests land, tropical countries will be able to grow without reducing the speed of development.

5) Secure and maintain biological diversity both inside and outside natural forests.

(2) The National Forestry Action Program for Protecting Forests

Indonesia's strategy of environmental protection has three goals to conserve biological resources in compliance with the world strategy of environmental protection.

1) To protect ecosystems and life-supporting system,
2) To conserve diverse genetic resources, and
3) To promote sustainable utilization of species and ecosystems.

(3) Sustainable Forest Management

The purpose of the Indonesian forestry is to secure long-term national benefits to increase in national income and employment by promoting environmental protection and sustainable use of natural resources in compliance with objectives of extensive economic development.

Strategies for sustainable forest management are to:

1) Direct loggers to improve management;
2) Adopt a planting system for sustainable production, especially regeneration of logged-over forests;
3) Use extensively by-products of natural forests to benefit local inhabitants;
4) Improve further forest protection measures;
5) Improve the monitoring of natural forest management;
6) Support the development of technology and manpower for forest development, promote the participation of people, and establish necessary training facilities;
7) Review concession management and provide incentives for improvement;
8) Support research and study to improve forest management, and create a pilot forest to apply the results;
9) Control forestry production;
10) Promote sound forest development as an industrial basis;
11) Improve further the trade of forest products;
12) Reforestation and development of Industrial Forest Plantation;
13) Operate the Indonesian selective cutting system in a harmonious way;
14) Conserve genetic diversity;
15) Promote PR activities to encourage people to become aware of environmental problems and love for nature; and
16) Promote the participation of non-government organizations.

4. Organization of Forest Management

Forests in Indonesia are state-owned under the jurisdiction of the Ministry of Forestry with some exceptions.

Forests are administered and managed by 27 forestry policy offices (Kanwil), 24 forestry offices (Dinas Kehutanan) throughout the country, and National Forest Corporation (Perum Perhutani) on Jawa Island. Forestry policy offices are mainly responsible for forest administration, while forestry offices and National Forest Corporation are mainly responsible for forest management and other executive aspects. In Jawa, National Forest Corporation and Forest Office share in administration and management by dividing forest areas. The latter is in charge of forests on outer isles.

The total of the people engaged in forest administration, and the staffs and organization charts of the Ministry of Forestry and National Forest Corporation are shown in Table 1, and Figs. 1, 2-1, 2-2, respectively.

The total of the people concerned with forestry (248,455) can be classified by educational background as follows:

Background	Number	%
a. University/college graduate (Sarjana)	4,994	2.00
b. Diploma holder (Sarjana Muda)	3,300	1.30
c. Senior high school graduate	82,353	33.10
d. Junior high school graduate	64,748	26.10
e. Elementary school graduate	93,050	37.50

Forestry offices manage national forests in parts of Java and outer isles. In the case of South Sulawesi, the forestry office has jurisdiction over 8 district forestry offices in charge of 141 forest sections. As a rule, university graduates are eligible for the head of a district office, while senior high school graduates are for the chief of a section (see the following chart).

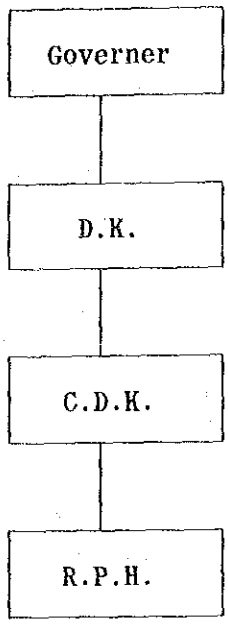


Table 1 shows the organization of the Ministry of Forestry. Items 1 to 16 are government officials, Item 17 is a public forest corporation, and Items 18 to 20 are employees of private companies.

Professional and Sarjana stand for university graduates, Sarjana muda for diploma holders, SLTA for senior high school graduates, SKMA for graduates from forestry senior high schools, KKMA for a training course equivalent to forestry senior high school, SLP for junior high school graduates, and SD for elementary school graduates.

Fig. 1 is an organization chart of the Ministry of Forestry. As shown in the lower right, 27 forestry policy offices (Kanwil Kehutanan) and 24 forestry offices (Dimas Kehutanan) are locally organized.

Fig. 2 is an organization chart of a public forest coproration in Java.

Table 1 Human Resource Position in the Forestry Sector, 1988/89

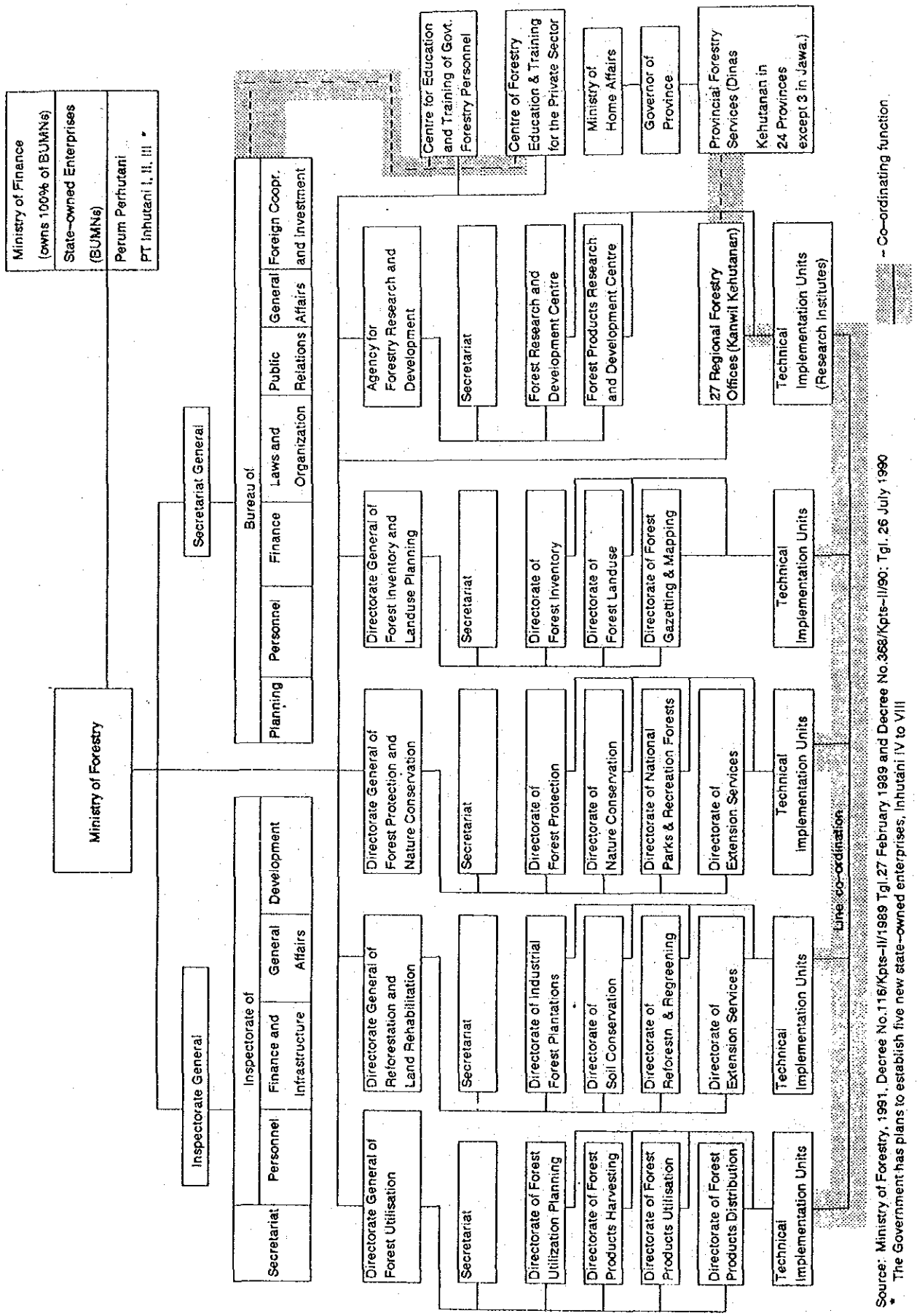
Institution	EDUCATIONAL QUALIFICATIONS								TOTAL
	Professional Sarjana and above	Technical			Vocational				
		Sarjana muda	SLTA 1/ (SKMA & KKMA)	Total	SLTA	SLP 1/	SD 1/	Total	
1. Advisory staff of the Minister	6	-	-	-	-	-	-	-	6
2. Secretariat Gen. and Centres for Forestry Education and Training	297	32	30	62	319	68	76	463	822
3. Inspectorate General	67	8	-	8	55	11	12	78	153
4. DG of Forest Utilization	167	35	17	52	134	30	33	197	416
5. DG of Reforestation and Land Rehabilitation	143	37	18	55	160	35	38	233	431
6. DG of Forest Protection and Nature Conservation	210	57	44	101	351	78	84	513	824
7. DG of Forest Inventory and Land-Use Planning	77	32	22	54	154	35	37	226	357
8. Agency for Forest Research and Development	185	67	34	101	318	69	76	463	
Ministry sub-total	1,152	268	165	433	1,491	326	356	2,173	3,758
9. Regional Forestry Office (Wilayah)	634	209	138	347	886	109	78	1,073	2,054
10. Provincial Forestry Service (Dinas Kehutanan)	839	406	925	1,331	6,276	2,426	2,121	10,823	12,993
11. Training Institution	94	62	28	90	224	56	125	405	589
12. Information and Forest Products Certification Institute	75	34	25	59	157	18	9	184	318
13. Soil Conservation and Land Rehabilitation	392	331	403	734	5,058	506	604	6,168	7,294
14. National Parks Service	243	193	211	404	2,455	569	468	3,492	4,139
15. Forest Inventory and Mapping Institution	144	77	114	191	1,194	145	90	1,429	1,764
16. Forest Research and Development Institution (LITBANG)	50	16	11	27	74	27	18	119	196
Regional/Provincial sub-total	2,471	1,328	1,855	3,183	16,324	3,856	3,513	23,693	29,347
17. Perum Perhutani	400	277	752	1,029	2,527	2,206	6,183	10,916	12,345
18. PT. inhutani I, II, III	147	82	160	242	334	258	560	1,152	1,541
19. Marunda Wood Centre 2/	20	6	-	6	19	5	21	45	71
State Enterprises sub-total	567	365	912	1,277	2,880	2,469	6,764	12,113	13,957
20. Forest Management and Logging	468	752	993	1,745	18,874	23,142	26,247	68,263	70,476
21. Sawmilling Industry	100	127	437	564	8,307	9,511	17,013	34,831	35,495
22. Wood-based Panels	236	460	1,506	1,966	28,609	25,444	39,157	93,210	95,412
Forest Concession sub-total	804	1,339	2,936	4,275	55,790	58,097	82,417	196,304	201,383
Grand total	4,994	3,300	5,868	9,168	76,485	64,748	93,050	234,283	248,445

1/SLTA = Senior High School; SLP = Junior High School; SD = Primary School; SKMA = Forestry Senior High School; KKMA = Senior Forestry Course
2/Marunda Wood Centre was liquidated in July 1990 as a State Enterprise, and its assets transferred to another enterprise for management

Source: (i) Ministry of Forestry, Secretariat General Evaluasi Hasil Pemantauan Tenaga Kerja Pengusaha Hutan Tahun 1988/89
(ii) FAO/GOI Forestry Studies Data Base

Note: (i) The figures in different tables provided in this report may not always tally with each other due to reporting errors, and definition and interpretation problems.
(ii) The figures do not include employment in non concession operation and mills, small-scale activities involving non-wood forest products and casual labour. It does not also include those who work in University Departments/Faculties of Forestry.

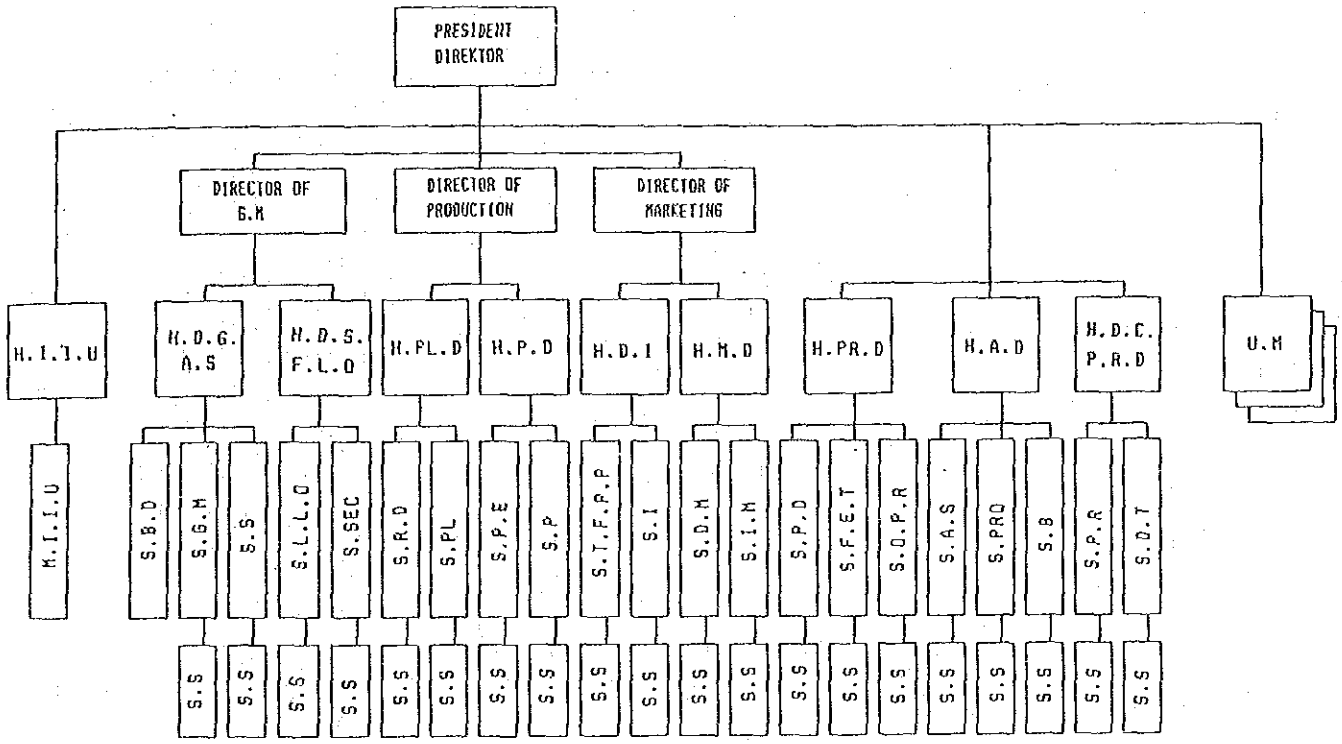
Fig. 1 Organization structure of public forest administration



Source: Ministry of Forestry, 1991, Decree No.116/Kpts-II/1989 Tgl.27 February 1989 and Decree No.368/Kpts-II/90: Tgl. 26 July 1990

* The Government has plans to establish five new state-owned enterprises, Inhutani IV to VIII

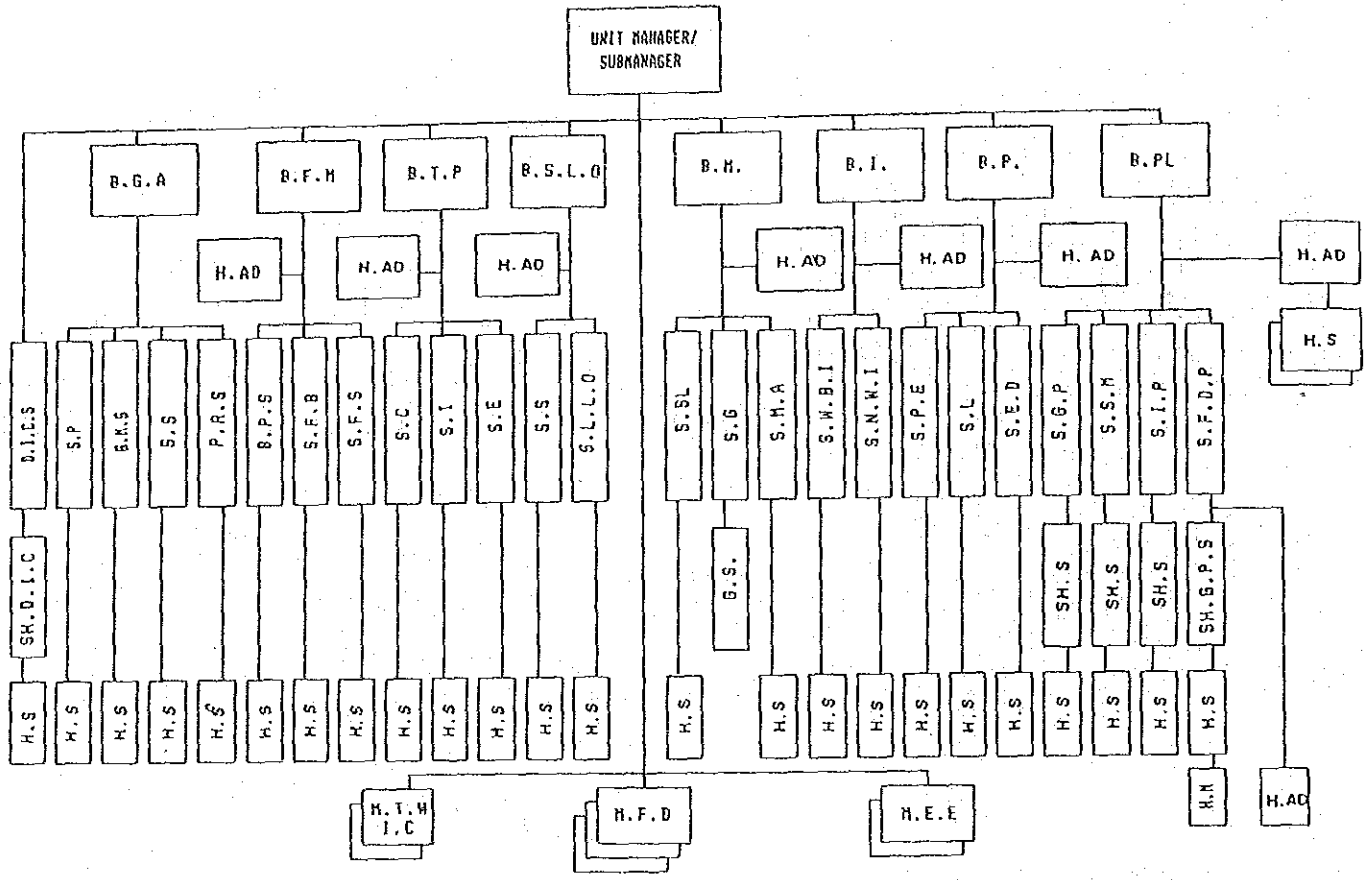
Fig. 2-1 Organization Chart of Perum Perhutani Office of the Board of Directors (Head Office)



NOTE:

H.I.I.U : HEAD OF INTERNAL INSPECTION UNIT
H.D.G.A.S : HEAD OF THE DIVISION FOR GENERAL AFFAIRS AND SUPPLIES
H.D.S.F.L.D : HEAD OF THE DIVISION FOR SECURITY AND FOREST LAND OWNERSHIP
H.PL.D : HEAD OF PLANNING DIVISION
H.P.D : HEAD OF PRODUCTION DIVISION
H.D.I : HEAD OF DIVISION FOR INDUSTRY
H.M.D : HEAD OF MARKETING DIVISION
H.PR.D : HEAD OF PERSONEL DIVISION
H.A.D : HEAD OF ACCOUNTING DIVISION
H.D.C.P.R.D : HEAD OF THE DATA CENTRE AND PUBLIC RELATIONS DIVISION
U.M : UNIT MANAGERS
M.I.I.U : MEMBERS OF THE INTERNAL INSPECTION UNIT
S.B.D : SECRETARY OF THE BOARD OF DIRECTORS
S.G.M : SUBDIVISION OF GENERAL MATTERS
S.S : SUBDIVISION OF SUPPLIES
S.L.L.D : SUBDIVISION OF LAW AND LAND OWNERSHIP
S.SEC : SUBDIVISION OF SECURITY
S.R.D : SUBDIVISION OF RESEARCH AND DEVELOPMENT
S.PL : SUBDIVISION OF PLANNING
S.P.E : SUBDIVISION OF PLANTATION ESTABLISHMENT
S.P : SUBDIVISION OF PRODUCTION
S.T.F.P.P : SUBDIVISION TECHNICS OF FOREST PRODUCT PROCESSING
S.I : SUBDIVISION OF INDUSTRY
S.D.M : SUBDIVISION OF DOMESTIC MARKETING
S.I.M : SUBDIVISION OF INTERNATIONAL MARKETING
S.P.D : SUBDIVISION OF PERSONNEL DEVELOPMENT
S.F.E.T : SUBDIVISION OF FORESTRY EDUCATION AND TRAINING
S.O.P.R : SUBDIVISION ORGANIZATION FOR PERSONNEL RECRUITMENT
S.A.S : SUBDIVISION OF ACCOUNTANCY AND SUPERVISION
S.PRO : SUBDIVISION OF PROCUREMENT
S.B : SUBDIVISION OF BUDGETTING
S.P.R : SUBDIVISION FOR PUBLIC RELATION
S.D.T : SUBDIVISION DATA CENTRE
S.S : SPECIFIC STAFF

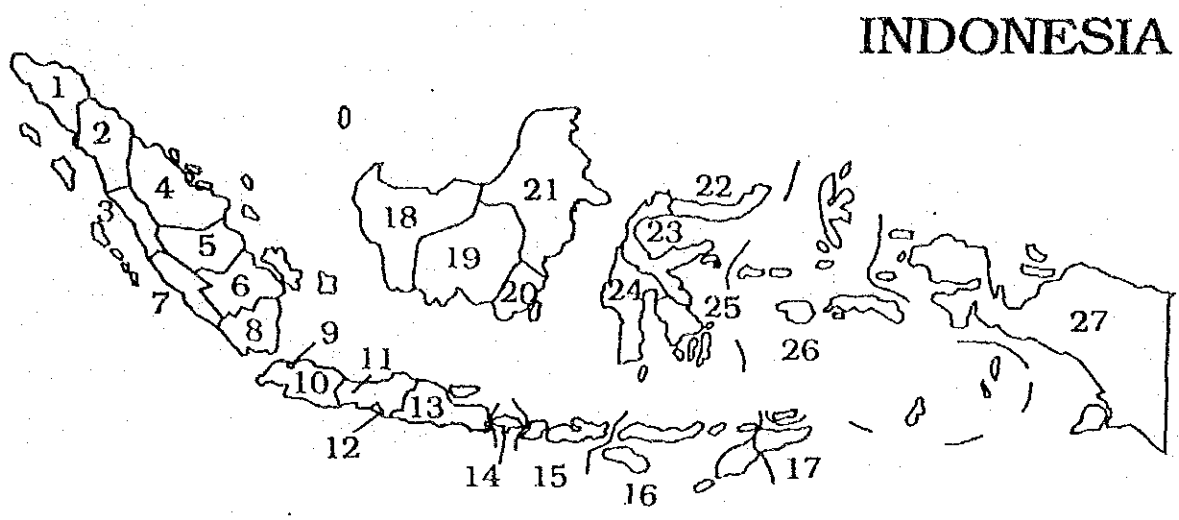
Fig. 2-2 Organization of Perum Perhutani
Unit (I = Central Java, II = East Java, III = West Java)



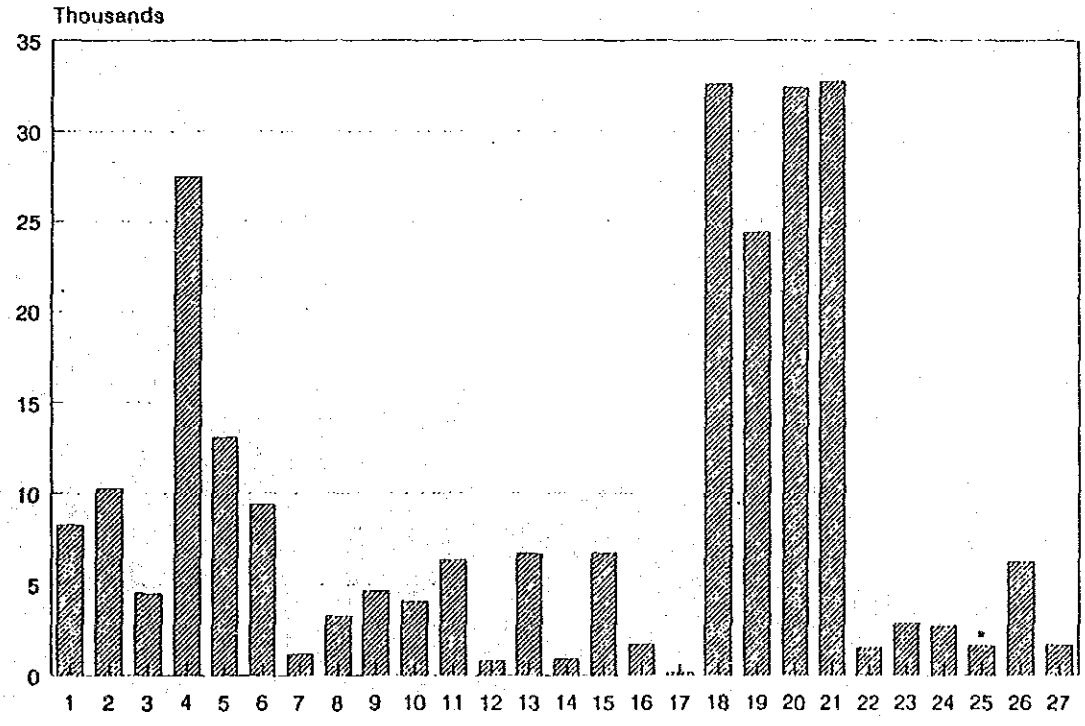
NOTE:

B.G.A : BUREAU FOR GENERAL AFFAIRS	B.P.S : BUDGETING AND PROCUREMENT SECTION	S.L : SECTION FOR LOGGING
B.F.M : BUREAU FOR FINANCIL MATTERS	S.F.B : SECTION FOR FINANCIAL BOOKKEEPING	S.E.D : SECTION FOR ENVIRONMENTAL DEVELOPMENT
B.T.P : BUREAU FOR TECHNICS AND PROCUREMENT	S.F.S : SECTION FOR FINANCIAL SUPERVISION	S.G.P : SECTION FOR GENERAL PLANNING
B.S.L.O : BUREAU FOR SECURITY AND LAND OWNERSHIP	S.C : SECTION FOR CONSTRUCTION	S.S.M : SECTION FOR SURVEYING AND MAPPING
B.M. : BUREAU FOR MARKETING	S.I : SECTION FOR INSTALLATION	S.I.P : SECTION FOR INFRA-STRUCTURE PLANNING
B.I. : BUREAU FOR INDUSTRY	S.E : SECTION FOR EQUIPMENTS	S.F.D.P : SECTION FOR FOREST DISTRICT PLANNING
B.P. : BUREAU FOR PRODUSTION	S.S : SECTION FOR SECURITY	SH.S : SUB-HEAD OF THE SECTION
B.PL : BOUREAU FOR PLANNING	S.L.L.O : SECTION FOR LAW AND LAND OWNERSHIP	SH.G.P.S : SUB-HEAD OF GENERAL PLANNING SECTION
H.AD : HEAD OF THE ADMINISTRATION	S.SL : SECTION FOR SALES	G.S. : GRADING SUPERVISOR
D.I.C.S : DATA AND INFORMATION CENTRE SECTION	S.G : SECTION FOR GRADING	SH.D.I.C : SUB HEAD OF THE DATA INFORMATION CENTRE
S.P : SECTION FOR PERSONNEL	S.M.A : SECTION FOR MARKET ANALYSIS	H.S : HEAD OF SECTION, H.M : HEAD OF MATTERS
G.M.S : GENERAL MATTERS SECTION	S.W.B.I : SECTION FOR WOOD BASED INDUSTRY	M.T.W.I.C : MANAGER OF THE TEAK WOOD INDUSTRY CENTRE
S.S : SECTION FOR STATISTICS	S.N.W.I : SECTION FOR NON WOOD INDUSTRY	M.F.D : MANAGER OF FOREST DISTRICTS
P.R.S : PUBLIC RELATIONS SECTION	S.P.E : SECTION FOR PLANTATION ESTABLISHMENT	M.E.E : MANAGER EXECUTER OF EXPORT

Reference Figure 1 Human Resource Development in Forestry by Province, 1988/89



1.	DI Aceh	(8,240)	15.	Nusa Tenggara Barat	(6,741)
2.	Sumatera Utara	(10,261)	16.	Nusa Tenggara Timur	(1,699)
3.	Sumatera Barat	(4,495)	17.	Timor Timur	(197)
4.	Riau	(27,481)	18.	Kalimantan Barat	(32,591)
5.	Jambi	(13,110)	19.	Kalimantan Tengah	(24,410)
6.	Sumatera Selatan	(9,379)	20.	Kalimantan Selatan	(32,385)
7.	Bengkulu	(1,184)	21.	Kalimantan Timur	(32,727)
8.	Lampung	(3,291)	22.	Sulawesi Utara	(1,552)
9.	DKI Jakarta	(4,652)	23.	Sulawesi Tengah	(2,882)
10.	Jawa Barat	(4,057)	24.	Sulawesi Selatan	(2,736)
11.	Jawa Tengah	(6,330)	25.	Sulawesi Tenggara	(1,630)
12.	DI Yogyakarta	(827)	26.	Maluku	(6,280)
13.	Jawa Timur	(6,693)	27.	Irian Jaya	(1,695)
14.	Bali	(920)			

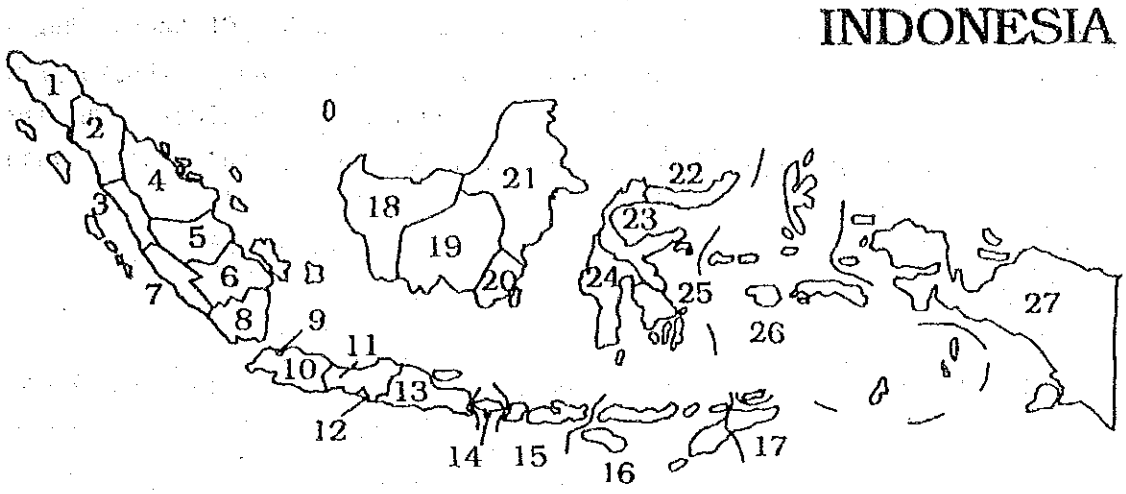


Reference Table 2 Employees with Sarjana, Sarjana Muda and SLTA in the Forestry Sector, 1988/89

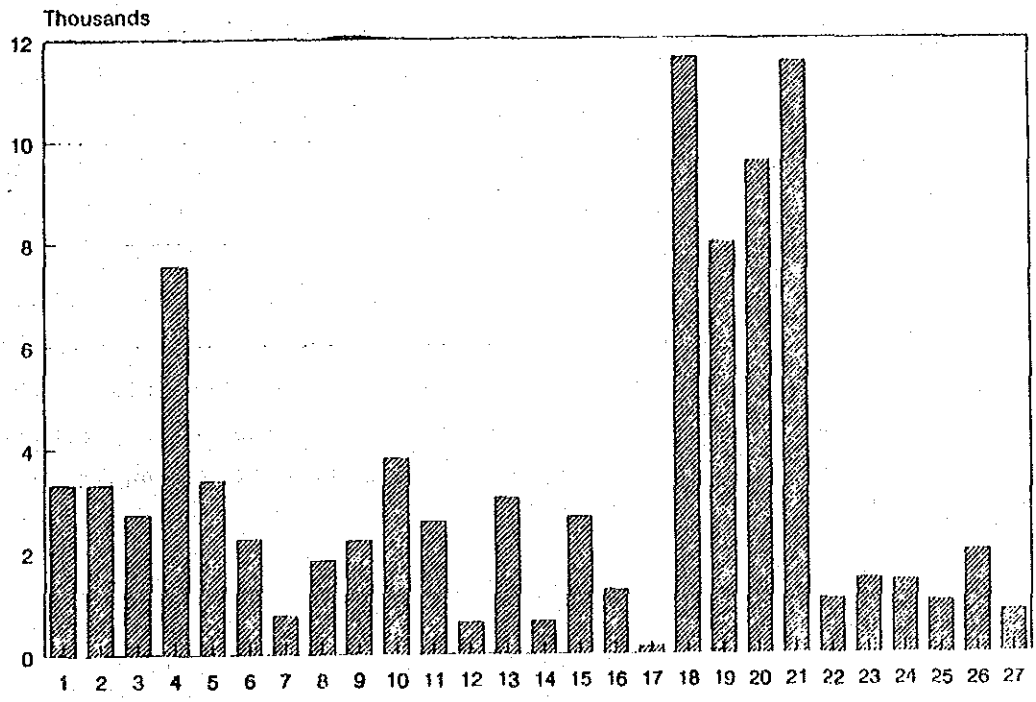
Province	Public Sector			Private Sector			Total			Grand Total
	Sarjana	Sarjana Muda	SLTA	Sarjana	Sarjana Muda	SLTA	Sarjana	Sarjana Muda	SLTA	
DI Aceh	77	42	540	31	72	2,550	108	114	3,090	3,312
Sumatera Utara	115	39	1,074	44	66	1,983	159	105	3,057	3,321
Sumatera Barat	76	42	533	36	36	2,019	112	78	2,552	2,742
Riau	84	51	586	69	167	6,585	153	218	7,171	7,542
Jambi	63	29	396	31	72	2,804	94	101	3,200	3,395
Sumatera Selatan	118	59	850	31	60	1,137	149	119	1,987	2,255
Bengkulu	59	25	363	5	14	298	64	39	661	764
Lampung	107	69	745	12	19	876	119	88	1,621	1,828
Jawa Barat	238	239	1,748	-	-	-	238	239	1,748	2,225
DKI Jakarta	1,392	357	2,051	-	-	-	1,392	357	2,051	3,800
Jawa Tengah	195	142	2,257	-	-	-	195	142	2,257	2,594
Yogyakarta	74	31	521	-	-	-	74	31	521	626
Jawa Timur	239	173	2,626	-	-	-	239	173	2,626	3,038
Bali	58	43	557	-	-	-	58	43	557	658
N. Tenggara Barat	69	37	483	69	63	1,942	138	100	2,425	2,663
N. Tenggara Timur	151	77	1,014	-	-	-	151	77	1,014	1,242
Timor Timur	20	9	103	-	-	-	20	9	103	132
Kalimantan Barat	91	39	785	73	138	10,485	164	177	11,270	11,611
Kalimantan Tengah	123	58	891	77	114	6,705	200	172	7,596	7,968
Kalimantan Salatan	132	53	796	143	193	8,259	275	246	9,055	9,576
Kalimantan Timur	199	69	1,060	103	208	9,889	302	277	10,949	11,528
Sulawesi Utara	79	29	853	16	6	80	95	35	933	1,063
Sulawesi Tengah	66	42	501	18	20	819	84	62	1,320	1,466
Sulawesi Selatan	147	114	758	11	14	364	158	128	1,122	1,408
Sulawesi Tenggara	70	38	576	21	35	302	91	73	878	1,042
Maiuku	58	22	365	5	21	1,535	63	43	1,900	2,006
Irian Jaya	89	34	596	8	21	94	97	55	690	842
Total	4,189	1,962	23,628	803	1,339	58,726	4,992	3,301	82,354	90,647

Source: FAO/GOI Forestry Studies Data Base

Fig. 2-2 Trained Human Resource with Sarjana, Sarjana Muda and SLTA in the Forestry Sector by Province, 1988/89



1.	DI Aceh	(3,312)	15.	Nusa Tenggara Barat	(2,663)
2.	Sumatera Utara	(3,321)	16.	Nusa Tenggara Timur	(1,242)
3.	Sumatera Barat	(2,742)	17.	Timor Timur	(132)
4.	Riau	(7,542)	18.	Kalimantan Barat	(11,611)
5.	Jambi	(3,395)	19.	Kalimantan Tengah	(7,968)
6.	Sumatera Selatan	(2,255)	20.	Kalimantan Selatan	(9,576)
7.	Bengkulu	(764)	21.	Kalimantan Timur	(11,528)
8.	Lampung	(1,828)	22.	Sulawesi Utara	(1,063)
9.	DKI Jakarta	(2,225)	23.	Sulawesi Tengah	(1,466)
10.	Jawa Barat	(3,800)	24.	Sulawesi Selatan	(1,408)
11.	Jawa Tengah	(2,594)	25.	Sulawesi Tenggara	(1,042)
12.	DI Yogyakarta	(626)	26.	Maluku	(2,006)
13.	Jawa Timur	(3,038)	27.	Irian Jaya	(842)
14.	Bali	(658)			
				Total	90,647



5. Forestry Education

In Indonesia, there are 14 universities and colleges which have courses in forestry, and produced 684 graduates in 1990. Of them, Bogor Agricultural University, Gajah Mada University, and Tanjungpura University have their respective forestry faculties or sections. In the following, Bogor Agricultural University and Hasanuddin University will be briefly described.

(1) Bogor Agricultural University

The forerunner of Bogor Agricultural University is Landbouw-hogeschool founded by the Dutch Government in the 1940s. Subsequently, this became the Faculty of Agriculture, the University of Indonesia. It became independent Bogor Agricultural University in 1963 composed of six faculties including forestry. Sarjana (Ir) (close to bachelor) was established in 1972, and master and doctor programs were developed in 1975.

The Faculty of Forestry is located 10 km west of Bogor City, and a college forest of about 350 ha is located 40 km south of the same. It has a regular staff of 109 as of 1989, and 22 members have doctrates, while 26 have master's degrees and the remaining members are Sarjana (Ir).

Sarjana (Ir) is a four-year (eight semesters) course, requiring a minimum of 140 units. In the first year (two semesters), students learn basic sciences, including mathematics, physics, chemistry, and humanities. The study of silvicultural subjects is started in the third semester (i.e., the first semester of the second year). Field practice is required for about one month in the fourth and fifth semesters. Students have to choose their respective majors from three subjects, namely Forest Management, Forest Products Technology, and Forest Resources Conservation. In the eighth semester (the second semester of the final year), students have to determine their themes of research under the guidance of committee members, and prepare their respective reports while consulting the members.

In addition to this, master's and doctor's courses are available. There are five options in the master's program. Each optional major is designed for students to acquire a wider range of expertise and improve their professional abilities and quality as researchers. Doctoral majors will be determined by consulting advisers as well as persons in charge of the program.

(2) Hasanuddin University

This university is located on the outskirts of Ujung Pandang in South Sulawesi. It is organized on a small scale, and silvicultural education began in 1963. The regular faculty were no more than two in 1972. Subsequently, scholarships from Asian Development Bank, SEARCA, and MUCIA supported the replenishment of the faculty. Currently, 29 regular members work for the university. Of them, 9 have doctrates (S_3), and 5 have master's degrees S_2). The number of the faculty by section is shown in Table 3. The number of students by birthplace is shown in Table 4.

It is now strongly required to improve the quality of the young faculty, facilities, and experimental equipment and materials.

Table 2 Universities Having Forestry Courses

No.	University	Location	Degree Offered	Freshmen in 1990
1.	Forestry Academy	Bangung, West Java	S_0	*
2.	Gajah Mada University	Yogyakarta	S_1, S_2, S_3	200
3.	Lambung Mangkurat University	Banjarmasin, South Kalimantan	S_1	60
4.	Mulawarman University	Samarinda, East Kalimantan	S_1	100
5.	Hasanuddin University	Ujung Pandang, South Sulawesi	S_1	50
6.	Pattimura University	Ambon, Maluku	S_1	50
7.	Cendrawasih University	Jayapura, Irian Jaya	S_1	40
8.	Bogor Agricultural University	Bogor, West Java	S_1, S_2, S_3	192
9.	Palangkaraya University	Palangkaraya, Central Kalimantan	S_1	30
10.	Malang Agricultural Institute	Malang, East Java	S_1	*
11.	Pantekulu University※	Banda Aceh, DI Aceh	S_1	*
12.	STIPER Agricultural Institute※	Yogyakarta	S_1	*
13.	Dumogabone University※	Dumogabone, North Sulawesi	S_1	*
14.	Tanjungpura University	Pontianak, West Kalimantan	S_1	50

Note: S_1: Bachelor (Sarjana), S_2: Master, S_3: Doctor,
※: Private universities
*: Unavailable (a few in any case)

Table 3 Teaching Staff (Area and Background)

Field	Academic Background			Total
	S1	S2	S3	
1. Forest Product Technology	4 (UNHAS) Indonesia	-	1 (HOKKAIDO) Japan	5
2. Forest Soil and Water Conservation	3 (UNHAS) Indonesia	1 (UPLB) Philippina	1 (IPB) Indonesia	5
3. Ecology	2 (UNHAS) Indonesia	1 (WSU) USA	1 (HAWAI) USA	4
4. Silviculture	2 (UNHAS) Indonesia	1 (NAGOYA) Japan	1 (IOWA) USA	4
5. Forest Planning and Management	3 (UNHAS) 1 (IPB) Indonesia	1 (NICE) France	1 (USA) 2 (Japan) 1 (France) 1 (Philip-pina)	10
6. Forest Exploitation	-	1 (UPLB) Philippina	-	1
Total	15	5	9	29

Table 4 Students by Birthplace

Birthplace	Subject				Total
	Forest Products		Forest Management		
	Male	Female	Male	Female	
1. South Sulawesi	47	21	142	56	266
2. Central Sulawesi	-	3	7	3	13
3. S.E. Sulawesi	3	1	11	6	21
4. Irian Jaya	1	1	8	2	12
5. Maluku	3	2	4	2	11
6. Nusa Tenggara	2	-	13	5	20
7. East Jawa	4	2	9	1	16
8. Central Jawa	3	4	4	1	12
9. East Kalimantan	2	-	8	3	13
Total	65	34	206	79	384

6. Training of Forestry Technicians

(1) Forestry Training Center

The Ministry of Forestry has its own training center for its staff. The organization of the center is illustrated in Fig. 3. The Center for Education and Training of Forestry Officials (CETF-O) has general control over the system, to which eight forestry training centers (FTOs) are affiliated as shown in Table 5. The situations of these facilities and experimental forests across the country are shown in Tables 6 and 7, respectively.

In 1991 and 1992, 10,309 technicians are scheduled to receive training in five courses in (i) forest utilization, (ii) forest inventory and mapping, (iii) reforestation and regreening, (iv) forest conservation and protection, and (v) management, administration and extension.

The CETF-O also accepts trainees from overseas, for example, Thailand, Madagascar, the Philippines, Papua New Guinea, Senegal, Sri Lanka, Pakistan, Brunei, Solomon, Malaysia, etc.

(2) Development Center

The Center for Development of Forestry Education and Training (CDFET) also belongs to the Ministry of Forestry. This center is mainly designed to improve human resources in the private sector. It is organized as shown in Fig. 4. The organization includes technical training facilities and directly controlled forestry high schools (FHSs) at four places (Kadipaten, Pekanbaru, Samarinda, and Ujung Pandang). The staff excluding instructors at the CDFET headquarters and four schools are shown in Table 8 according to educational background.

The Fifth Five-year Plan (1989-1993) will be intended to educate and train about 31,000 persons. Specific subjects and students by grade are shown in Table 9. Trainees include persons concerned with logging concessions and forestry consultants, employees of afforestation companies, and technicians in the timber processing sector, including sawmills, plywood and block board mills, and

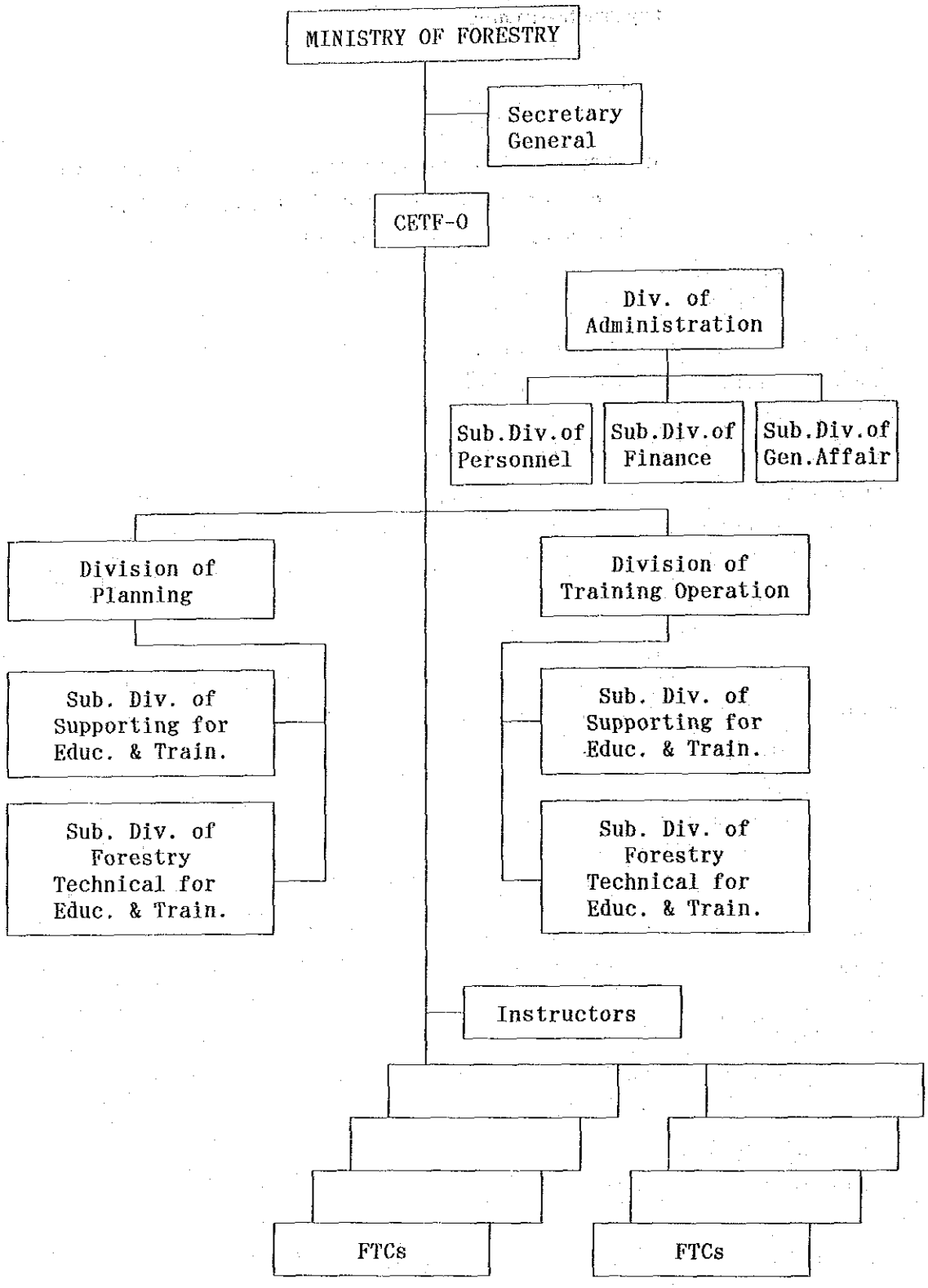


Fig. 3 Organization Chart of Forestry Training Center, MOF

Table 5 Location of Forestry Training Center

(1)	Bogor Forestry Training Centre, West Java Province, address Jl. Gunung Batu, P.O. Box 42, Phones (0251) 312841, Bogor
(2)	Kadipaten Forestry Training centre, West Java Province, address Jl. Raya Timur Sawala, Kadipaten
(3)	Pematang Siantar Forestry Training Centre, address Jl. Bali, P.O. Box 26, Pematang Siantar
(4)	Pekanbaru Forestry Training Centre, address Jl. Sidomulyo Km. 12.5, P.O. Box 47, Pekanbaru
(5)	Samarinda Forestry Training Centre, address Jl. Suropati, Karangasem, P.O. Box 78, Samarinda
(6)	Ujung Pandang Forestry Training Centre, address Jl. Perintis Kemerdekaan, Km. 17, Ujung Pandang
(7)	Kupang Forestry Training Centre, address Jl. Suropati, P.O. Box 76, Kupang
(8)	Manokwari Forestry Training Centre, address Jl. Untseng Trikora Arfai II, P.O. Box 77, Manokwari

Table 6 Facilities at Each Forestry Training Center

	Facilities	Classroom Capacity	Dormitory Capacity	Laboratory	Library	Workshop	Personnel's Residence	Office (m^2)
1.	FTC Bogor	3/120	1/99	3	-	-	13	240
2.	FTC Ujung Pandang							
	a. In Mappanyuki	2/60	1/60	-	-	-	5	225
	b. In Sudiang	6/180	2/120	1	1	1	4	471
3.	FTC Kadipaten	3/120	3/100	2	1	2**)	28	393
4.	FTC Samarinda	3/100	2/100	2	1	4	4	553
5.	FTC Pekanbaru	4/120	4/120	2	1	1	15	143
6.	FTC P. Siantar	4/60	4/60	1	1	1	15	137
7.	FTC Kupang *)	2/30	2/30	-	-	-	-	98
8.	FTC Manokwari *)	1/30	1/30	-	-	-	-	664

Note: *) Used by courtesy of the local Forestry Office.
**) At the disposal of the Forestry Senior High School and the Forestry Training Centre

Table 7 Training Forests of Each Forestry Training Center

No.	Location	Area
1	Jampang Tengah, Sukabumi, West Java	43.08 Ha
2	Sawala, Kadipaten, West Java	245.00 Ha
3	Aek Na Uli, P. Siantar, North Sumatera	300.00 Ha
4	Bukit Suligi, Pekanbaru, Riau	2,450.00 Ha
5	Loa Haur, Samarinda, East Kalimantan	12,500.00 Ha
6	Tabo-Tabo, Ujung Pandang, South Sulawesi	596.70 Ha
7	Tuwan Wowi, Manokwari, Irian Jaya	6,000.00 Ha
8	Soc, Kupang, East Nusa Tenggara	1,400.00 Ha
9	Gunung Walat, Sukabumi, West Java	350.00 Ha
10	Wanagama I, Yogyakarta, Central Java	600.00 Ha
11	Wanagama II, Jambi Province	pm Ha

furniture manufacturers.

(3) Bogor Forestry High School

This school is under the direct jurisdiction of the Ministry of Forestry. A middle level of technicians are trained at this school. Students are junior high school graduates who have passed the test given by the Ministry of Forestry. The number of students is 70 to 100 per year. The period of education is three years (two semesters a year), and students are divided into one to three classes. Subjects are required as shown in Table 10.

(4) Forestry Educational Center

Forestry educational centers affiliated to State Forestry Public Enterprise are located at Madiun and Cepu. Both centers train the personnel in forestry technology and management. The center at Madiun covers foremen and field supervisors. The details of training, including courses, period, and the number of trainees are shown in Table 11. The center at Cepu covers an upper level of employees who graduated from universities and colleges. The details of training, including courses, period, and the number of trainees are shown in Table 12.

(5) Training Program under the South Sulawesi Forestry Conservation Project

As part of the South Sulawesi Forest Conservation Project implemented by JICA, a training program covers the staff of the Soil Conservation and Land Rehabilitation Center belonging to the Indonesian Ministry of Forestry. The training began in 1991. Training facilities are not available under the project, but provided by the Forestry Training Center and partially by the Ujung Pandang Branch. It is planned to construct training facilities in 1992 at Marino Village near the project site. The layout of facilities of the Forestry Training Center at Ujung Pandang is shown in Fig. 5.

There are eleven soil conservation and land rehabilitation centers belonging to the Ministry of Forestry across the country, and the

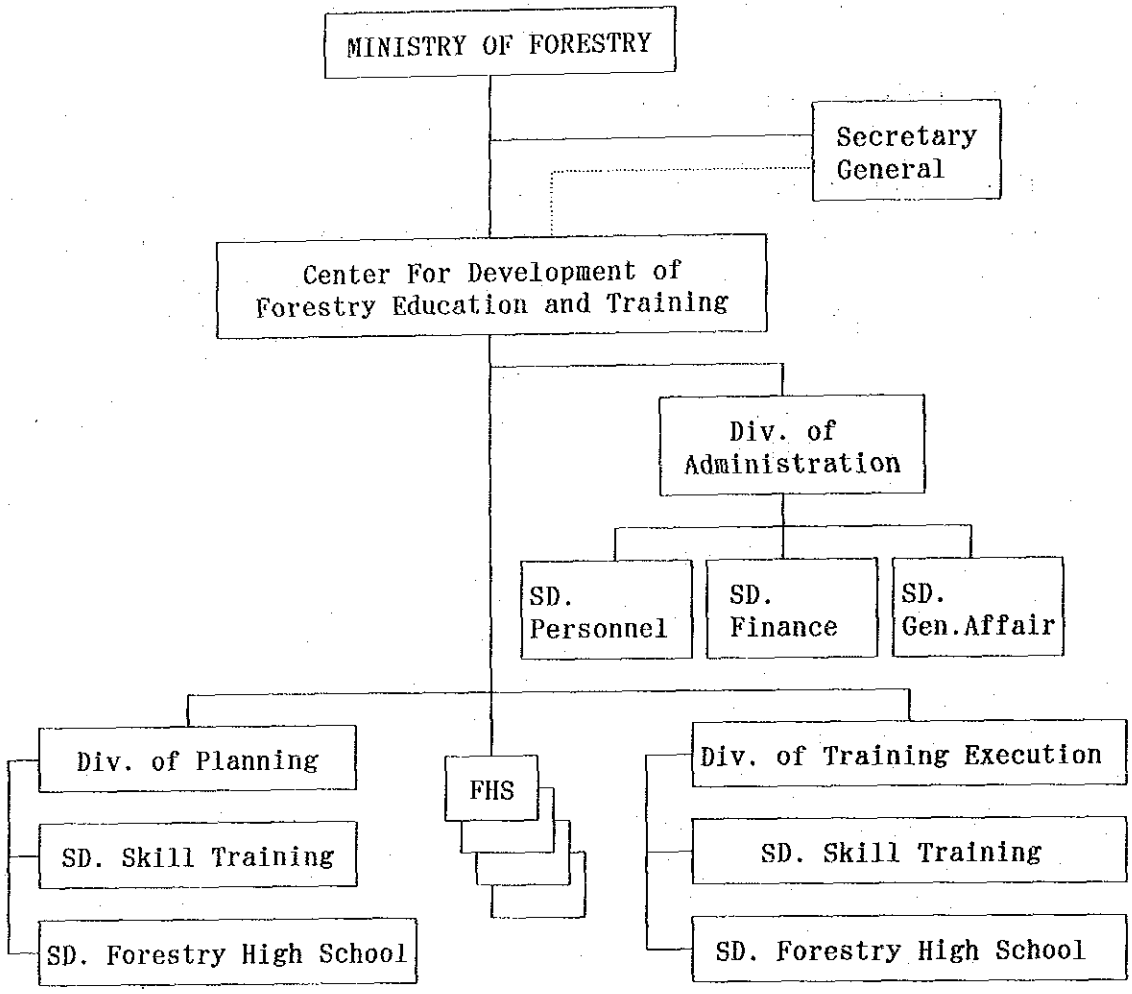


Fig. 4 Organization Chart of CDFET

Table 8 Educational Backgrounds of CDFET Personnel

No.	Organization	Background				Total
		University	Junior College	Senior High School	Lower than Senior High School	
1.	CDFET	16	3	8	6	33
2.	Kadipaten FHS	7	6	16	17	46
3.	Pekanbaru FHS	-	1	-	-	1*)
4.	Samarinda FHS	10	-	11	11	32
5.	Ujung Pandang FHS	-	-	1	-	1*)
	Total	33	10	36	34	113

Table 9 Training Program under the Fifth 5-year Plan

No.	Subject	No. of Trainees					Total
		1989/ 1990	1990/ 1991	1991/ 1992	1992/ 1993	1993/ 1994	
A.	Vocational Education	600	760	840	840	840	3,880
1	Forestry High School						
B.	Skill Training	2,920	3,300	3,130	4,020	4,200	17,570
1	Forest Utilization						
2	Reforestation and Land Rehabilitation	990	1,200	1,270	1,470	1,640	6,570
3	Forest Protection and Natural Conservation	720	900	900	900	1,200	4,620
4	Forest Inventory and Land Use	240	300	360	420	570	1,890
	Total B	4,870	5,700	5,660	6,810	7,610	30,650
	Total A + B						

Table 10 The Curriculum of Bogor Forestry High School

The details of the subjects are as follows:

1. General basic subjects consist of:

a. Religion
b. Education of Moral Pancasila
c. Education of the History of the Struggle of Nations
d. Indonesia National History and World History
e. Indonesian and Indonesian Literature
f. Sports and Health

2. Specification basic subjects consist of:

a. Mathematics
b. English
c. Cooperative
d. Physics
e. Chemistry
f. Biology
g. Introduction of Forestry Sciences
h. Forest Soil Science
i. Population and Environment
j. Climatology
k. Regulation of Law
l. Dendrology
m. Military Training

3. Specification subjects consist of:

a. Silviculture
b. Measurement and Mapping
c. Forest Planning
d. Forest Inventory
e. Forest Protection
f. Management of Natural Reservation (flora and fauna)
g. Forest Exploitation
h. Forest Product Technology
i. Scaling and Grading of Timber
j. Forest Economics and Forest Product Marketing
k. Forestry Extension
l. Forestry Management
m. Watershed Management (DAS)

Table 11 Number of Trainees by Course at the Madiun Forestry Education Center

No.	Course	Period	Trainees per Class	Total	Remarks
1	2	3	4	5	6
	I. Regular				
1.	Grade Course Level IB (KP.IB)	6 months*)	40/50	1,455	*Generally 1 (one) class, sometimes 2 (two) parallel classes per draft
2.	Grade Course Level IA (KP.IA)	6 months*)	40/50	1,489	
3.	Grade Course Level IIB (KP.IIB)	6 months*)	40/50	824	
4.	Grade Course Level IIA (KP.IIA)	6 months*)	40/50	581	
5.	Foreman Course				
	5.1 Preservation/ Spacing	10 days	90-95	654	
	5.2 Felling	10 days	90-95	727	
	5.3 Tapping	10 days	100-105	414	
	5.4 Planting	10 days	85-90	439	
	5.5 Security	10 days	90-100	1,184	
6.	Candidate Planting Foreman Course	30 days	175-100	1,070	
	Total				

Table 11 (Continued)

No.	Course	Period	Trainees per Class	Total	Remarks
1	2	3	4	5	6
	II. Non Regular				
1.	Senior Forestry Intermediate Course (KKMA)	12 months	40	190	
2.	Mensuration Course	a.12 months b. 6 months	30	143	
3.	Drawing Course	a.12 months b. 6 months	30-35	91	
4.	MPL/PEMK Operator	12 months	20-24	149	
5.	Maintenance	12 months	10-12	21	
6.	Assistant Operator	6 months	21	42	
7.	TPK Course	2 months	80-85	329	
8.	Timber Inspector Course	2 months	40-45	262	
9.	Wood Processing Course	2 months	72	72	
10.	Warehouse Adm.	2 months	61	122	
11.	P I P S	1 month	165-170	502	
12.	Computer	9 days	69	69	
13.	Felling Foreman Consolidation	10 days	83	166	
14.	Pre-functioning Group I II, III	1 month	100-150	6,062	
15.	Office Adm.	5 days	110-120	830	
16.	Sawdoctoring	3 days	16	16	
17.	Selection Test of a Candidate Civil Servants Group I, II, III	2 days	100-110	636	
	Grand Total			9,702	

Table 12 Number of Trainees by Course at the Cepu Forestry Education Center

No.	Course	Period	Trainees per Class	Total
1	2	3	4	5
1.	A. Regular Advanced Grade Course (KPI I)	6 months	30	722
2.	Advanced Grade Course (KPI II)	4 months	30	274
	B. Non Regular			
3.	School for Administrative Management, Advanced Level (Sepala)	2.5 months	30	60
4.	Man Power Planning	4 months	30	28
5.	Forest Inventarisation	1 month	30	30
6.	Public Relation	1 month	30	25
7.	Tree Upgrading	5 days	30	26
8.	Technical Hands for Forest Surveys and Interpretation of Air Photos	2 months	20	60
9.	KPL for Civil Engineers/Civil Engineers	6 months 4 months	30 30	60 30
10.	Treasurer A	2 months	30	188
11.	Treasurer B	2 months	30	240
12.	Finance, Material/HH (Forest/Timber Crops) Supervisor	1 month	30	66
13.	Administration I	1 month	30	239
14.	Administration II	2 months	30	106
15.	Computer Programmer	1 month	30	56
16.	Data Base Management System	1 month	20	40
17.	Fox Base	2 weeks	20	19
18.	Computer Maintenance	9 days	25	51
19.	Total Quality Control	10 days	20	47
20.	Sawmaster	10 days	20	62
21.	Saw Doctoring	3 days	20	20
22.	Timber Inspection Assistant	1 month	30	40
23.	Head of General Forestry Engineering (K.T.K.U.) Refreshment Course	1 month 2 months	25 30	50 30
24.	Planning Refreshment Course	1.5 months	30	77

Table 12 (Continued)

No.	Course	Period	Trainees per Class	Total
1	2	3	4	5
25.	Construction Engineering Refreshment	1 month	25	88
26.	Timber Yard (TPK) Chief Refreshment Course	1 week	30	40
27.	Marketing/Timber Yard (TPK) Inspector Refreshment	1 month	20	41
28.	Forest/Timber Crops (HH) Industrial Refreshment Course	1.5 months	20	22
29.	Forest/Timber Crops (HH) Marketing/Course Refreshment	1.5 months	20	22
30.	Administration Head Refreshment Course	1 month	30	151
31.	Personnel Refreshment Course	1 month	30	297
Total				3,309

training program under the project accept trainees from the Ninth Soil Conservation and Land Rehabilitation Center. The organization of this center is illustrated in Fig. 6.

The general extension course accepts 30 trainees from the staff of the field office who graduated from senior high schools (see Note) for one month, and our Indonesian counterparts provide them with general knowledge of forest conservation, afforestation and seedling production. The purpose of the course is to train foremen or instructors who will spread afforestation among local inhabitants. The staff of the field office who graduated from senior high school work at the office shown in Fig. 5 and are in charge of forest conservation, afforestation or tree breeding. They are called field superintendents, and currently total 820. In addition to this, the special technician training course is also available.

The specific training program and its details are shown in Table 13. They are practically subject to some change. Teaching materials are actively studied by Japanese experts. Although teaching materials should be developed based on the results of the project, forestry taking a long time makes it difficult to develop them for training which began in the third year of the project. As it is expected that full-scale implementation of various projects, including forestry conservation will impose more burdens on experts, we consider it appropriate to use existing data and teaching materials available from other projects while adding technologies developed and improved under this project to them from time to time.

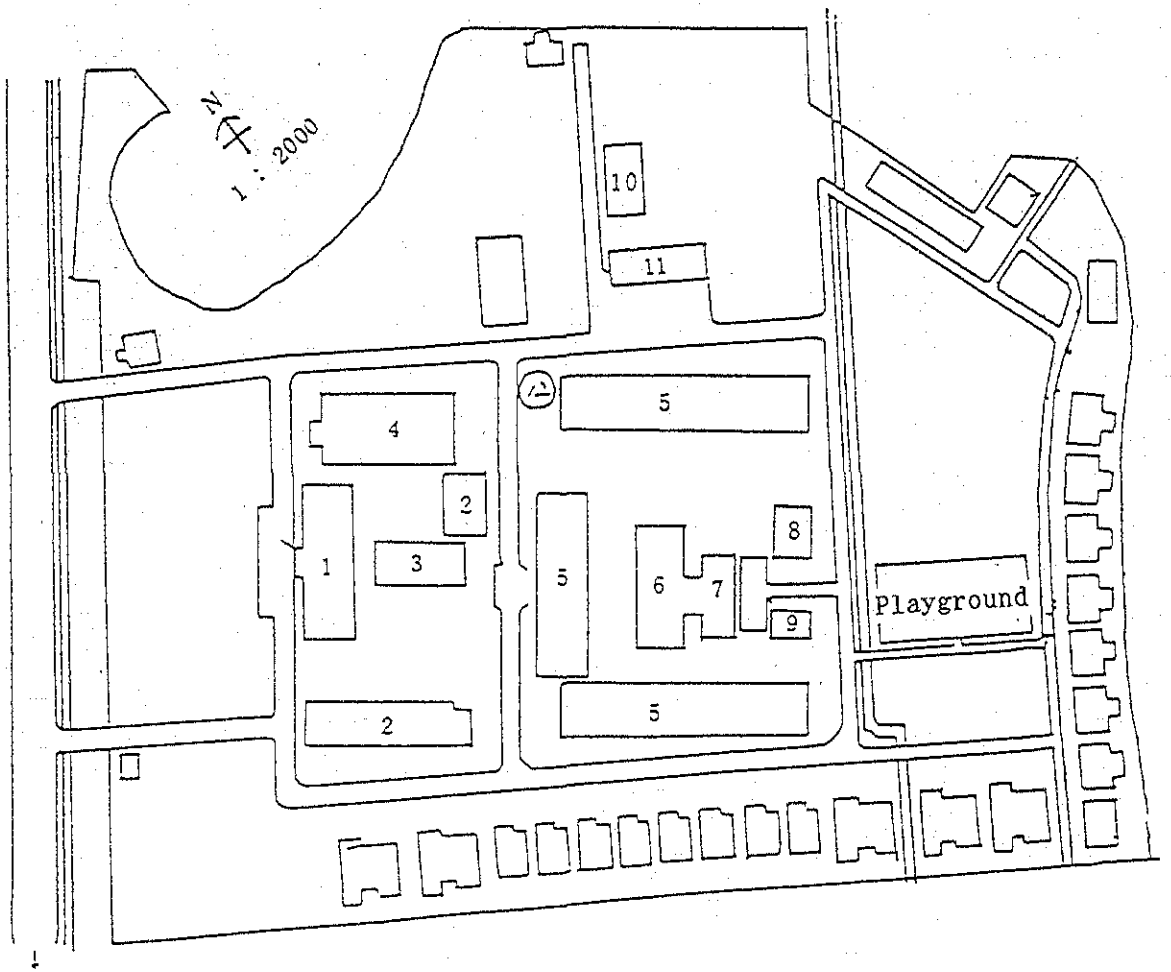
Moreover, the following problems in this training and their possible solutions are pointed out.

Our Indonesian counterparts currently assigned to training are all university/college graduates, and have no problem in transfer of technology. Therefore, knowledge and technology have been steadily transferred from Japanese experts to them. In the future, the number of the Indonesian counterparts should be increased by all means in anticipation of full-scale afforestation and training. We have to make a request for such increase as well as the stabilization of the present counterparts to Indonesia.

Since training is mainly provided by the Indonesian counterparts to the staff of the field office, teaching materials must be prepared in the local language. Accordingly, a budget will be required for preparing them.

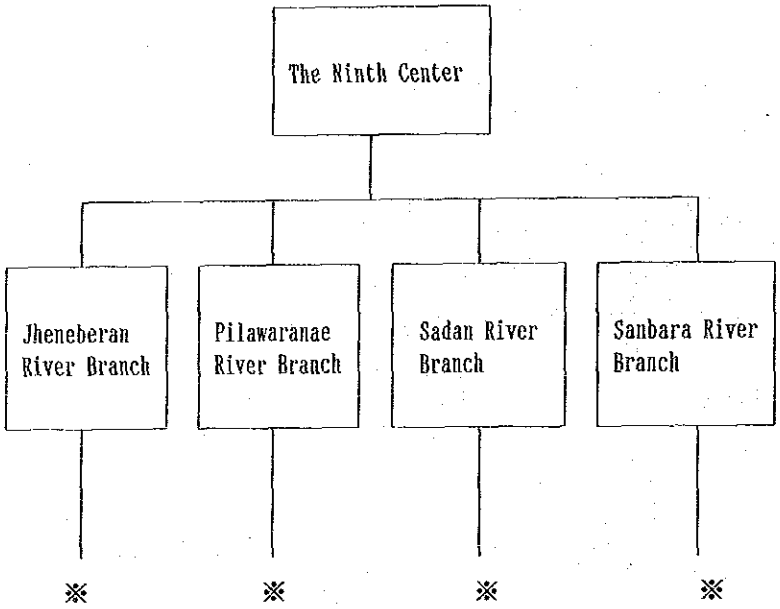
To upgrade their quality, our counterparts need to be trained in Japan as soon as possible.

Indonesia has very strong enthusiasm and expectations for training and already appropriated a budget for training. Despite the above-mentioned problem, various conditions for implementing the training program have been gradually provided. Transfer and extension of technologies developed and improved under this project are major objectives of this project. We should make more efforts to provide various conditions for implementing the training program on a full-scale by referring to the progress of training which started in 1960.



Facilities	Floor Space	Remarks
1 Office	960 m²	
2 Classroom	580	Photo 7 at the beginning of this report
3 Library	150	
4 Auditorium	600	
5 Dormitory	1645	
6 Dining room	320	
7 Kitchen	147	
8 Laundry	120	
9 Warehouse		
10 Repair room	120	
11 Garage	160	
12 Mosque	80	
No mark Personnel's residences, etc.		

Fig. 5 Facilities of the Ujung Pandang Forestry Training Center



※: Each branch has 17 local offices (one in each of 17 provinces in South Sulawesi).

Fig. 6 Organization of the Ninth Soil Conservation and Land Rehabilitation Center

Table 13 Training Program

Course	No. of Trainees	Period	Instructor	Background	Purpose	Goal
1. General Extension Course					To widespread general knowledge in various fields. To master the mechanism, sequence and process of operations, and personnel administration through practical experience.	Instructors who will widespread knowledge among local people, or field supervisors.
Forestry conservation, afforestation, tree breeding	30	1 month	Counterparts	Senior High School		
2. Special Technician Training Course					To give a high level of special knowledge. To master the mechanism of operations requiring sophisticated technology, process control, and personnel administration.	Chiefs at conservation centers or equivalents.
Forest and riverhead conservation	20	3 months	Counterparts Experts College lecturers	University College		
Erosion conservation						
Afforestation						
Seed and Nursery						
Machinery	15	1 & half months	Counterparts	Senior High School		
3. Training Course for Experts in Watershed Management					To give systematic education covering forest and riverhead conservation, forestry conservation, afforestation, tree breeding, and machinery, as well as required basic and applied sectors such as computer.	Special technicians in watershed management in Indonesia.
Watershed Management	5	1 year	Counterparts Experts College lecturers	University or higher		

7. Proposals

(1) Indonesia is one of the major forestry countries in the world. It is excellent in all aspects of forestry, including the forest area, forest resources and forest production, and forestry administration, management, organization and education.

Nevertheless, forests are not completely managed in all parts of the country. It is reported that forests have been destroyed at a rate of 1.3 million ha per year, and consequently the area and forest resources have been reduced. If the destruction continues at this rate, one quarter of the present forests are predicted to disappear by 2030. It is also forecast that economic development will also make timber supply tight and reach its limit unless man-made forests are substantially expanded. Whenever the rainy season begins late, forest fires cause great damages.

In areas where shifting cultivation is actively performed or cattle are excessively grazed, forests are remarkably destroyed. We wonder if no measure against them exists.

(i) In the ITCI's (International Timber Corporation Indonesia) plot in East Kalimantan, shifting cultivators are somehow prevented from invading.

(ii) In the Bukit Suharto Forest of Murawaruman University, an area of 30,000 ha was reduced to 5,000 ha due to shifting cultivation. The reduction was, however, stopped by the frequent appearance of people who vigorously carry out research activities in the college forest.

(iii) Java is an incomparably densely populated area in the world. Intensive forestry prevents forests from being reduced. Concrete measures include the creation of forests, the introduction of tunpang-sari, and the extension of pekarangan. As the above-mentioned three cases show, intensive forestry should be regarded as a specifically effective measure for preventing forests from being destroyed.

(2) Like other countries, Indonesia recently attaches the most importance to sustainable management and environmental protection in forestry policy. Indonesia promotes environmental protection in its

own way. We may well expect the Indonesian government to continue efforts for that. On the other hand, sustainable management is not easy to achieve in any country. We should like to take up it as one of our proposals in this report.

There are three approaches to sustainable management. They are to:

1) Prevent forests from decrease
2) Expand man-made forests
3) Utilize forest products by better ways.

1) Preventing Forests from Decrease

Education of local people and patrol are effective countermeasures.

Reckless shifting cultivation and excessive grazing cause forests to disappear and consequently devastate the national land. The less becomes forest area in upper reaches, the more difficult become water reservation and soil conservation as well as agriculture, live-stock farming, and livelihood in lower reaches. This fact should be widely made known to the public. It is essential to educate local inhabitants in the effects of forests and the importance of water and soil conservation.

Education of inhabitants requires training of extension workers, which in turn requires effective lectures and practice.

The current training of extension workers seems to need improvement. In Indonesia, every dinas kukutana (the state forest department) has lots of extension workers. As mentioned in Paragraph (1), there are favorable cases of reeducation of such workers within the country, and also many good cases in other countries, which will be useful as a case study. Moreover, senior extension workers should be trained by selecting good instructors at home and abroad so that they can be engaged in activities on the site. The authorities are also required improve their remuneration, and give an opportunity of promotion as instructors to those who have achieved a good result in field activity.

Although patrol is very effective in many cases, its effectiveness cannot be expected in disorderly areas unless patrol is specially reinforced.

Two patrolmen cannot cover more than 6,000 - 8,000 ha. Patrol should be selectively carried out in areas which need more patrol, because it is impossible to carry out simultaneously all over the region.

2) Expanding Man-made Forests

Technologies for creating forests have been developed in Indonesia. Therefore, some other problems will be discussed in the following.

a. It should be considered how to extensively attract private capital (participation from the private sector). Many cases of success in other countries should be reviewed so that appropriate tax incentives may be introduced.

b. Farmers also should be encouraged to plant trees. For this purpose, various measures, including the supply of necessary seedlings, guidance in agroforestry, the security of tenure, farmland ownership should be studied.

c. Public corporations for afforestation should also be established in areas other than Java, and large-scale industrial afforestation should be considered.

d. Afforestation is a project for infrastructure. Methods for procuring required funds should be considered.

e. More efforts should be made to breed tree species in order to enhance the economic value of planted trees.

As for b and e above, relevant technicians should be trained.

Those who wish private participation may be immediately faced with the problem of securing (a) land to plant and (b) silvicultural technicians.

With respect to (a), one possible solution is a sharing silvicultural system. That is, the government will offer land, while private participants will share in funds (execution of afforestation). The sales of harvests from plantations will be also shared by these parties. The ratio of the government to private participants is 3 to 7 or 4 to 6.

These two ratios will be chosen in view of:

(a) the necessity of incentives for afforestation (scale of incentives);
(b) the level of established silvicultural technology (if it is not established, investors will have to take a great risk, namely a great chance of failure); and
(c) the grade of the afforestation site (status and convenience).

With respect to (b), some people note a shortage of technicians. Technicians were previously somehow found in projects for afforestation by private participation when such project were still a few. If the projects increase, however, the training of additional technicians will be urgently needed.

Even if technicians are additionally required for private afforestation, they will need to be trained at national training institutions which have enough capacity and capability for training because the government promotes afforestation as its national policy.

In the case of Japanese local forestry offices, the continuous plantation of 50 to 100 ha per year requires at least one technician.

3) Utilizing Forest Products

a. Bucking efficiency on harvesting and the value of harvested trees should be improved. More persentage of one harvested tree should be bucked and sent to markets. Trees should be carefully bucked and handled.

b. To improve processing efficiency, sawdust and waste should be reduced as far as possible trying to use nearly 100% of raw materials.

c. To extend the durable years of products, preservation and insect control should be effectively used. Standard sizes should be introduced to avoid waste. Fuelwood should be used in appliances with high thermal efficiency.

With respect to all of a, b and c above, the opportunity of training should be improved in order to have good results.

Manpower training in the processing of forest products has three main approaches:

i) Project cooperation (e.g., a project for processing forest products, etc.)
ii) Dispatching trainees overseas (both public and private)
iii) Technical assistance by tie-up with foreign enterprises.

As these approaches have their respective characteristics, manpower could be effectively trained by combining them properly.