

**MINUTES OF MEETING BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY AND
AUTHORITIES CONCERNED OF THE GOVERNMENT OF
THE REPUBLIC OF INDONESIA
ON JAPANESE TECHNICAL COOPERATION FOR
THE FOREST FIRE PREVENTION MANAGEMENT PROJECT
PHASE TWO IN INDONESIA**

Japan International Cooperation Agency (hereinafter referred to as "JICA") had a series of meetings, through the Resident Representative of JICA in the Republic of Indonesia, with the Indonesian authorities concerned on the Forest Fire Prevention Management Project Phase Two in the Republic of Indonesia.

As a result of the meetings, both sides reached common understandings concerning the matter referred to the Project Document attached hereto.

Jakarta, March 9, 2001



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**Forest Fire Prevention
Management
Project
Phase II**

Project Document

March 2001

Technical Cooperation
Between
The Ministry of Forestry, Republic of Indonesia
And
Japan International Cooperation Agency (JICA)

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1. Introduction

Indonesia is an archipelago country of around 17,500 islands including three large islands namely Sumatra, Kalimantan and Sulawesi. This country lies bounded by latitudes 5°N and 11°S, longitudes 94° and 141°E. Population in 1999 was around 207 million and surface area is around 195 million square kilometers.

The Indonesian tropical rainforests cover around 10% of the remaining tropical rainforest in the world but are now being rapidly disappeared (annually 10.8 thousand square kilometers was lost from 1990 to 95). National parks cover about 13% of the Indonesian forestry area and are strongly and widely admitted to be important heritage for conservation by both Indonesian government and international society. The protection of national parks is important not only for Indonesia but also for people of the world in terms of conserving property for all human beings.

In 1997 and 1998, forest fires raged on and caused huge socio-economic impact including the loss of a wide area of tropical rainforest and accidents by aircraft because of haze. In 1997 and 98, large area of forest was lost by forest fire (nearly 807,000ha of forest including 126,000ha of forests in national parks). Forest fire is one of the most important issues that Indonesian government is facing and the government has committed to cope with forest fire in CGI meetings.

On April 15, 1996, JICA started a 5 year technical assistance project (Forest Fire Prevention Management Project) based on the request from Indonesian government to develop technologies for early warning and detection, and fire control, along with improvement of technology of participants of forest fire prevention and management.

Following Forest Fire Prevention management project, the government of Indonesia requested Japan to support the second phase of the project for the following technical cooperation in November 1999:

- (1) Development of technologies and applied systems using Early Warning and Detection through NOAA and MTSAT satellites.
- (2) Conduction of training on forest fire prevention and initial suppression at target provinces (such as Jambi and West Kalimantan.)
- (3) Assistance in training of forest fire prevention and initial suppression conducted by the training center of the Ministry of Forest, Bogor.
- (4) Development and establishment of social forestry technology to find incentives for people living in the surrounding forest area and effect of forest fire prevention.

2. Background

1) Socio-economic context

According to World Development Report 2000/2001 and Asian Development Outlook 2000, population of Indonesia in 1999 was 207 million, surface area was 1,905 thousand square kilometers, GNP was 119.5 billion US\$, GNP per capita was 580 US\$ and the economic growth rate on GNP from 1998 was 1.9%.

Changes in consumer prices show quite high inflation (58.5%) in 1998 but it dropped to 20.5% in 1999 and is expected to be 6.0% in 2000. Government expenditure is 18.37 trillion Rupiah (2.6 million US\$) against the government revenue of 13.77 trillion Rupiah.

Indonesia achieved quite good socio-economic development based on the 5-year national development plans started in 1969 but this growth suddenly stopped in 1997. In 1997, Indonesia faced a big economic crisis but now is on the way of recovery and has been launching reform programs including decentralization and the banking sector reform.

The share of the GDP in 1999 was 17.4% in the agriculture, forest and fishery sector, 42.8% in the industry sector and 39.8% in the service sector. Major products in the agriculture, forestry and fishery sector included rubber and palm oil produced in large-scale plantations. Especially, palm oil is assumed an important export item in this sector. Indonesia could continue high economic growth at around an 8% average until 1996, at 7.5% in 1994, 8.2% in 1995 and 7.8% in 1996. However, this growth declined to 4.6% in 1997 and -13.7% in 1998 with the Asian crisis. The economy recovered to 2% in 1999 but has still not yet completely recovered from the crisis.

2) Description of the sector/sub-sector

According to the World Development Report 2000/2001, the forest area of Indonesia was 1,098 thousand square kilometers in 1996, which was 10% of the remaining tropical rainforest in the world and the third widest country after Brazil and Zaire. The conservation of the tropical rain forest is a quite important issue in international society because of gene resources, ecology, natural water cycle system, and absorption and emission of carbon dioxide. However, Indonesia forest are now being rapidly disappeared (annually 10.8 thousand square kilometers or 1% of total national forest was lost from 1990 to 95). This decreasing rate is much higher than world average; 0.3% during the same period.

Table 2-1: Annual Deforestation of Indonesia

Annual Deforestation 1990-1995		Nationally Protected Area 1996	
Square Kilometers	Av. Annual % of change	Thousand sq. km	% of total land areas 1996
10,844	1.0	192.3	10.6

Source: World Development Report 2000/2001, The World Bank, 2000

Notes: Average deforestation rate between 1990 to 1995 is 0.3% in the world. Indonesian deforestation rate is in worst country group.

Forest fire is one of the most important causes for decrease in forest area. According to the Kebakaran Hutan dan Lahan di Indonesia 1998 and the Forest and Land Fire management Under Regional Authority, medium sized forest fires happened every 3 to 4 years and big forest fires happened approximately every 15 years. By recent large-scale forest fire, which continued for 6 months in 1997 and for 4 months in 1998, nearly 807,000ha (or 8,070 thousand square kilometers) of forest including 126,000ha (or 1,260 thousand square kilometers) of forests in national parks was lost by forest fire. As shown in Table 2-2, Provinces in Sumatra and Kalimantan are vulnerable to forest fire.

Table 2-2: Forest Fire in Indonesia, 1984-1997

Forest Fire in Indonesia, 1984 - 1997 (ha)														
Province	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Aceh			10.00								1,431.00		102.00	630.00
N Sumatra	4,010.34	15,812.63	6,277.10	539.00	1,283.30	1,283.30	7,471.63	326.23	2,811.30	1,200.00	986.00		64.00	383.00
W Sumatra	798.00	1,134.23	316.91	40.00						183.00	67.00	303.65		3,237.89
Riau		820.30	1,078.16	1,050.00	348.00	348.00	273.00	298.00	100.00		573.00		675.00	4,063.56
Jambi			3.50					435.67			340.00			6,150.27
S Sumatra				7,446.90	1,890.00	1,890.00		7,261.50		24,706.00	15,430.00			34,289.88
Bengkulu								1.23			20.00			2,091.50
Lampung		2,530.00	3,557.00	2,000.00	2,000.00		6,184.00			1,125.00	17,585.00		1,439.00	21,311.17
Jakarta														
W Java		0.00		3,057.80	619.10	619.10		2,401.82		40.00	6,614.00	3.00	1.00	11,735.02
C Java		1,283.46	1,096.47	11,079.18	5,703.00	5,703.00	3,273.00	19,672.20	3,010.60	4,625.00	78,370.00	3,931.18	2,447.40	11,410.80
Yogyakarta							0.63	32.75	2.50	39.20	45.00			41.47
E Java	10,263.40	4,009.90	3,978.50	3,887.50	3,872.00	3,872.00	2,150.25	13,010.00	2,778.00		10,126.00	1,768.00	3,071.50	4,078.30
Bali	1.50	119.00	708.06	700.60	242.40	242.40	19.00	772.15	113.33		744.00	476.00	4.00	930.07
NTB			231.30	2,576.70			731.00	2,783.06	611.57	2.28	2,496.00		478.33	267.00
NTT	6.50	11,922.50	30.20	3,057.00	366.00	366.00	2,089.00	6,028.16	1,578.13	6,389.00	7,195.00		500.00	6,109.00
E Timor								9,870.50					72.00	
W Kalimantan			4,689.00	1.00	743.00	743.00				2.00	5,881.00		4,422	26,390.36
C Kalimantan				0.30				18,422.00			2,230.00			12,632.24
S Kalimantan				2,133.30			1,000.49	6,779.43			6,218.00	41.00	305.99	25,916.02
E Kalimantan				233.50			314.50	4,693.29	3,526.00	330.00	3,963.00	34.50	301.75	21,483.76
N Sulawesi		16.00	306.00	4,873.00			1,300.00	6,840.00			700.00		442.00	5,790.00
C Sulawesi			500.00	873.80			1.00	12.00			966.00			4,928.50
S Sulawesi				3,172.60				1,448.00		6.00	784.00	36.25		10,981.50
SE Sulawesi		1,500.00	73.00	879.38	27.80	27.80	133.00	201.00			2,071.00			4,999.83
Makassar								623.00	225.00		1,132.00			12,561.07
Iya		6,100.00		250.00				49.00						30,143.00
Total	15,079.74	42,569.86	22,038.20	49,324.40	17,661.40	15,885.34	25,573.54	118,881.28	14,531.65	40,897.48	161,798.00	6,705.58	10,356.21	265,991.21

Sources: Kebakaran Hutan dan Lahan di Indonesia 1998

The fire also caused smoke to reach all across Indonesia. Haze caused airplane accidents and flowed to neighboring countries including, Malaysia and Singapore. The impact of this haze in 1997 is as follows according to Indonesia's Fire and Haze 1999.

Table 2-3: Indonesia's Fire and Haze 1999

Type of Damage	Haze-Related Damages Arising from the 1997 Forest Fire (million)						Total (US\$)
	Indonesia		Malaysia		Singapore		
	Rp	US\$	RM	US\$	S\$	US\$	
Short-term health damage	2,310,000	924	20.1	8.0	12.5	8.8	940.9
Industrial-production losses	U	U	393.5	157.4	N	N	157.4
Tourism losses	176,000	70.4	318.5	127.4	81.80	58.4	256.2
Airline and airport losses	44,000	17.6	0.5	0.2	9.70	6.9	24.7
Fishing decline	U	U	40.6	16.2	N	N	16.2
Cloud seeding	U	U	2.1	0.8	N	N	0.8
Total	2,530,000	1,012	264.7	310.0	104.0	74.1	1,397.1

Note: Damages excluding long-term, health damages, reduced crop productivity, aesthetic value visibility, avertive expenditure, accidents, loss of life, evacuations, and loss of confidence by foreign investors. Small discrepancies in totals reflect rounding off.

In July 1997 the exchange rates were US\$=Rp2,500/RM2.5/S\$1.4.

N=Negligible or not applicable

U=Unknow: data unavailable.

Sources: Indonesia's Fire and Haze 1999

The Asian Development Bank conducted analysis of forest fire causes and concluded that the majority of fires were caused by human activities and accelerated by the severe El Nino and the existence of coal seams and peat soils.

Table 2-4: Causes of Fire

Causes of fire	%
Cigarette butts	35%
People's carelessness	25%
Land conversion	13%
Shifting Cultivation and other slash-and-burn farming	10%
Agriculture activities	7%
Social Conflict (jealousy)	6%
Transmigration	3%

Sources: ADB internal report of Agriculture, Forest and Fishery Sector, 1998

3) Host country strategy

The forest is one of the biggest resources Indonesia has and the Indonesian government assumed that solving forestry sector problems is the most important issue. The government of Indonesia has made commitments on several important forestry policies in the past several CGI (the Consultative Group on Indonesia) meetings. In the ninth CGI meeting at Jakarta in February 2000, the government of Indonesia announced the following commitments:

- To arrange the establishment of the Interdepartmental Committee (IDCF)
- To invite cooperation and coordination of other Ministries to impose strong measures against illegal loggers, especially those operating within national parks and closure of illegal sawmills.
- To evaluate the body in conversion forest and put moratorium on all natural forest conservation until NFP agreement.
- To connect the reforestation program with the existing forest industries and those under construction.

Indonesian government has been focussing on forest fire prevention and reduction of damage by fire for nearly a decade and has made strategies for forest fire prevention area:

- Establishment of detection system: the system using satellite information
- Establishment of suppression system: capacity building of various organization especially in charge of initial forest fire suppression
- Promotion: establishment and strengthening of people's awareness to forest fire

4) Prior or ongoing assistance

The table 2-6 is the list of donor projects in forestry sector. Mainly four types of assistance projects in forest fire have been conducted:

- Institutional building or capacity strengthening such as projects sponsored by ITTO
- Technical assistance such as projects sponsored by EU, GTZ and JICA
- Assistance projects focus on social forestry
- Assistance projects focus on environment and ecology

With respect to forest fire sub-sector, EU has been supporting the project in South Sumatra and GTZ has been assisting the project in East Kalimantan. DfID recently launched a new development scheme on forest management including forest fire prevention management in the scheme. ITTO, which developed

the National guideline on the Projection of Forest against Fire, focuses their activity on human resources development and developing curriculum and training material of forest management after survey of training needs.

Table 2-6: Project list on forestry

No.	Working Unit	Project List
1	Secretariat General	<ul style="list-style-type: none"> - Forest Liaison Bureau (EU, Grant) - Training Development on the Assessment of Sustainability Forest Management in Indonesia (ITTO, Grant) - Expert in Project Planning and Coordination (JICA, Grant)
2	Directorate General of Forest Protection and Nature Conservation (PKA)	<ul style="list-style-type: none"> - Forest Fire Prevention Management Project (JICA, Grant) - Integrated Forest Rehabilitation Project in Way Kambas NP (JICA, Grant) - Forest Fire Prevention and Control Project (EU, Grant) - Support for Integrated Forest Fire Management (GTZ, Grant) - Integrated Forest Fire management in Indonesia Phase II: National Guidelines on the Protection of Forest against Fire (ITTO, Grant) - The Enhancement Cooperation and Capacity Building in the Areas of Nature Conservation and Sustainable Use Wildlife (Australian Nature Conservation Agency, NGO) - Forestry Policy Reformation Study and Dialog in Lampung (Ford Fund, NGO)
3	Directorate General of Land Rehabilitation and Social Forestry (RLPS)	<ul style="list-style-type: none"> - Social Forestry Development Programme, SPL (JICA, Grant) - Social Forestry Development Project (GTZ, Grant) - Social Forestry Development Project at West Nusa Tenggara (Ford Found, GO) - Community Forest Institutional development (Ford Found, NGO) - Supporting Community Participation in the Forest Management in Indonesia (Ford Found, NGO) - Establishing Community Forest Institutional in Indonesia (Ford Foundation, NGO)
4	Directorate General of Production Forest Management (PHP)	<ul style="list-style-type: none"> - Bureau Forest Management Project (EU, Grant) - Promotion of Sustainable Forest Management in East Kalimantan (GTZ, Grant)
5	Forestry Planning and Programming Agency (BAPLAN)	<ul style="list-style-type: none"> - Forest Inventory and Mnitoring Project (EU, Grant) - Provincial Level Forest Management System (UK, Grant)
6	Forestry and Estate Crops Research and Development Agency (LITBANG)	<ul style="list-style-type: none"> - Bureau Forest Management Project (EU, Grant) - Sustainable Forest Management and Human Resources Development (ITTO, Grant)

3. Problem to be addressed, the current situation

1) Problem to be addressed: Institutional framework for the sub-sector

A) Framework of laws and regulations

The government of Indonesia has the following laws and regulations system for forest conservation. Until 1999, Forestland was administered under the Basic Forestry Law, Act 5 of 1967 and the other land was



administered under the Basic Agrarian Laws No. 5 of 1960. However, in 1999, new basic law for forest was issued as the Act on Forestry No.41 September 30, 1999 which included many decentralization concepts of forestry policy. The law clearly mentioned the concept as “All forests within the territory of the Republic of Indonesia including all the richness contained therein are under the state’s control for people’s maximum welfare.” in article 4 number 1. In article 48 number 5, part 5, this law determined as “To secure its sound implementation, community shall be involved in efforts of forest protection”. Also, in article 48 number 4, the law says, “Forest protection shall be undertaken by the holder of right”.

Table 3-1: Major laws and regulations

A. Basic laws on forestry
1-1. Act Number 5 of 1969 on basic forestry law.
1-2. New Basic Law on Forestry, Act 41 of 1999, September 30, 1999
B. Major regulations
B-1. Fire control and fire control organization
2-1. Decree of the Director General of Forest Protection and Nature Conservation Number 47/Kpts/DJ-VI/1997 on technical guideline on controlled burning
2-2. Decree of the Director General of Forest Protection and Nature Conservation Number 152/Kpts/DJ-VI/1997 on technical guidelines for controlled burning.
2-3. Government Regulation Number 28 of 1985 on forest protection
2-4. Decree of the Ministry of Forestry Number 195/Kpts-II/1986 directives on the prevention and control of forest fires.
2-5. Decree of the Director General of Forest Protection and Nature Conservation Number 244/Kpts/DJ-VI/1994 on technical guideline for forest fire control.
2-6. Decree of the Director General of Forest Protection and Nature Conservation Number 245/Kpts/DJ-VI/1994 on the functions, application, maintenance and storing of fire control equipment, transportation and communications tools.
2-7. Decree of the Director General of Forest Protection and Nature Conservation Number 247/Kpts/DJ-VI/1994 on standardize PPKH infrastructure.
2-8. Decree of the Ministry of Forestry Number 677/Kpts-II/1993 on the establishment of Echelon III Sub-directorate of Forest Fire under the Directorate General of Forest Protection and Nature Conservation.
2-9. Decree of the Ministry of Forestry Number 188/Kpts-II/1995 on the establishment of the National Forest Fire Control Center (Pusdalkarhutnas).
2-10. Decree of the Coordinating Minister of People Welfare/Head of Bakornas PB Number 17/Kep/Menko/Kesra/X/1995 on the task of Bakornas PB.
2-11. Decree of the Director General of Forest Protection and Nature Conservation Number 81/Kpts/DJ-VI/1995 on guidelines for the local forest fire control center (as follow up of MoF decree No. 188/Kpts-II/1995 and MoE decree No. 18/MenL.h/3/1995)
2-12. Decree of the Ministry of Forestry on Fire Prevention, July 1986, amend at 1995
2-13. Government Regulation Number 4, 2001 on Forest Fire Prevention Act
B-2. Prohibition of Controlled Burning
2-14. Presidential Decree on Prohibition of Controlled Burning, August 1997
B-3. Empowerment and decentralization
2-15. The Transferring a Part of the Government Affairs on Forestry Function to the Provinces, Government Regulation No. 62/1998
2-16. The Maximum Area of Forest Utilization and Forest Area Release for the Estate Cultivation, the Decree of the Ministry of Forest and Estate Crops, No. 728/Kpts-II/November 9, 1998

2-17. The Decree of the Minister of Forest and Estate Crops Regarding Social Forest, No.677/Kpts-II/1998
2-18. The Procedure for the Auction of HPH (Forest Concession), the Decree of the Minister of Forest and Estate Crops, No.731/Kpts-II/1998
2-19. The Government Regulation Regarding the Transferring of a Part of the Government Affairs on Forestry Function to the Provinces, No.62/1998
C. Major action plan by the Ministry of Forest
3-1. Indonesian Forestry Action Programme, Nov. 1997
D. Recommendations and proposed action plan by donor agencies
4-1. National Guidelines on the Projection of Forests Against Fire, ITTO Project PD 12/93, Bogor, March 1999
4-2. Forest and Land Fired in Indonesia: Plan of Action for Fire Disaster Management, State Ministry for Environment Republic of Indonesia, 1998

B) Action plan by the Government

The Indonesian Forestry Action Programme, November 1997 issued from the Ministry of Agriculture and Forestry is an effective plan right now. Several proposals and recommendations on action plan and guidelines about forest fire management and forest management were submitted by many donor organizations including ITTO, ADB and UNDP. However, these proposals and recommendations have not yet been fully utilized.

C) Organization for fire suppression

In Indonesia, there are 4 levels of government organizations for forest fire suppression, namely PUSDALKARHUTNAS at the national level, PUSDALKARTHUTLADA at the provincial level, POSKOLAK at the district level and SATLAK at the sub-district level. These organizations conduct fire suppression planning and coordination with related organizations based on the size and difficulty of suppression. These organizations are not ad hoc when the forest fire happens but are set up as permanent organizations to prepare for disaster. According to the law, SATGAS (the fire-fighting unit) must be formulated by private landowners or land managers including farmers, mining companies and afforestation companies. Managers of the forestry or landowners own the responsibility of initial fire suppression. It means the national park management centre must own the responsibility for the forest fire inside the parks and afforestation companies must own the responsibility for the forest fire inside their own forestry area. When they find that they cannot control the fire by themselves, they must immediately request SATLAK for fire suppression. If SATLAK finds that they can not control it by itself, they must request POSKOLAK and things go like that. If SATLAK receives a request, they order fire-fighting activities to related organizations at their command.

However, this system is not actually working well because of limited budgets and weak institutional capacity to operate fire fighting. Moreover, in the process of the decentralization, the roles and responsibility of these organizations is not so clear at this moment.

Chart 3-1: Fire Prevention and Suppression Organizations

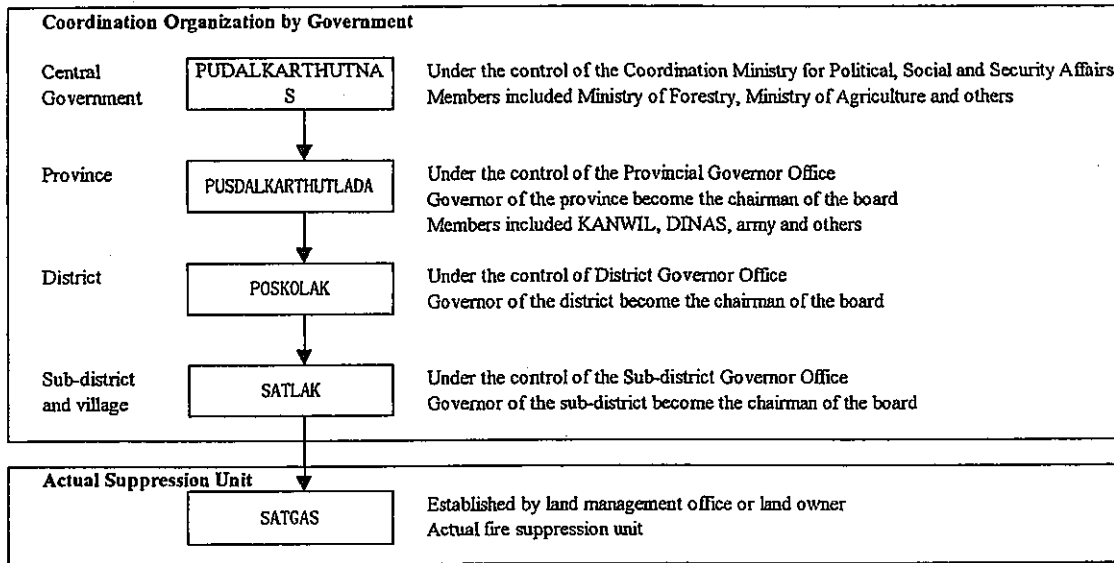


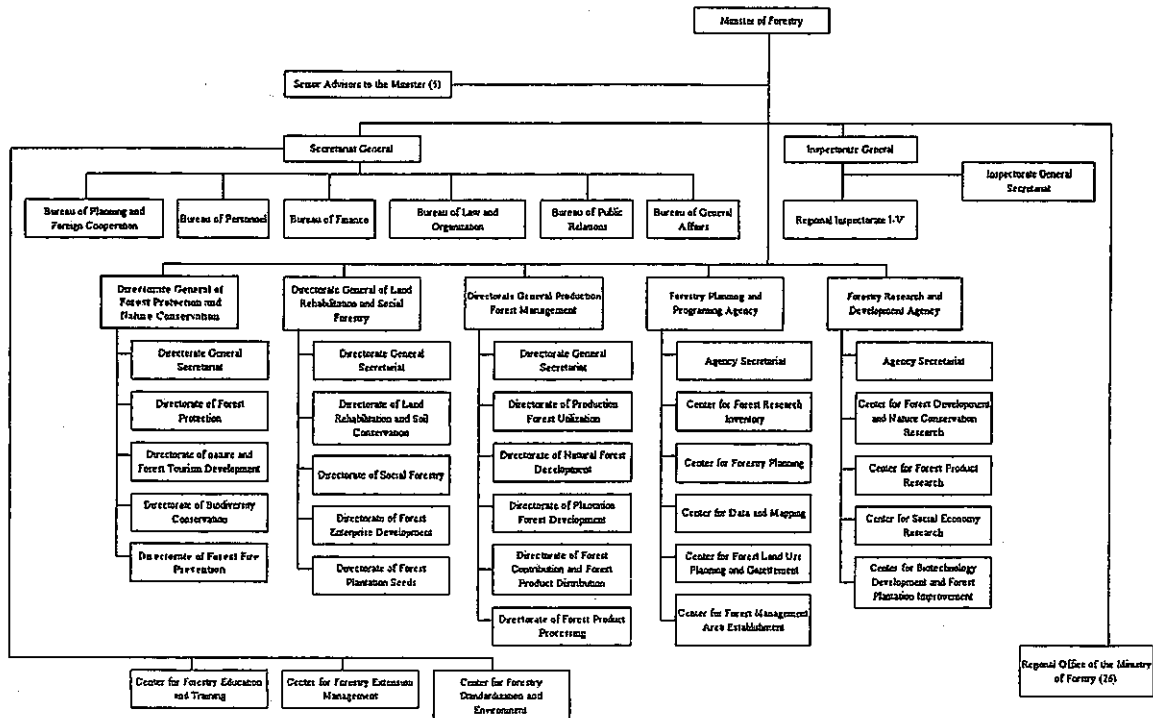
Table 3-2: Fire Prevention and Suppression Organizations

Name of organization	Control agency
BAKORNAS-PB (Disaster)	The Vice President Office
SATKORLAK (Disaster)	Provincial Government
PUSDALKARHUTNAS (Forest Fire)	The Ministry of Forestry
PUSDALKARHUTLADA (Forest Fire)	Provincial Governor Office
POSKOLAK (Forest Fire)	District office
SATLAK (Forest Fire)	Provincial Office
SATGAS (Forest Fire)	Responsible agency (e.g. national park management centre, plantation owner)

D) Executing agencies

The Ministry of Forestry conducts policy on forestry. The Directorate of Forest Fire Control under the Directorate General of Forest Protection and Nature Conservation of this ministry conducts policy on forest fires. The organization of this ministry is shown in the following chart.

Chart 3-2: Organization chart of the Ministry of Forestry



2) Problem to be addressed: the current situation

As mentioned in 2. 2), medium scale forest fire happened every three or four years and large scale forest fires happened every 15 years in Indonesia by desiccation of El Nino and other climate changes.

According to the Asian Development Bank's research, 99% of the causes of fire comes from human activities including fire coming from cigarette butts or campfires. However, things are not so simply solved by just prohibiting those activities in the forest. There are so many complicated problem structures on this matter including weak and poor communication and reporting system between local society and government organization, limited equipment for fire fighting, not enough promotion activity on strengthening the awareness to the people living in and around forests, and poor motivation of those people to participate in forest fire suppression. Tropical rain forest itself had some resistance power against the fire but this power has been gradually reduced because of change in the ecosystem caused by illegal logging and large-scale land development.

The current problems in this sector could be summarized in mainly following categories:

- Socio-economic problems
- Ecological problems
- Institutional problems (including central government and local government)
- Technical problems

(A) Socio-economic problems

The socio-economic problems are mainly summarized into following categories:

(A)-1 Causes of fire

- **Cultivation by immigrants force for transfer from forest to cultivation land:** Increasing of population in Java escalated immigration to Sumatra and Kalimantan, especially. These immigrants cultivate and transfer forest to farm land. In the process of cultivation, immigrants use vegetation fire for easy way to remove trees. These activities sometimes cause forest fires.
- **Pressure for transfer to plantation area:** Economic development heats up the investment in oil palm plantation. To transfer from forest to large-scale oil palm plantation, large area of forest lands (several hundreds ha) are often burn out to remove trees. A large-scale vegetation fire makes haze and spark that could be ignition of forest fire.

(A)-2 Participation of people in forest fire suppression

- **Change of the social structure:** Indonesian rural society had a structure controlled by seniors of village. In urgent situation such as fire suppression, village master gathered village people and order operation of fire fighting. However, recently, the rural society structure is changing and village people have much interesting in their own economic activities. This situation sometimes makes it difficult to make local people involved in the fire fighting by commands of village master.

(B) Ecological problems

- **Changes in ecosystem caused by human activities:** Generally speaking, tropical rain forest has fire resistance. However, human activities such as illegal logging that may decrease fire resistance of the ecosystem. Some researchers insist that drainage system may dry up the moist peat and keep fire under the ground, especially in unusual dry period such as El Nino. Other researchers point out that illegal hunting cause reduction of seed carriers.

(C) Institutional problems

- **Decentralization:** Under the current decentralization policy, executing roles and responsibility of forest fire prevention and suppression are supposed to be transferred from the central government to local government. Although the national park management will continue to be under the central government, the demarcation of central government and local government is still not clear in other forest areas.
- **Dilemma of economic development or forest protection for local government:** Local governments are facing the dilemma of request for economic development from local community and request for forest protection from the central government. Local governments have a tendency to prioritize the economic development rather than forest protection.

(D) Technical problems

- **Poor fire fighting equipment and units:** Most villages and townships do not have sufficient professional fire fighting units with trained staff and modern and enough equipment for fire fighting. Neither the central government have enough budgets for covering all villages and towns nor local governments could allocated sufficient budget by their own.
- **Poor training and drill in fire fighting:** Local people of villages and townships and government staff do not receive enough training and drill on fire fighting, especially operational training with collective action of several teams.

- **Shortage of human resources in fire fighting:** Shortage of human resources especially commander level fire fighters is a problem. There are not enough training courses or capacity building assistance projects focus on development of commander-level forest fire fighters.
- **Slow extension of the early warning and detection system using satellite information:** Early warning system using satellite information is an effective tool to monitor forest fires in wide areas and to take quick measures against them. However, this system has not yet been utilized especially at field level due to two reasons. The first reason is that this system and technologies are still under development. The system detected hot spots but they are now including vegetation fire and other heat such as road maintenance work. Development of surrounding subsystems such as land-usage-mapping and automatic-data-processing subsystem is necessary. The second reason is poor network infrastructure. If the network system is improved, the information become real-time and useful for quick action such as initial suppression of forest fire.

Following is the list of those major problems and concerns categorized by each organization and group.

Table 3-3: Major Problems and Concerns of Organization and group

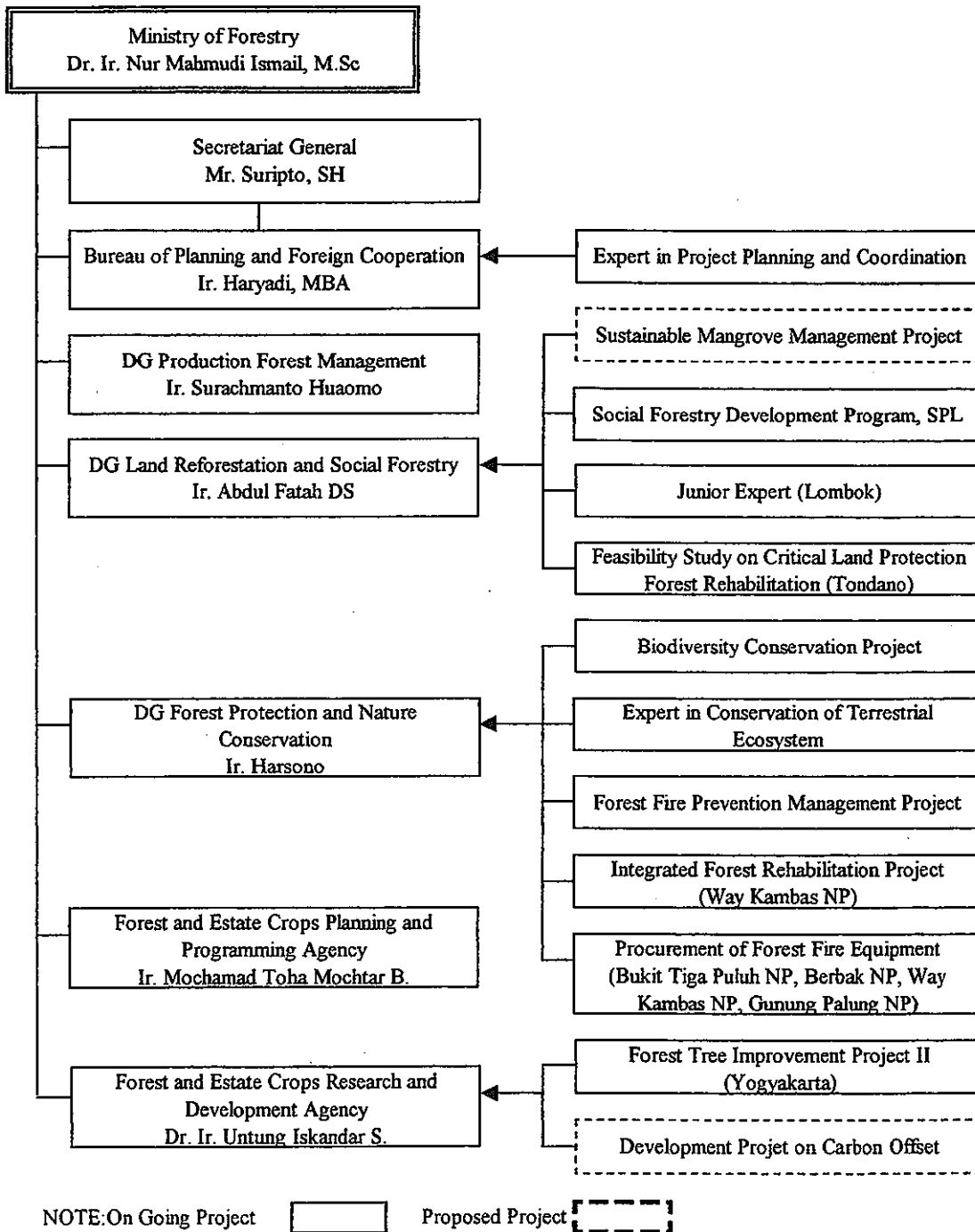
Groups	Problems and issues
I. Government	
1-1. Central government	<ul style="list-style-type: none"> - Decentralization policy weakens the policy and law enforcement capability of the central government. However, the policy of "manage and operation of the national park under the central government" has not changed even with decentralization being conducted. Other parts are not yet clear. It may take several more years to clear everything up including the demarcations of central government and local government in detail. - Limited budget and human resources make it difficult for policy and law enforcement. - Social culture, which avoids strong punishment against outlaws, and secured budget and human resources, may cause inefficient law enforcement sometimes.
1-2. National Parks	<ul style="list-style-type: none"> - They have clear mission for protect national park including from forest fire but still not have enough equipment for fire prevention and fire fighting. That including not only directly related equipment such as water pump and trucks but also equipment for support such as computer system and communication transceiver. - Shortage of human resources especially commander level of fire fighter. They must protect their national park from the fire in the park by themselves, and they must also protect their national park from the fire coming from outside the park with cooperation of people surrounding. Although the current human resources are limited, the national park management centres have educated and motivated technical staff and rangers to be trained. - Lack of model on forest fire prevention and initial suppression. They do not have suitable model for forest fire prevention and initial suppression. Without suitable model, they could not conduct suitable planing, training and daily routine work efficiently and effectively including the activities of the forest fire prevention and initial suppression.
1-3. Local government	<ul style="list-style-type: none"> - Local governments tend to select economic development policy rather than forest protection policy. Also the demarcation of the roles and responsibility with the central government is not yet clear in the transition of decentralization. - Modern fire fighting equipment is not allocated suitably to townships and village level local government. They do not have self-defense-type professional organization.

	- Also secured budget and human resources problems are same for the local government on forest conservation including forest fire prevention and suppression.
2. People surrounding the forest	
2-1. Farmer	- They do not have much interest in forest fire prevention because they do not get much benefit from the activities now.
2-2. Traditional tribe	- Some tribes conduct vegetation fire as their traditional cultivation methods. Some people say that it quite seldom causes forest fires. However, some people argue that it should be stopped and they should change the style of cultivation.
2-3. Oil palm plantation owner	- Vegetation fires for transfer from forest to palm oil plantation with wide area sometimes causes big forest fires and haze. - However, after developing the plantation, they are afraid to lose their assets (oil palm tree) by fire.
2-4. Concessionaire	- Some of them handle illegal logging in the national parks and protected forest areas, and the illegal logging weakens the nature of forest against forest fires.
3. Others	
3-1. Neighbor government	- Singapore and Malaysian government complain about the haze from Indonesia
3-2. NGO	- They insist that conservation of tropical rainforests of Indonesia is important asset for all people of the world but the tropical rainforest is disappearing rapidly.
3-3. Donors	- EU, GTZ, JICA, and other agencies have continued assistance activities in forest fire.

3) Relation with Japan's aid policy

The Indonesian tropical rain forests have a tremendous value as a natural gene bank and environmental resources for human kinds. The forest conservation of Indonesia is key topic in CGI meetings and Indonesian government has commitment on the protection. With a long history of Japanese cooperation to Indonesia, this area has been a priority matter.

Chart 3-3: Current Status of the Japanese Official Assistance in Forstry Sector (As of March 2001)



4. Project strategy

1) Project strategy

1)-1. General strategies

Based upon the current situation and problems in forest fire and some experiences from the phase one project, this phase two project will employ three major basic strategies.

The first strategy is to focus on strengthening the fire prevention and initial-suppression capacity in the national parks. It is obvious that huge area of Indonesian forest cannot be protected at once with limited institutional capacity and resources. We have to put different priorities among various types of forest. The national parks must be protected with highest priority because of their precise natural resources. The national parks also have an advantage over other forest in terms of institutional capacity and technical potential. They are allocated professional technical staff and rangers who are usually engaged in protecting the parks from illegal logging and other threats while other organizations such as SATLAK/SATLAG and local governments do not have enough professional field staff. Moreover, the national park management centres will continue to be under the direct control of the central government and not be affected by the decentralization. For these reasons, national parks should be the targets of the phase two.

The second strategy is to train various staff from the central government to the frontline staff systematically, thereby enhancing overall institutional capacity to implement fire prevention and initial suppression. As the joint final evaluation team of the phase one recommended, the phase two will develop comprehensive model with linking closely each technical components developed in the phase one. To do this, training of various staff in charge of various technical components is necessary.

The third strategy is to develop models of forest fire prevention and initial suppression that can be applicable to other national parks and sustainable within their budget and human resources capacity. Applicability and sustainability in terms of institution and finance will be investigated in the process of the development of the model.

1-2) Technical strategies

The phase two will conduct four major core activities, namely development of the Early Warning and Detection system, conduct training and drills for initial suppression of fire, conduct activities to strengthen and increase awareness of people, and investigation of participatory forest fire prevention management methods.

In the area of the Early Warning and Detection system, the project has established the technology and system, and provided hot spot data to the target local governments through KANWIL, local office of the ministry in the phase one. In phase two, project will provide hot spot data information directly to target national park management centres and will establish the feedback system to confirm the actions taken by the centres. This system is expected to encourage routine actions at parks such as patrol, dissemination of

warning information, preparation for initial suppression according to the degree of vulnerability and also to check the accuracy of hot spot information.

In the area of training and drills for initial fire suppression, the phase one conducted training to SATLAK. Shortage of commander level human resources makes barrier for conducting participatory forest fire suppression. In phase two, main target of training and drill will be commander level fire fighters in national parks.

In the area of awareness promotion and extension, the phase one has developed extension material and contents. In the phase two, those output will be upgraded and utilized to scale up the intervention.

In the area of the participatory forest fire prevention management, the green belt was highly evaluated by Indonesian government. The achievement of the phase one will be monitored and applicability of the technologies to other areas will be investigated mainly through research activities.

2) Implementation structure

2-1) Capacity of the counterpart organization

a) Counterpart Organization

Directorate General of Forest Protection and Nature Conservation, Ministry of Forestry is only one executing agency for conducting policy on forest fire at central level. The Indonesian government clearly demarcated the roles and responsibility on forestry policy and clearly determined that the Ministry of Forestry should handle the forest fire prevention management. Also, this Directorate General is the executing agency on management of the national parks. As the conclusion, the Ministry of Forestry is most suitable counterpart ministry for this project.

In the Ministry of Forestry, there are some sections the project need to collaborate closely. Centre for Forestry Education and Training conducted training including forest fire prevention and suppression, and extension. They have three courses on forest fire prevention and suppression, course developed by USDA, course developed by the center and course for mainly teaching operation and maintenance of equipment. The Bureau of Public Relation conduct all PR activities of the ministry but PR and campaign on forest fire prevention mainly conducted by the Directorate of Forest Fire Control.

The strength and weakness points of each candidate counterpart agency for this project are listed up as follows.

Table 4-1: Strength and Weakness of Candidate Counterpart Organization

Candidates of the counterpart agency	Strength and Weakness
The Directorate of Forest Fire Prevention, Directorate General of Forest Protection and Nature Conservation, the Ministry of Forestry	<ul style="list-style-type: none"> - Counterpart agency of phase one and in charge of policy making on forest fire prevention - They have been providing the hot spot information from the Early Warning and Detection system to the local governments and other related organization and requested the continuity in the phase two.

	<ul style="list-style-type: none"> - They have responsibility on general matter of forest fire prevention management but not directly in charge of national park management. Management of national park including forest fire prevention and initial suppression in the park is in charge of the Directorate of Conservation Areas.
The Directorate of Conservation Areas and the National Park Management Centre of target national parks.	<ul style="list-style-type: none"> - They have responsibilities on forest fire prevention and initial suppression in the national park - They have strong empowerment on the management and operation of the national parks. (National Park Management Centre) and they could take necessary action on forest fire prevention and suppression by their own responsibility. - The conservation of national parks is the consensus for Indonesian government both for central and local. - Enough volume of staff is allocated to each national park management centre. Average more than 40 staffs is in each national park management centre and they have mission on forest fire prevention and suppression, promotion for strengthening the awareness of people surrounding and extension in their routine activities.
Local Government Organization including: <ul style="list-style-type: none"> - Kanwil (function will transfer to DINAS) - DINAS - CDK and KPH - BKPH 	<ul style="list-style-type: none"> - They have now conserve and maintain the national forest directly (Kanwil) and control the other forest (DINAS, CDK, KPH, BKPH) but roles and responsibility in the future is not yet clear at this moment. - They have a responsibility for forest fire suppression as the member of SATLAK and POSKOLAK. - They have responsibility of the forest management conducted by the forest management company and right owner.
Forest Fire Suppression Organizations including: <ul style="list-style-type: none"> - PUSDALKARTHUTNAS - PUSDALKARHUTLADA - SATLAK - SATGAS 	<ul style="list-style-type: none"> - They have responsibility on forest fire suppression - They have also responsibility on forest fire prevention management. (Control responsibility to PUSDALKARTHUTNAS, PUSDALKARHUTLADA and SATLAK. Direct responsibility to SATGAS) - They rather focus on coordination activities and weak capability as fire fighting commander organization. - Still there are quite few professional fire fighting units with modern equipment in SATGAS level.

b) Budget allocation

The Indonesian government has allocated their budget as much as possible to the forestry management. The ministry has tried to allocate the budget for management of national parks as shown in Table 4-2. The budget has been increasing in nominal Rupiah but economy recession and increase of inflation case rather decline of real value especially in 1998/99. However, real routine budget value was stable and it increased this amount almost double from 1997/1998 to 1998/1999.

Table 4-2: Planned Budget for All Parks Combined, March 1993 – April 1999

Budget Year	Component	Rupiah(nominal)	Rupiah (real)	US Dollars	Percent
1993/1994	Total	11,840,247,000	11,840,247,000	5,262,332	
1994/1995	Total	15,870,750,000	15,057,637,353	6,900,326	
1995/1996	Total	21,756,861,000	18,500,732,283	9,337,709	
1996/1997	Total	22,105,927,000	17,475,041,107	9,366,918	
1997/1998	Total	23,953,797,000	15,916,144,186	9,581,519	
1998/1999	Total	34,601,726,000	11,572,483,612	4,613,563	
	Development Budget	7,421,864,000	2,482,228,763	989,582	21.45
	Routine Budget	9,855,959,000	3,296,307,358	1,314,128	28.48
	foreign aid or donor funds	8,390,613,000	2,806,225,084	1,118,748	24.25
	reforestation fund	3,537,239,000	1,183,023,077	471,632	10.22
	forest concession royalties	5,396,051,000	1,804,699,331	719,473	15.59

Source: Enhanced and Alternative Financing Mechanisms for Strengthening National Park Management in Indonesia, September 1999, USAID

Table 4-3 shows the trend of number and covering area of whole national parks. Rapid increase in number and covering area shows strong commitment of Indonesian government to protect forest from pressure of development.

	1989	1991	1994	1999
Number	n. a.	25	31	39
Area (thousand ha)	3,119	6,540	n.a.	14,753

Source: Ministry of Forestry

JICA budget and the counterpart budget in the phase one was shown in Table 4-4. The counterpart budget from Indonesian side decreased in 1999 and 2000 because of economic recession. Ministry of Forestry is requested to make further efforts to secure more budget for reliable operation of the Project.

Table 4-4: Counterpart Budget

Fiscal Year	Indonesia		Japan		
	Budget	Result	Budget	Result	
	Available	Applied	Available	Applied	
	unit:1,000 Rupiah	unit:1,000 Rupiah	unit:1,000 Rupiah	unit:1,000 Rupiah	unit:1,000 Yen
1996	0	0	175,763	175,763	8,498
1997	170,000	106,719	357,859	357,859	14,781
1998	141,000	122,467	1,265,709	1,182,528	16,193
1999	66,450	44,760	1,087,238	1,087,238	17,948
2000	37,500	21,741	944,437	944,437	13,735
Total	414,950	295,687	3,831,006	3,747,825	71,155

Note: Figure of the fiscal year 2000 is only April 2000 to December 2000

Other fiscal year is April to March next year

Table 4-5: Counterpart budget by cost item in 1998- 2000 (2 years)

Item	Amount
Allowance *)	39,400,000
Stationery and office supplies	10,800,000
Rental fee for office space and satellite office **)	156,000,000
Travel allowance (to sites)	90,000,000
Travel allowance (from sites)	45,700,000
Operation and management cost for the project	21,550,000
Supply by material (exclude stationery and office supply)	156,000,000
Supply by cash (exclude stationery and office supply) ***)	207,450,000
Total	363,450,000

Note: *) Include allowance for project manager, coordinator and 4 counterparts

***) Rental cost for JICA Project office: 108,000,000 and Satellite office: 48,000,000

***), Budget of 1998 - 1999. Actual supply by cash in this period is 167,227,000 (not included rental fee)

c) Institutional arrangement

Counterpart organization at phase one is shown in Chart 4-1. In the phase two, this institutional arrangement will incorporate the target national park management centres and the Directorate of Conservation Areas under the Directorate General of Forest Protection and Nature Conservation, the Ministry of Forestry.

CHART 4-1: COUNTERPART ORGANIZATION AT PHASE ONE

Directorat Jenderal Perlindungan Hutan dan Konservasi Alam
Directorate General of Forest Protection and Nature Conservation
Directorat Jenderal: Ir. Harsono

DIREKTORAT PENANGGULANGAN KEBAKARAN HUTAN DAN KEBUN
(Directorate Forest and Estate Crops Fire Control)
Director : **Ir. Djoko Setijono, MM** (Project Director)**

SUB DIREKTORAT PENANGGULANGAN KEBAKARAN HUTAN DAN KEBUN
(Sub Directorate Forest and Estate Crops Fire Control)
Head of Sub Directorate : Letkol. Drs. Ami Harbi

- **Dr. Ir. Dwi Setyono, MSc.** (Penata, III/c)
- **Drs. Hidayat, DAPPL** (Penata Muda, III/a)
- **Danang P. Mardijono**** (Extension and Training)

SUB DIREKTORAT PENGEMBANGAN SISTEM PENGENDALIAN KEBAKARAN HUTAN
(Sub Directorate Fire Control System Development)
Head of Sub Directorate : **Ir. Soedarmo ****(Project Manager)

- **Ir. Sumantri** (Penata, III/c)**(Participatory Method)
- **Ir. Erly Sukrismanto, MSc** (Penata, III/c)

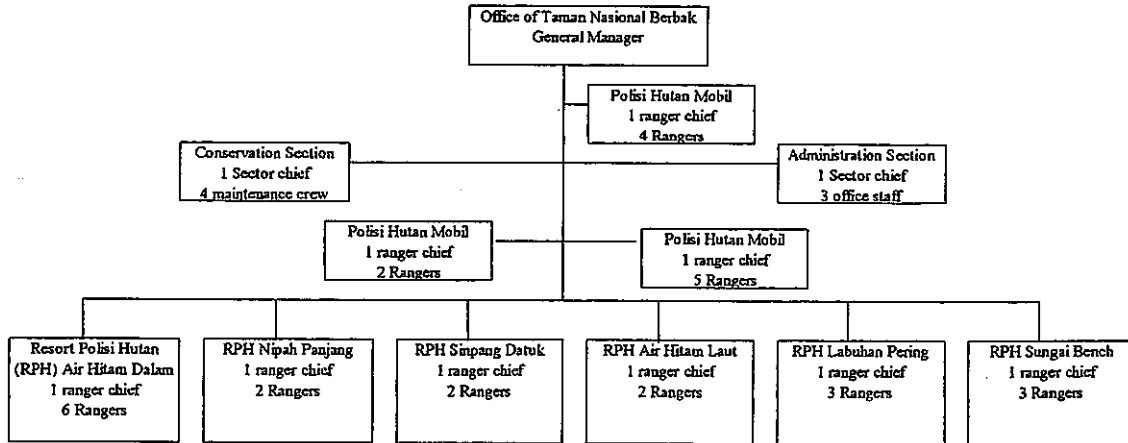
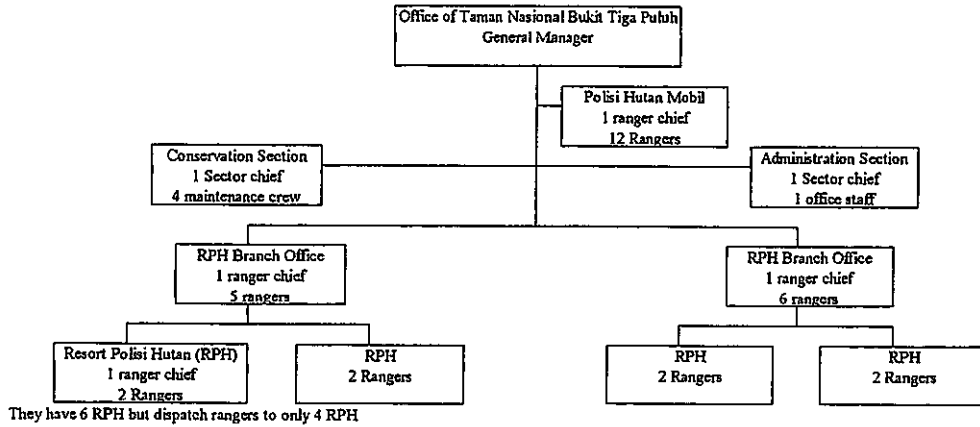
SUB DIREKTORAT PENANGGULANGAN DAN PENANGANAN PASCA KEBAKARAN
(Sub Directorate Post Fire Control and Handling)
Head of Sub Directorate : **Ir. Rahman Sidik, MED**

- **Ir. Suprayitno** (Pembina, IV/a)
- **Yono Dwi Waryono, BSc.F** (Penata, III/c)
- **Yenny Suyatni B.Ac****(Coordinator)

SUB DIREKTORAT PEMANTAUAN DAN EVALUASI
(Sub Directorate of Monitoring and Evaluation of Forest and Estate Crops Fire)
Head of Sub Directorate : **Ir. Mudjiono Misron**

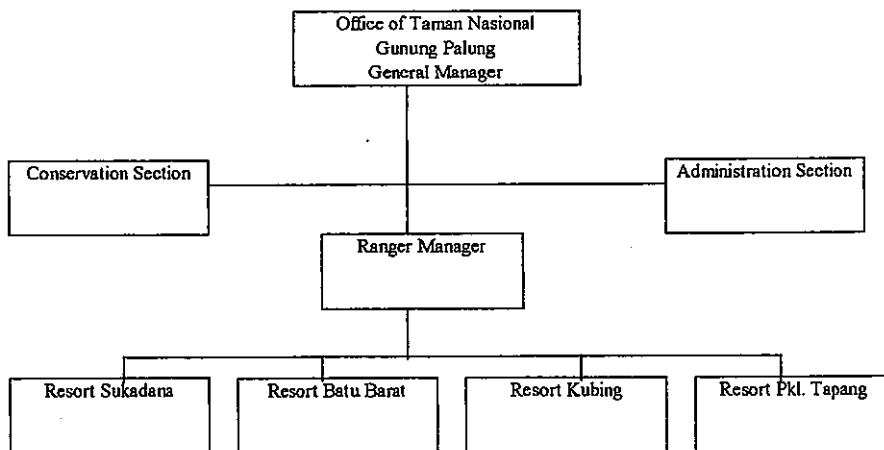
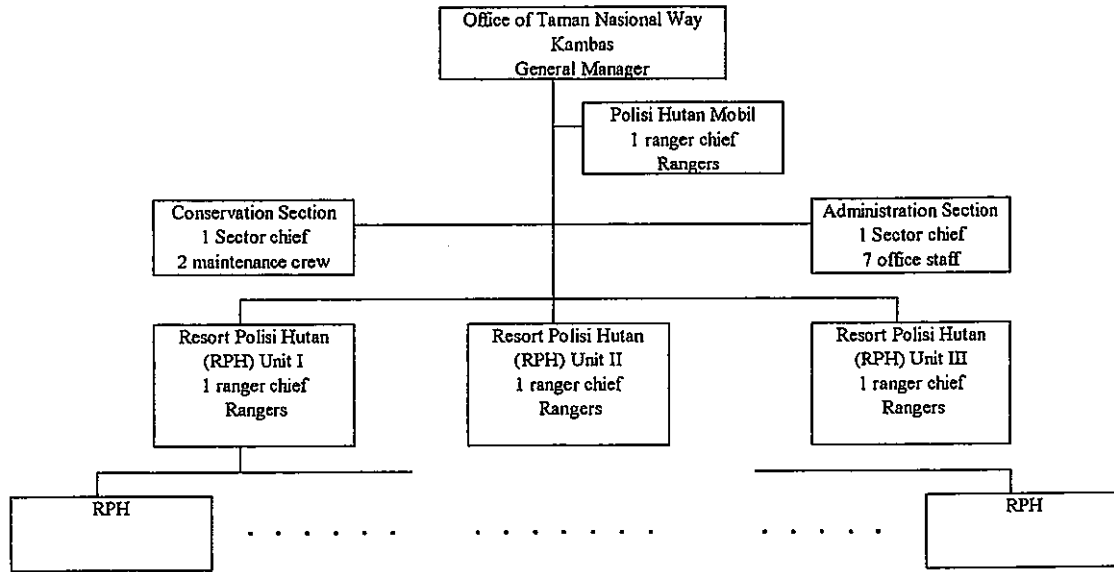
- **Ir. Zulkifli Ibnu** (Penata Tk. I, III/d)
- **Ir. Mirawati Soedjono, MA** (Penata, III/c)
- **Johnnie Hadi Prakoso ****(Early Warning and Detection System)

Chart 4-2: Organization Chart of Target National Parks



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Chart 4-2: Organization Chart of Target National Parks (Continued)



d) Organizational management capability

The organizational management capability in term of forest fire control policy formation capability itself is appropriate. As planning agency, this ministry does not have a big problem. Problem is laid on the structure of relationships and enforcement capacities with local governments and coming from the decentralization.

Indonesian government has tried to increase the number of staff of national park management centre. Many national park management centres are not matured because more than one third are newly set up

during the last decade. However, organizational management capability is relatively high by nature of rangers' organization.

e) Counterpart allocation

The ministry prioritizes the forest fire control policy and tries its best for allocation of good counterparts for this project. Also there are enough quantity of staff in each targeted national park management centres. Following tables show the number of staff by education and job category on each target national park management centres.

Table 4-6: Staff allocation of Target National Parks

National park	Master degree and Ph.D.	University graduate	High School graduate	Others	Total
Bukit Tiga Pulu	1	8	38	1	48
Berbak	1	6	36	0	43
Way Kambas	1	9	111	1	122
Gunung Palung	0	14	44	2	60

Table 4-7: Staff allocation of Target National Parks (continued)

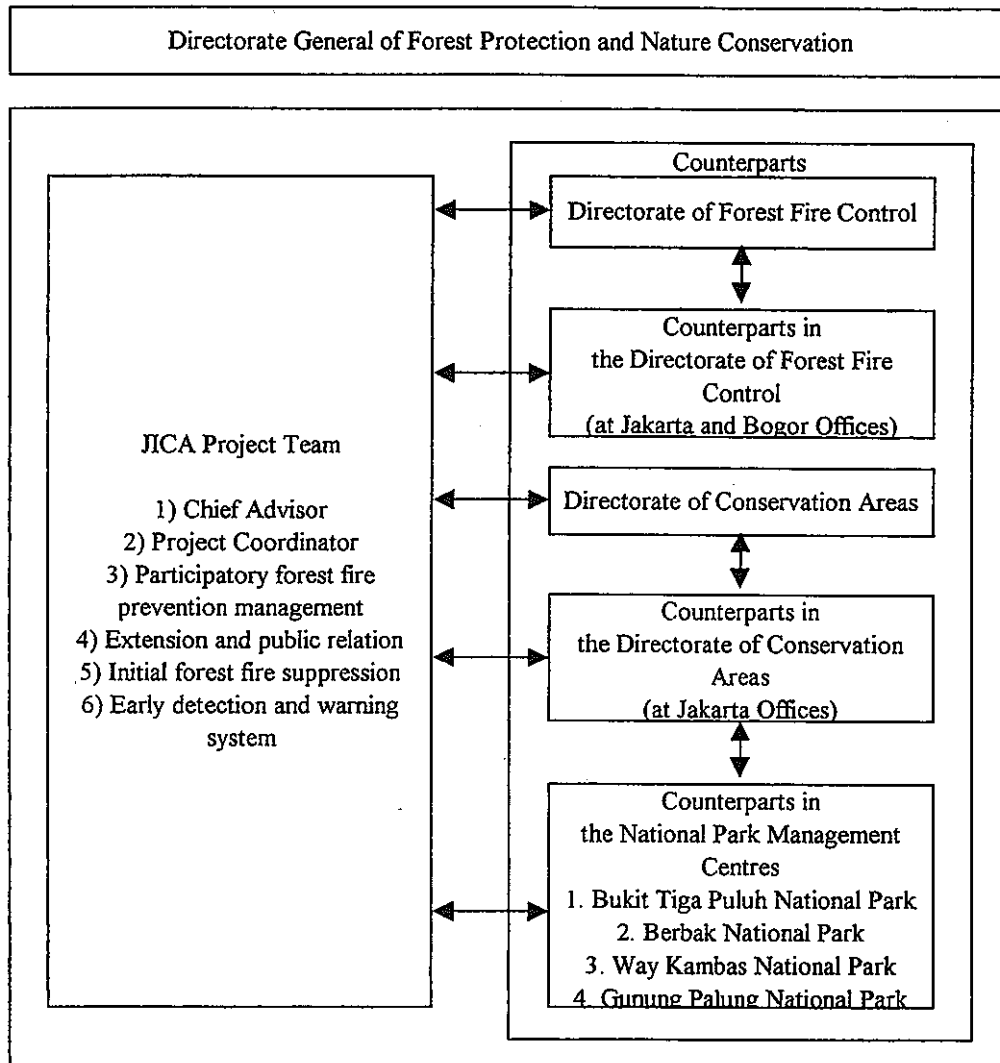
National park	Manager class	Staff and maintenance crew	Rangers	Total
Bukit Tiga Pulu	6 (Include one general manager and 4 ranger unit chiefs)	8 (Include one general manager and one staff unit chief)	34 (Include 4 ranger unit chiefs)	43
Berbak	11 (Include one general manager, and 8 ranger unit chiefs)	10 (Include two staff unit chiefs and one general manager)	34 (Include 4 ranger unit chiefs)	43
Way Kambas	6 (Include one general manager and two staff unit chiefs and 3 ranger unit chiefs)	13 (Include one general manager and two staff units chiefs)	90 (Include 3 ranger unit chiefs)	122
Gunung Palung				60

Indonesian side (which include the Director General of Forest Protection and Nature Conservation, the Director of Forest Fire Control, the Director of Conservation Areas, 4 General managers of National Park Management Centres (Bukit Tiga Pulu National Park, Berbak National Park, Way Kambas National Parks, Gunung Palung National Park)) committed the allocation of suitable number of counterpart staffs to the project. There are so many educated staff of national park management centres and some of them have enough conversation skills in English. Smooth communication with counterparts could be one of key success factors on technology transfer project.

2-2) Project implementation structure

Project implementation structure is planed as chart 4-3.

Chart 4-3: Project Implementation Structure



3) Sustainability

3-1) Institutionalization

The methods and technology on forest fire prevention management will be transferred to the counterparts in the central government located in Jakarta and Bogor, and 4 target national park management centres. The project activities are not pure technical transfer but are designed to institutionalize the output of the project in various sections of the government through actual operation of forest fire prevention and initial fire suppression.

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3-2) Overall sustainability

(1) Institutional structure and priority of forest policy

The Ministry of Forestry must take all roles and responsibility of forest policy planning and keep direct management of national parks. Also, this ministry makes clear institutional structure on policy making, extension and promotion of necessary activities and results.

Also forest conservation especially conservation of tropical rain forest is priority matter for Indonesia. Indonesia committed clearly to international society and it also committed assistance to the Indonesian government.

(2) Executing organization, leadership and participation of local resident

The executing organization as counterpart is also clear and experienced. The Directorate of Forest Fire Control presently is controlling all budget for forest fire prevention management including budget for extension and promotion.

Target national park management centres also have sufficient structured management organization. General manager can always use more than 40 staffs. This centralized organizational structure supports leadership of general manager for management of the national park. Participation of local resident is sometimes one of key issues for national park management. For example, general manager of Bukit Tiga Puluh national park is conducting many participation scheme of local resident in forest fire finding and social forestry activities.

(3) Financial condition, economy situation and budget allocation

Even in quite difficult financial situation, related sections of Ministry of Forestry are getting relatively stable budget as discussed in 4. 2)-1. This ministry has also reforestation fund and forest concession royalties that can be used to stabilize the budget allocation.

(4) Technology

The ministry has limit on budget to sustain the forest fire prevention management system. Several developed countries offer high tech large-scale fire suppression system carrying water by jumbo jets or integrated control system linked with satellite. However, those system need huge maintenance cost and have barrier on sustainability. This project focuses on system and model development that can be managed, operated and sustained by Indonesian government and people within their normal budget and technology (for example, equipment for initial fire suppression is jet shooter and small water pump). The project intends to technical transfer of not only concept but also field level applicable technology.

(5) Socio-culture impact

This element may directly relates to the participatory forest fire prevention management field. The project will conduct study and research on socio-economic issues of local residents for participatory forest fire prevention management. Based on the study and research results, the project will study suitable participatory forest fire prevention methods and technology, and will propose participatory forest fire prevention technology and methods to the government. This step-by-step approach is expected to avoid social conflict.



(6) Environment impact

This project focuses on environment conservation of forest from the damage by fire. In this sense, this project gives positive impact to environment.

4) Special consideration

To protect the national parks from the fire coming from outside, they need the cooperation of people surrounding the national parks. It is necessary to coordinate with local governments' organizations (by POSKOLAK and SATLAK or KANWIL and DINAS) that may take over the present forest fire prevention and suppression activities after present decentralization is settled. For this reason, the project must keep watching the situation and progress of the decentralization. The training opportunities conducted in Indonesia under the control of this project should be open not only to the staff of national parks, but to the staff of local governments when it is necessary.

Other considered issues may arise on gender. Especially in the participatory forest fire prevention management and the extension and public relation, women's role may be important to support activities and maintenance activities in their daily life. We must keep finding maximum opportunity for participation of women.

5. Project design

1) Overall goal

The overall goal is set as "Indonesian forests, especially those in national parks, are protected from forest fire."

2) Project purpose, outputs, activities

2-1) Project purpose

The project purpose is "Forest fire prevention and initial suppression activities (which are sustainable, feasible and replicable with Indonesian resources) to protect national parks are carried out."

2-2) Outputs

There are following 3 outputs of the project:

- The capacity of the Indonesian Government to engage in forest fire prevention and initial suppression of fires in forest areas, and especially those that may expand to national parks, is improved and strengthened.
- The awareness of people of the necessity for forest conservation and forest fire prevention is increased and strengthened.
- Methods and techniques for increasing and strengthening local residents' willingness and capability in participatory forest fire prevention management are examined.

2-3) Activities

To achieve the outputs mentioned above, the project will plan to conduct following activities:

- (1). Activities on strengthening and improvement of the capacity of the Indonesian Government to engage in forest fire prevention and initial suppression of fires in forest areas, and especially those that may expand to national parks.
 - (1)-1. To improve the early warning and detection system using satellite information.
 - (1)-1-1. To develop the automatic system of hot spot data processing. (C/P of central government)
 - (1)-1-2. To develop the forest fire monitoring techniques. (C/P of central government)
 - (1)-1-3. To study techniques of the warning systems. (C/P of central government)
 - (1)-1-4. To collect weather and climate information. (C/P of central government)
 - (1)-1-5. To improve the feedback system. (target national parks)
 - (1)-1-6. To develop the map for forest fire management using satellite information. (target national parks)
 - (1)-2. To disseminate the early warning and detection system to the field level.
 - (1)-2-1. To improve the techniques of hot spot data processing at the provincial level.
 - (1)-2-2. To improve the techniques of hot spot data processing at the national park level.
 - (1)-3. To provide information related to early warning and detection using satellite images to the national parks and surrounding areas.
 - (1)-4. To analyze hot spot data collected by the project and field surveys.
 - (1)-4-1. To analyze the hot spot data by the land use and others.
 - (1)-4-2. To analyze the hot spot data by the field surveys.
 - (1)-5. To improve the field-level forest fire management system using KBDI (Keetch-Byram Drought Index) method.
 - (1)-5-1. To disseminate and extend KBDI method.
 - (1)-5-2. To develop the techniques of announcement to the people surrounding the national parks using KBDI.
 - (1)-6. To develop the curriculum for the human resources development for fire-fighting.
 - (1)-6-1. To develop training courses according to the technical levels.
 - (1)-6-2. To develop training curriculums.
 - (1)-6-3. To develop training materials.
 - (1)-7. To conduct the training for fire fighting.
 - (1)-8. To develop a forest fire prevention and initial suppression model in the national parks.
 - (1)-8-1. To develop and propose patrol systems.
 - (1)-8-2. To develop and propose fire prevention systems by rangers.
 - (1)-8-3. To develop and propose organizing techniques of people surrounding the national parks for forest fire prevention.
 - (1)-9. To issue warnings based on analysis of past and current hot spot data.
 - (1)-9-1. To provide information on hot spot patterns based on land use.
 - (1)-9-2. To provide hot spot information and satellite images to facilitate Indonesian government's actions.
 - (1)-9-3. To develop techniques for announcement to local people using the hot spot information.
- (2). Activities on increasing and strengthening of the awareness of people of the necessity for forest conservation and forest fire prevention.
 - (2)-1. To assist in forest fire prevention activities and management by the central government.
 - (2)-1-1. To assist in nationwide campaigns.
 - (2)-1-2. To introduce the outputs of the project in the training conducted by the Indonesian government.