

INTERNATIONAL CROSS SECTORAL FORUM ON FOREST FIRE MANAGEMENT IN SOUTH EAST ASIA

THE COMPILATION
OF
ABSTRACTS

December 7-8, 1998
Jakarta - INDONESIA



REPUBLIK INDONESIA
BAPPENAS
National Planning Development Agency



Japan International Cooperation Agency



ITTO

International Tropical Timber Organization

INTERNATIONAL ASSOCIATION OF MANAGEMENT
CONFERENCE ON THE MANAGEMENT OF MANPOWER

PLENARY SESSION

PLENARY SESSION

The first session of the conference was held in the morning of the 1st day. It was devoted to the opening of the conference and the election of the President and Vice-President. The President of the conference was elected to be the Honorable Mr. [Name] of [Country].

The second session was held in the afternoon of the 1st day. It was devoted to the presentation of the report of the International Association of Management for the year 1965. The report was presented by the Secretary-General, Mr. [Name]. The report dealt with the activities of the Association during the year and the work of the various committees. The report was well received and the Secretary-General was thanked for his excellent work.

The third session was held in the morning of the 2nd day. It was devoted to the presentation of the report of the International Association of Management for the year 1965. The report was presented by the Secretary-General, Mr. [Name]. The report dealt with the activities of the Association during the year and the work of the various committees. The report was well received and the Secretary-General was thanked for his excellent work.

The fourth session was held in the afternoon of the 2nd day. It was devoted to the presentation of the report of the International Association of Management for the year 1965. The report was presented by the Secretary-General, Mr. [Name]. The report dealt with the activities of the Association during the year and the work of the various committees. The report was well received and the Secretary-General was thanked for his excellent work.

AN OVERVIEW OF INTERNATIONAL GUIDELINES: ITTO GUIDELINES ON FOREST FIRE MANAGEMENT*)

by :

Dr. JOHANN G. GOLDAMMER

ABSTRACT

In the recent 20 years forest fires influenced by climate variability and rapid demographic changes have become a major problem adversely affecting the sustainable management of tropical forests. Hazards to human health, the destruction of

valuable forest resources and biodiversity, accidents and difficulties for land, water and air transportation, the disruption to the lives and livelihood of millions of people and the far-reaching negative impact to several sectors of the economy, have all been widely reported. This problem is not only confined to Southeast Asia but also in many other parts of the world. Obviously, forest fire management is a new dimension which must be accorded urgent and utmost attention and vigilance.

Forest fire was identified as a major problem by the International Tropical Timber Council (ITTC) since it started operational activities in 1986. Pursuant to a Decision of the International Tropical Timber Council, ITTO undertook the development of a set of international guidelines for the protection of tropical forests against fire. This resulted in the publication "ITTO Guidelines on Fire Management in Tropical Forests" in 1996. The Guidelines contain 29 Principles and recommended actions: Policy and Legislation, strategies (Fire Management Planning, Fire Management Options, Fire Suppression, Role of Communities in Fire Protection), Monitoring and Research, Institutional Framework and Capacity Development, Socio-economic Considerations, Land Resources Management and Utilization, and Training and Public Education.

The guidelines which are targeting tropical countries in general offer a framework of criteria for the development of national guidelines which need to be fine-tuned and more specific in accordance with the socio-economic, cultural and vegetation conditions. Based on the ITTO guidelines, a specific national project has been developed in Indonesia ("Integrated Forest Fire Management in Indonesia: Phase I -- National Guidelines on Forest Protection Against Fire"), while a similar initiative is at an early stage of preparation in Namibia.

At the recent consultation on "Public Policies Affecting Forest Fires" by the Food and Agriculture Organization of the United Nations (FAO) it has been suggested that equal/comparable guidelines for other regions of the world (boreal, temperate areas) be developed with reference to ITTO guidelines. The ITTO is now enhancing cooperation with several regional, international and UN organizations and agencies, notably ASEAN, FAO, the World Health Organization (WHO), ADB and World Bank to jointly develop fire policy and management capabilities and strengthen the local capabilities. Inputs from the fire science community and the Global Fire Monitoring Center (GFMC) ensure that guiding recommendations and technical projects are based on updated state of research and development.

**) Paper presented on "International Cross-Sectoral Forum on South East Asia Forest Fire Management, Jakarta, December 7-8, 1998.*

***) International Tropical Timber Organization (ITTO) and Global Fire Monitoring Center (GFMC)@ Fire Ecology Research Group, Max Planck Institute for Chemistry, c/o Freiburg University, D-79085 Freiburg, GERMANY.*

THE MISSION ON FOREST FIRE PREVENTION AND MANAGEMENT TO INDONESIA AND MALAYSIA (SARAWAK)*

by :

Dr. C. CHANDRASEKHARAN

ABSTRACT

During the last twenty years, wildfires devastated parts of Indonesia, on several occasions. Millions of hectares of cropland and forests in Sumatra and Kalimantan burned, spurred by the prolonged drought spell of 1997-98 caused by El Niño. Millions of tonnes of biomass, including timber and non-wood forest products were consumed by the fires, affecting the livelihood of untold numbers of people. A dense haze from the fires enveloped an area the size of Western Europe, and blanketed many parts of the ASEAN. Health of some 70 million people in six countries was affected, directly or indirectly, in the worst transboundary pollution ever recorded. The total estimated value of economic and social damages is between US\$ 5-6 billion.

Investigations indicate that while the El Niño phenomenon creates dry conditions, the direct cause of the damaging fire incidents are the habitual use of uncontrolled, open and broadcast fires as a cheap means of land clearing and preparation, by owners of plantations (oil palm, rubber, timber), small farmers and slash and burn agriculturists. The El Niño phenomenon made the considerable amount of fuel load in the forest highly combustible, providing the material to feed the conflagration.

To face this disaster, a large number of countries and organisations provided emergency relief and short-term assistance. It was the onset of rains that finally extinguished the fires and ended the present emergency. It is now necessary to review the situation comprehensively and take urgent measures, for ensuring resource and environmental security.

In some ecosystems and circumstances, fire plays an ecologically significant role in maintaining biogeochemical cycles and disturbance dynamics. In others, it may lead to destruction and long-term site degradation, and other detrimental impacts. Fire is a useful tool of land management. It can also be used intentionally as a weapon by persons or communities dissatisfied by landuse policies and situations.

Integrated fire management is essential to control the damaging role of fire without unduly curtailing its beneficial aspects and to reduce the intensity of fires in unavoidable cases of fire events. Scientific and planned actions for routine fire protection, monitoring, prediction and prevention, timely fire danger warning and adequate preparedness for fire-fighting and suppression, supported by policies and strategies covering social, economic, ecological, technological and institutional aspects of the issue are essential.

With the uncertainty about the next visit of El Niño, there is no time for complacency. An effective and efficient system should be established to prevent, control and combat devastating impacts of this phenomenon. This is a herculean task.

*) Paper presented on "International Cross-Sectoral Forum on South East Asia Forest Fire Management, Jakarta, December 7-8, 1998.

**1997 FIRES IN INDONESIA
SATELLITE REMOTE SENSING FOR MAPPING AND MONITORING*)**

by :

Mr. CHRISTOPHER A. LEGG

ABSTRACT

A study of the 1997 fires in Indonesia was undertaken during October and November 1997, partly to assess the extent and nature of fires during August and September, and partly to undertake real-time monitoring of the fires. Data, mainly in the form of satellite imagery and image products, was obtained from local receiving stations and through the Internet. The distribution of fires in time and space has been assessed, mainly using indicative "hot-spots" from NOAA AVHRR and ERS-2 ATSR imagery. A rough assessment of areas burnt in southern Sumatra up to the end of September 1997 has been undertaken using SPOT digital quicklook imagery and vegetation classes burnt assessed by interpretation of pre-burn satellite imagery, where available.

Major fires started in southern Sumatra and southern Kalimantan in early August 1997 and continued to burn until the second week of November, when they appear to have been extinguished by the arrival of substantial rain. Fires have also burnt for much of this period in south-eastern Irian Jaya. The total area

burnt in Sumatra Selatan and Lampung provinces of southern Sumatra alone is estimated to be about one million hectares, and the total in all of Indonesia is in excess of two million hectares. Most of this area was not forest, but scrub, grassland and agricultural lands. The most persistent fires, and the source of probably ninety percent of the smoke haze which blanketed parts of Indonesia and surrounding countries, were seven clusters of fires along the edges of degraded peat-swamp forests in southern Sumatra and Kalimantan. Almost no fires occurred deep within undisturbed primary forest and most were associated with land-clearing for new settlements or plantations, or with logging operations.

*) Paper presented on "International Cross-Sectoral Forum on South East Asia Forest Fire Management, Jakarta, December 7-8, 1998.

**) GIS Specialist, EU Forest Inventory and Monitoring Project, Ministry of Forestry, P.O. Box 7612, JKP 10076, Jakarta Indonesia.

FIRE MANAGEMENT IN INDONESIA - *QUO VADIS**)

by :

Mr. LUDWIG SCHINDLER**)

ABSTRACT

After the Bandung Conference in 1992 there was some confidence that Indonesia could go ahead and overcome its fire problem with international help. In 1997/98 Indonesia was again struck by a drought and resulting conflagration that has roughly consumed 10 million hectares of land and forest.

The haze and drought 1997/98 triggered a mushrooming of international activities and much money has been thrown at the problem. The paper examines the odds of fire-management in Indonesia and also the chances of success of various donor activities based on the author's 4-year experience in a bilateral fire project in Indonesia, which resulted from the Bandung conference. It points out some major constraints, the chances of success and the changes necessary towards a sustainable land use that has to include fire as one of the most threatening factors.

*) Paper presented on "International Cross-Sectoral Forum on South East Asia Forest Fire Management, Jakarta, December 7-8, 1998.

***) GTZ.

FOREST FIRE MANAGEMENT AND CONTROL PROGRAM IN THE PHILIPPINES*)

by :

Dr. ARTURO S.A. CASTILLO**)

ABSTRACT

The problems about forest fire require institutional, national, and even international understanding and cooperation. Certainly, the occurrence of big fires in the ASEAN region signals the need to adopt a certain type of cooperation and sharing of resources among the member-countries to ably address fire management issues.

In the Philippines, about 304,345 hectares of plantation and natural forests were burned from 1978-1996. During the first five months of 1998, big fires occurred in several parts of the country destroying forest resources, agricultural croplands, communication facilities, and a number of electric installations. In order to minimize the problem on forest fire, the Forest Fire Management and Control Program (FFMCP) under the Department of Environment and Natural Resources implemented four (4) major activities namely: fire prevention; fire preparedness; fire suppression; and monitoring and evaluation.

There is a need to pass a law on "Forest Fire Management and Fire Control" that will form the basis of more specific regulations and ordinances to be passed by the different law making bodies at the provincial, city, municipal, and barangay levels to address forest fire problems. The program needs volunteerism, information gathering, agency participation/coordination, resource generation, and alliance building.

*) Paper presented on "International Cross-Sectoral Forum on South East Asia Forest Fire Management, Jakarta, December 7-8, 1998.

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**A SOCIAL SCIENCE RESEARCH FRAMEWORK
ON THE CAUSES OF INDONESIA'S FOREST
AND LAND FIRES*)**

by :

Dr. WILLIAM D. SUNDERLIN)**

ABSTRACT

This paper proposes a research framework for answering three of the principal questions that remain unanswered with regard to Indonesia's 1997-98 forest and land fires:

- (1) What area of the fires was caused by smallholder farmers as compared to largeholders (companies establishing plantations and timber concessionaires) ?
- (2) How much of the burnt area results from use of fire as a land clearing tool as compared to the use of fire as a weapon under situations of tenure conflict ? and
- (3) What area of the fires was consumed as a result of intentional action, as compared to accidental loss of control over the use of fire?

Answers to these questions can be gotten through combined case study and remote sensing research at sites where the fires happened. Cogent answers are essential for formulating appropriate preventive policy measures in the future. The essence of the research framework is a matrix model of fire causation, agency, and intentionality. The model aims to measure and cross-classify the area of parcels burned by: mode of causation (fire as tool versus fire as weapon); by mode of agency (long-rotation shifting cultivation, short-rotation shifting cultivation, pioneer farming, and largeholders); by target of agency ("own" land versus the land of people in other agency categories); and intentionality (intentional vs. accidental). The model also aims at specifying the absolute and relative shares of areas burned by the various kinds of agents.

**) Paper presented on "International Cross-Sectoral Forum on South East Asia Forest Fire Management, Jakarta, December 7-8, 1998.*

****) Center for International Forestry Research (CIFOR).*

equal sharing of responsibilities and benefits, but will have to diversify IGB design gradually in response to their different preferences and abilities.

FFPMP will step up IGB trials with expansion of the green belts, establishment of demonstration plots and group nurseries, and construction of a fire lookout and other related facilities. Various planting models will be explored with new potential tree species for more effective land use intensification and fire prevention on the community land and the park buffer zone.

**) Paper presented on "International Cross-Sectoral Forum on South East Asia Forest Fire Management, Jakarta, December 7-8, 1998.*

***) Forest Fire Prevention Management Project (FFPMP).*

**THE INDONESIAN PERSPECTIVE AND EXPERIENCE IN
FOREST FIRE MANAGEMENT*)**

by

Dr. F. GUNARWAN SURATMO)**
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ABSTRACT

The pattern of forest and land fires in Indonesia is unique. It should be understood to be able to determine the causes, impact of forest and land fires management. International assistance and cooperation which have been conducted since 1986 have for the greater part been conducted in certain areas/provinces in Indonesia. ITTO has initiated to give more assistance to projects with macro objectives such as National Guidelines on Forest Fire Management.

The Government of Indonesia has developed middle future plans which can be used as one of the basic considerations to develop assistance in the future. The Consultative Group on Indonesian Forests (CGIF) which was established in 1994 can play an important role in communication, coordination and cooperation among all related parties working on forest fire management in Indonesia.

This paper highlighter pertinent issues on forest and land fire disaster occurred in Indonesia during the period of 1997-1998. Forest fire causes and damaging impacts have been summarized.

**) Paper for International Cross Sectoral Forum on Forest Fire Management in South East Asia (part of this paper had been presented in the FAO Consultation on Public Policies Affecting Forest Fire in Rome, October 28-30, 1998) December 7-8, 1998*

****) Prof. Dr. F. Gunawan Suratmo: Head of Forest Protection Lab, Faculty of Ofrestry ; Head of Study Program on Environment, Graduate Program, IPB; Senior Technical Advisor, Integrated Forest Fire Management in Indonesia, ITTO Project PD 12/93 Rev. 3 (F).*

OVERCOMING PEAT RESOURCES IN WEST KALIMANTAN*)

by :

Ir. ERWIN EFFENDY**)

ABSTRACT

Annual forest fires in West Kalimantan result in large areas of degraded peat resources each year.

Peat soil fires burns not only above ground, but also below ground, in the form of long narrow tunnels or large kettles that make fire detection difficult.

Using an integrated system of water injection into below ground fire sources, and digging to loosen peat soils burning at the surface only, we have brought peat fires under control in several conversation areas in West Kalimantan. On occasions where fires can not through or have reappeared in adjacent areas outside the conservation areas, this has resulted only from a shortage of personnel and equipment.

Our efforts in the field to combat peat resource fires have guided us to develop a systematic planning approach to extinguishing fires that is highly efficient and quickly achieves optimum results.

*) Paper presented on "International Cross-Sectoral Forum on South East Asia Forest Fire Management, Jakarta, December 7-8, 1998.

***) PHPA, MoFEC.

**INTERNATIONAL CROSS SECTORAL FORUM ON FOREST FIRE
MANAGEMENT IN SOUTH EAST ASIA*)
Policy Framework required to prevent forest and land fires**

by :

Dr. ALAISTER FRAZER)**

ABSTRACT

In considering a policy framework for the prevention of forest and land fires, it is important to recognize that it will never be possible to totally prevent such fires since fire can be a naturally occurring phenomena which even plays an important role in the dynamics of some ecosystems.

Policy must aim at minimising the risk of fires occurring and spreading as a result of human activities, and should also aim to minimize the economic losses which result of from fire for the least possible cost, Economic losses include both the direct loss of crops, timber and property damage of destroyed, and the indirect costs of environmental deterioration loss of soil fertility, increased erosion, loss of wildlife and biodiversity and loss of the site potential for cultural, recreational and tourism activities.

The major forest fires which have occurred in recent year in Indonesia, have been strongly associated with seasonal factors, particularly drought associated with die EL NMO phenomena Climatic factors are not subject to any significant control, and therefore it must be recognized that the level of fin risk varies tom year to year. An important element of policy must therefore an Early Warning system, which alerts all concerned to the potential increase in the risk of fires. The key to the effectiveness of on Early Warning System is that the information must be widely disseminated.

It is not clear, whether the El Nino drought has a uniform impact throughout Indonesia. The impact of El Nino seems to be a redistribution of rainfall rather than a reduction in the overall amount. Maps produced by Badan Meteorologi dan Geofisika, suggest that below average and above average rainfall can be experienced in neighboring regions in the same season.

This topic may justify research to determine whether the areas experiencing reduced rainfall during El Nino phenomena are always the same or may vary from one cycle to the next.

A second aspect of an Early Warning System is monitoring Vegetation Indices, which indicate when and where the effects of drought have increased the risk to danger levels. Modern technology which enables such data to be captured in real time from satellites such as NOAA have been available for a few years, and need to be organized into an effective system for alerting "all concerned" to the changing situation within hours, rather than days, so that preventive measure can be taken.

A second element of policy must be to address the human induced causes of forest fires, and develop measures, to eliminate or greatly reduce these.

Information from the recent fires in Indonesia, suggest a number of human related causes of fires, starting :

1. Land clearing and burning of residue by both small farmers and large companies, getting out of control.
2. Arson
3. Fires starting from natural causes – e.g. Lightning or from Windburn embers.

The second of this causes, to be as a result of Conflict, possibly over land ownership Claim or access to land.

If forest fires are to be reduced to a minimum in the future there needs to be a clear policy relating to land management and land clearance, which take account of the needs of land for different purposes, the needs for land by different groups within the community, and the economic and environmental costs and benefits of forest conversion. The alternative of intensification of management of plantation crops and agriculture, as an alternative to extensification needs to be carefully evaluated, to minimize future forest clearance. Where possible all future development of plantation crops, should be on forest land already cleared to avoid the need to convert any more forest.

**) Paper presented on "International Cross-Sectoral Forum on South East Asia Forest Fire Management, Jakarta, December 7-8, 1998.*

****) USAID.*

THE UNIVERSITY OF CHICAGO
DEPARTMENT OF POLITICAL SCIENCE

RESEARCH REPORT
NO. 100

WORKING GROUP

WORKING GROUP

2

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MONITORING FOREST FIRES BY USING METEOROLOGICAL SATELLITE INFORMATION*)

by :

**TOMOYUKI UEDA, JOHNNIE HADI PRAKOSO,
HIDEAKI TAKAI, DWI PRABOWO YUGA SUSENO
AND AHMAD BASYIRUDDIN USMAN**

ABSTRACT

Forest fires have periodically occurred in Indonesia at the interval of several years mainly due to unusually long and severe droughts. The Forest Fire Prevention Management Project (FFPMP) has started in 1996 as a technical cooperation program between the Ministry of Forestry and Estate Crops of Indonesia and Japan International Cooperation Agency (JICA). The Project aims to enhance prompt measures against forest fires at the central government level and to improve forest fire prevention and initial suppression methods at local community level in Indonesia.

The Early Warning / Detection System is one of the components of the Project activities. The information from meteorological satellites, HIMAWARI and NOAA, is received at the head office in Bogor in order to detect forest fires and provide such information on forest fires to the central government and local fields.

HIMAWARI information is received once an hour mainly to observe smoke and haze conditions, while fire positions are identified as hot spots from the NOAA information.

In 1997 and 1998, a large scale of forest fires had occurred in Indonesia due to the unusual drought derived from *El Niño* phenomena. During that period, the Project had monitored the fire conditions in the country by the satellite information continuously.

In this paper, NOAA hot spot data of forest fires in the Way Kambas National Park in the Lampung Province in 1997 and in the Kutai National Park in the East Kalimantan Province in April 1998 is examined. The result shows that NOAA hot spot data can describe the change of extent and position of fires clearly. The observation suggests that hot spot information can be useful to monitor fires for the scale of several hundred hectares in their extent. It is further suggested that satellite information can assist forest fire management not only at central government level but also it might be effective at provincial government level and local field level as well.

**) Paper presented on "International Cross-Sectoral Forum on South East Asia Forest Fire Management, Jakarta, December 7-8, 1998.*

****) The Forest Fire Prevention management Project Jl. Ir. H. Juanda No.100, Bogor, Indonesia*

THE PRACTICALITIES OF FIGHTING FOREST FIRES: A VIEW FROM THE PROVINCE OF SOUTH SUMATRA*)

by :

Mr. MARC V. J. NICOLAS

ABSTRACT

South Sumatra remains poorly prepared to deal vegetation fires on the scale experienced during the drought of 1997. There are few fire fighters directed by an inadequate command structure which is also restricted by poor communications. In many areas fire fighting equipment is insufficient, in the others there is none. Where fire fighters are available, they have little protective equipment and are incompletely trained.

The European Union funded Forest Fire Prevention and Control Project (FFPCP), working with the Provincial Office of the Ministry and Forestry and Estate Crops, has identified the provision of support to Forestry Districts Offices (Cabang Dinas Kehutanan Tk. II) as the most effective way to strengthen fire fighting capacity - and fire prevention - in the immediate future.

The prime need is to form, train and equip District level fire crews; the foundation of any future system. To this end FFPCP has advised on team formation and provided training in trial areas. Crew safety is considered paramount: the necessity for protective clothing, risk avoidance and first-aid are stressed. Once understood, training continues in the choice and use of equipment to suppress vegetation fires, and in basic fighting tactics. Field experience has shown the necessity to keep equipment simple, compatible and adaptable. Over-complex equipment is never used or is quickly broken. Increased success brings recognition from authorities and community and, with this, increased motivation and achievement.

In the longer term there is a need to establish a national fire management organisation which encompasses both prevention and control. Modern methods to anticipate and manage risk, allocate resources, and deal with crises are needed if periodic smoke and haze events are to be avoided. Such an organisation will need continued, substantial donor support. For now, well-trained, simply-equipped. District level teams are an effective and realistic beginning.

*) Paper presented on "International Cross-Sectoral Forum on South East Asia Forest Fire Management, Jakarta, December 7-8, 1998.

**) Forest Fire Prevention and Control Project

RESOURCES MOBILIZATION FOR EFFECTIVE SUPPRESSION AND CONTROL*)

by :

Dr. ADANG SETIANA)**

ABSTRACT

The National Disaster Management Coordinating Board (Bakornas PB) is chaired by the Coordinating Minister for People's Welfare and Poverty Alleviation (Menko Kesra dan Taskin) who reports directly to the President. Main functions of Bakornas PB is coordination, consultation, and information including those of resources mobilization. regarding natural as well as man-made disaster. Resources mobilization in provincial level is carried out by Provincial Disaster Management Coordinating Unit (Satkorlak PB) whereas for district level by District Disaster Management Implementing Unit (Satlak PB). Regional and international cooperation arrangements are also organized by Bakornas PB to strengthen its above mention functions. Therefore, effective suppression and control of fires all over the countries depend on effective coordination.

*) Paper presented on "International Cross-Sectoral Forum on South East Asia Forest Fire Management, Jakarta, December 7-8, 1998.

***) Deputy Assistant for Disaster Mitigation and Preparedness Affairs State Coordinating Minister for People's Welfare and Poverty Alleviation National Disaster Management Coordinating Board (Bakornas PB).

APPROPRIATE FOREST FIRE EQUIPMENT FOR ASEAN*)

by

Mr. SIRI AKAAKARA

ABSTRACT

Success or failure in fighting forest fire greatly depend on the efficiency and effectiveness of fire crew as well as fire fighting equipment. Fire crew have to be well trained, well organized, and experienced. While fire equipment must be appropriate. With respect to fire suppression equipment, general public strongly believe that the sophisticated and hi-tech equipment especially aircraft is the most effective means for combatting fire. Such attitude is not likely to be correct. Because in many cases, hand tool as well as low-tech equipment have been proven to be much more effective than the hi-tech one. Therefore the first criterion for choosing fire equipment is whether it suits the fire condition, not how high technology the equipment is.

In Southeast Asia, most of forest fire breaking out in this region are classified as surface fire. Yet in some particular areas ground fire could be developed. However both types of fire usually have relatively lower rate of spread, lower fire intensity, and lower flame length compared with crown fire. Therefore most of fires could be suppressed effectively by merely appropriate hand tools mainly fire swatter, rakehoe, backpack sprayer, and portable water pump. Heavy machinery as well as aircraft especially the fixed-wing type are not likely to fit ASEAN condition due to the unique fire behaviors and terrain of this region. Only helicopter has been proven to be very useful in supporting fire suppression operation. Helicopter could serve as command post, transporting fire crew and equipment, conducting logistics and rescue operation, and to some extent, suppressing fire.

*) Paper presented on "International Cross-Sectoral Forum on South East Asia Forest Fire Management, Jakarta, December 7-8, 1998.

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FOREST AND LAND FIRES IN INDONESIA: AN EVALUATION OF FACTORS AND MANAGEMENT EFFORTS

by :

Ms. HIRA JHAMTANI

ABSTRACT

Forest and land fires in Indonesia are caused by a set of complex factors such social, economic, technological factors as well as "bad" policies in land and forest utilization. Ecological factors do play a role as well, but climatic factor only aggravates the fires. These factors should have been analyzed and understood since the large fires of 1982/1983 in order to conduct effective fire prevention.

The Indonesian government, particularly the Ministry of Forestry has conducted fire management efforts over the years, but these efforts rarely address the causes. This is reflected in the fact that three large fires have occurred over a period of eight ears, i.e. 1991, 1994, 1997/1998. In addition, an evaluation of fire management efforts shows that ineffective management policies, weak policy and law enforcement, poor organization and coordination as well as weak resources management have made these efforts less effective. This paper briefly discusses the factors influencing forest and land fires and evaluates fire management efforts, with most of the information taken from the recently completed study undertaken by UNDP and the Indonesian Ministry of Environment.

**) Paper presented on "International Cross-Sectoral Forum on South East Asia Forest Fire Management, Jakarta, December 7-8, 1998.*

****) Coordinator of UNDP Environmental Emergency Project and executive director of the National Consortium on Forest and Nature Conservation in Indonesia – KONPHALINDO.*

APPROACH AND STRATEGY ON LAND REHABILITATION INDONESIA*)

by :

Harsono)**

ABSTRACT

Fire has contributed significantly to forest and land degradation in Indonesia, especially in 1997 when a serious El-Nino phenomenon triggered a number of forest and land fires in the South East Asia region. Such fires destroyed valuable forest resources and gave rise to critical lands. Appropriate approach and strategy, as well as actions, should be employed in rehabilitation measures of such degraded land and forest.

As a matter of fact, budget is one of major constraints in land and forest rehabilitation. Therefore, to ensure the effectiveness and efficiency of such rehabilitation measures, determination of high priority areas for rehabilitation need to be taken first. To have high priority to rehabilitate, the areas should be in the high priority watershed. There are a number of criteria to determine the priority level of watershed. The first criteria is land aspect, considering the existence of critical land, erodibility level, and percentage of land cover. The second criteria is hydrology aspect, taking into account the bulk of sedimentation,

water utilization index, coefficient of variation, and water quality. The other criteria is social and economic aspects which include inhabitant pressure, people awareness on soil conservation, people's wealth level, and number of under-developed village. Investment for infrastructure such as irrigation system or dam and regional development policy especially regarding land-use planning are also taken into consideration.

As high priority areas to rehabilitate is determined, sound approach and strategy need to be implemented to make the rehabilitation fruitful in sustainable basis. It can be seen from the experience that lack people's participation in forest development has brought about low awareness of people to the existence of forest resources. In turn, people especially living adjacent: to the forest has no sense of belonging to the forest resources and does not care about the existence of the forest. As a result, people does not take any action to prevent from forest fire and save forest when forest fire occurs. Based on this experience, any measure to enhance people's participation should be addressed in line with the forest and land rehabilitation. The approach of "community based development" should be employed in such a manner as to empower the people and strengthen rural institution development.

Finally, harmonious relationship between forest and people emerges, the quality of forest is improved and on the other hand, people's prosperity is also increased.

**) Presented for the International Cross Sectoral Forum on Forest Fire Management in South East Asia. Jakarta 7-8 December 1998,*

****) Director General of Reforestation and Land Rehabilitation, Ministry of forestry and Estate*

REHABILITATION OF BURNT NATURAL FORESTS IN NATIONAL PARKS*)

by :

MIYAKAWA HIDEKI**)

ABSTRACT

Forest fires in 1997 / 98 have given tremendously huge damage in national parks in Indonesia. Providing natural habitats to wildlife and tourism opportunities to human beings, national park ecosystems are very important. It is an urgent task to recover fire-damaged park forests. In general, natural regeneration is more desirable than man-made rehabilitation owing to high species diversity. Nevertheless, quick natural recovery of the damaged vegetation is hardly expected due to significantly large fire-affected areas with the absence of mother trees and high risk of another fire occurrence. The Forest Fire Management Project (FFPMP) of JICA/PHPA – Ministry of Forestry and Estate Crops has implemented surveys of fire damaged national parks throughout Indonesia since early 1998, with a view to improving measures for protection of national parks against fires.

This paper reviews existing government regulations and guidelines concerning rehabilitation of national parks. Then it recommends feasible methods of rehabilitation of the burnt park forests, including site selection, identification of suitable local species, planting, maintenance and protection. Special emphasize is given to forest fire prevention measures, based on findings of the FFPMP surveys. Finally, the paper discusses formulation of rehabilitation plans as a case study for selected two national parks, Kutai and Way Kambas National Park.

*) Paper presented on "International Cross-Sectoral Forum on South East Asia Forest Fire Management, Jakarta, December 7-8, 1998.

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ROLE OF HEALTH SECTOR TO PREVENT ADVERSE HEALTH IMPACT OF HAZE IN INDONESIA*)

by :

Mr. ATRISMAN NUKMAN

ABSTRACT

Forest and agriculture lands in Indonesia have been "fired" for years. The 1982 and 1997 - 1998 fires were in association with major EL NINO events. Many hectares of forest has been repeatedly burned in some provinces eg. Riau, Jambi, North Sumatra, West Kalimantan, South Kalimantan, East Kalimantan. Major fires have also severely impacted original growth forest lands.

The population health impact of haze from forest fires have resulted in elevated health effects such as for ARI diseases, asthma, diarrhoea and eye irritation. Changes in micro and macro climates have impacted on biological natural resources and ecosystems.

Management of haze disasters is the responsibility of a number of Ministries with the State Minister of Social Welfare as coordinator. The National Policy in haze management for the health sector is to increase the available medical emergency services and to increase the environmental health, diseases surveillance and health education service provision.

Management of haze disaster for each health administrative level is divided into pre disaster, disaster and post disaster response phases. The activities in pre disaster phase includes preparation of guidelines, placement of respiratory drugs and re-enforcing local health facilities and identification of areas for possible evacuation. The activities during disaster including distribution of masks, medicines, air purifiers, air monitoring equipment and health education materials, 24 hours medical services, to support the evacuation areas with sanitation facilities, monitoring of ambient air quality, surveillance of diseases. In the post disaster phase activities include regulatory measures to control land clearing activities in sensitive areas, stocks of emergency supplies and equipment, establishing air quality monitoring and warning systems and follow up research and review.

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HAZE POLLUTION AND ITS EFFECTS*)

by :

Mr. SHIGENOBU OBAYASHI**)

Ir. T, SACHRUL ISMAIL***)

ABSTRACT

According to the result of the investigation of the haze in Indonesia, various substances that would be harmful for the human health were detected. In this paper, we introduce the major knowledge and lessons obtained through this investigation,

Results of the investigation

- (1) As for the five basic items, PM₁₀ (particulate matter whose diameter is under 10 μm) showed as high as nearly 1600 μg/m³ at the maximum of daily average. This value is more than six times as high as the environment standard in Indonesia, whose value is more than six times as high as the environment standard in Indonesia, whose value is 260 μg/m³ at the Index of TSP (Total Particulate Matter) .
- (2) As a result of the analysis of seventeen substances among PAHs (Polycyclic Aromatic Hydrocarbons) in the particulate matter, the concentration of each substance in Jambi is between 2.7 times and 65.4 times as high as that in EMC (Environmental Management Center), which is located in Jakarta, As far the concentration of Benzo(a)pyrene, which is one of the most toxic substance among PAHs was fifteen times as high as that in EMC,
- (3) As a result of the analysis of the gaseous components, following matters were found.

It is suggested that photochemical reaction is promoted in the ambient air because the concentration of acetone (C₃H₆O)₅ which is one of the major photochemical reaction products from hydrocarbons, was high.

Organic sulfur compounds such as DMS (dimethyl sulfide) was detected in high concentration. DMS is supposed to be generated as a result of the combustion of peat lay. DMS are oxidized into methansulfonic acid (CH₃SO₃H) and sulfuric acid (H₂SO₄), the latter of which is related to acid deposition.

Methyl halides, which is said to destroy the ozone layer, showed a high concentration.

Conclusion and Recommendation

On the basis of the knowledge and lessons obtained through this investigation, following matters are recommended .

- (1) The monitoring data obtained through this investigation were those of limited time and limited place. In generally, the polluted substances caused by forest fire are said to be changed according to the kinds of combustible objects and condition of weather. Therefore it is essential to accumulate monitoring data under the various conditions in order to make clear the pollution mechanism.
- (2) To make clear the pollution mechanism, it is desirable not only to collect continuous data on basic items by using automatic air monitoring machine but also to collect the data on various toxic substances by using sophisticated equipment such as GC-Mass in a laboratory.
- (3) In order to decrease the exposure to the citizens, it is necessary to give information to the citizens on the prospect of the degree of haze pollution in each area. In the prospect of the degree of haze pollution, one of the effective methods is to use continuous monitoring data obtained from automatic air monitoring machine as well meteorological data.

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IMPACTS OF LARGE SCALE FOREST AND LAND FIRES IN INDONESIA 1997 ON REGIONAL AIR POLLUTION*)

by :

DR. GERHARD DIETERLE
ANGELIKA HEIL**)

ABSTRACT

As a consequence of the spreading and intensifying forest and land fires in Indonesia, air pollution levels in Kalimantan, Sumatra, Irian Jaya and Sulawesi increased significantly from July 1997 onwards, peaked during the second half of September until the end of October and decreased to background levels by mid November with the onset of the monsoon rain. Predominately south westerly low level winds throughout the months of September and October in the northern equatorial region transported the smoke plumes towards the neighbouring countries Malaysia, Singapore, Brunei and Thailand and caused widespread exceeded air pollution levels. The main pollutant was particulate matter which predominately consisted of fine particles (PM10 and PM2.5). Fine particles efficiently scatter light and cause severe reduction of visibility – a characteristic phenomenon observed during the smoke haze episode 1997. Fine particles are also of major concern in respect to health impacts since they may penetrate into the lower respiratory system where they are retained for a long period. Health impacts associated with an exposure to fine particles are obstructive pulmonary diseases, bronchitis, asthmatic symptoms, decreased lung function, cardiovascular diseases and an increase in daily mortality.

Even though Indonesia itself was the most affected by the air pollution from fire's emissions during the haze episode 1997, the present knowledge on regional air pollution levels and the transport mechanisms contributing to the dispersion of the emissions is sparse. In order to reassess the regional haze development as a function of the distance to fire clusters and prevailing meteorological conditions, data from particle measurements conducted on behalf of the Meteorological and Geophysical Agency (BMG) and the Ministry of Health were collected for six locations Sumatra and four locations in Kalimantan and correlated with meteorological parameters. However, quantitative evaluation of the data is limited due to the fragmentary character of particle measurement data as well as meteorological parameters.

Most affected by the haze were Central Kalimantan and Jambi, southern east Sumatra, where peak particle concentrations of 4000 $\mu\text{g}/\text{m}^3$ Total Particulate Matter (TPM as daily average) were recorded. Those locations were downwind from dense, emission intense peat fire clusters in the coastal areas as wind predominately originated from the south in Kalimantan and the south-west in eastern Sumatra, respectively. In most other locations, peak values between 2000 and 2500 $\mu\text{g}/\text{m}^3$ TPM were measured resulting local fires and medium to long range contributions from

more distant sources. Relatively less affected were East-Kalimantan and the southern-east and northern part of Sumatra where particle concentrations remained below 800 $\mu\text{g}/\text{m}^3$ TPM. Those areas were only tangentially impacted by the smoke trajectories or local fire sources. In all locations, particle concentration showed high daily fluctuations which reflect the interdependencies with the spatial and temporal variations of fire locations as well as wind conditions. Daily mean horizontal visibility during the haze episode was below 1 km on 80 days in Palangkaraya, Central Kalimantan, and on 60 days in Jambi, Sumatra. In almost all locations, daily mean visibility was below 3 km for at least 50 days. The time series of the particle development, based on the fragmentary data-set at hand, indicate that in three locations in Kalimantan and four locations in Sumatra, particle concentrations were above 626 $\mu\text{g}/\text{m}^3$ TPM for one month. Particle concentration (TPM) above this value is categorised as hazardous, according to the US-EPA PSI-system. Taking into consideration the fine particle dominated character of the haze with an estimated ratio of PM10 (particulate matter smaller than 10 μm diameter) to TPM of 80 to 90%, the number of days categorised as hazardous will be much more higher as PM10 concentrations beyond 430 $\mu\text{g}/\text{m}^3$ are categorised as hazardous.

Relatively calm winds and marginal precipitation during the haze episode 1997 contributed to the accumulation of the particles in the lower atmosphere. The trapping of the air pollutants was additionally favoured by the fact that the dense haze layer reduced the atmospheric solar radiation transmissivity which caused decreased surface temperature and decreased vertical motion and promoted the formation of low level inversion layers.

The constraints to assess the 1997 haze in Indonesia due to fragmentary data reveal the importance to strengthen the air quality monitoring capacities in Indonesia. A continuously working air quality monitoring network and the online dissemination of air quality data would not only allow to inform the public adequately on the development of regional air pollution levels and to increase the overall awareness towards air pollution. It would also support the early warning and emergency response system for forest/land fire episodes.

**) Paper presented on "International Cross-Sectoral Forum on South East Asia Forest Fire Management, Jakarta, December 7-8, 1998.*

****) Strengthening the Management Capacities of the Indonesian Ministry of Forestry (SMCP)/German Technical Cooperation (GTZ)*

**ASPECT OF THE METEOROLOGICAL SERVICES IN
THE MANAGEMENT AND CONTROL OF FIRES &
TRANSBOUNDARY SMOKE/HAZE OVER
INDONESIA AND ADJOINING AREA**

by :

Mr. SRI DIHARTO

ABSTRACT

This paper deals with the discussion transboundary haze pollution. The discussion of the atmospheric condition during the occurrence last 1991, 1994 and 1997/98 might give the idea for further used especially in the haze management and control over Indonesia. As it was known the haze accumulation mostly dry particles, the sources of particles are suspected coming from emission of fires, vehicles, industrial activities and etc. As the occurrences are still problem from several institutions both from national and international level, this paper might give the perspective idea in the management and control in the near future.

Looking at the experience with occurring the fires where the time occurrences coincide with the drought over mostly of Indonesia region, the technical aspect of the haze formation, the role of the Meteorological and Geophysical Agency in the management and control haze and its experience during last occurrence last 1997/98 are the major discussion. This paper is intended to show the major prevention and mitigation, it should consider further of the information services in the management and control these occurrences.

The management of the meteorological data, the tool used in the analyses and forecasting the weather and climate system might the best consideration to minimize the smoke emission as part of the management and control transboundary air pollution problem.

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****) Director General Meteorological and Geophysical Agency of Indonesia*

SATELLITE MONITORING OF LAND AND FOREST FIRES*)

by :

Mr. JOHN LOW KWANG KEANG**)

ABSTRACT

Land and forest fires are common occurrences in many countries in the region. The fires are caused by traditional practices of slash and burn to clear land. During normal times, the fires are confined and controlled by the rainfall in the region. During the dry season and unusual drought events, the fires can spread to neighboring forests and become uncontrollable. Thus the need for satellite fire monitoring to detect forest fires at the early stage. Satellite fire monitoring is economical compared to methods using serial surveillance and ground surveys. It can also monitor large areas simultaneously. The satellites that are available to the meteorological community in the ASEAN region are the Japanese Geostationary Meteorological Satellite (GMS) and the US NOAA polar orbiting satellites. The GMS is of limited use because it does not have a fire channel available on the NOAA satellite. However, it can sometimes be used to confirm suspected forest fires detected by the NOAA satellites. The NOAA satellite can provide estimates of coordinates of suspected fire locations to initiate a fire response plan. Increasingly, high resolution satellite data like SPOT and Landsat, is being used to confirm forest fire locations as well as provide more precise estimates of coordinates of the forest fire location.

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OVERVIEW NATIONAL POLICY AND LEGISLATION CONCERNING FOREST AND LAND FIRE IN INDONESIA*)

by :

DR. F. GUNAWAN SURATMO and DR. NENGAH SURATI JAYA **)

ABSTRACT

This paper describes the existing national policy and legislation including all Minister's, Governor's and Director General's decrees, Government act and regulation for both national and provincial levels that related to forest and land fire Indonesia.

Their inter-sectoral linkages are also discussed. Of the government policies and legislation studied some findings are, (1) several Government regulation are considered inadequate for present and future condition and need to be refined or revised; (2) Overlapping tasks, authorities and responsibilities between National Forest Fire Control Center (PUSDALKARHUTNAS) and National Coordinating Committee on Land Fire (BAKORNASKARLA); and (3) confusion on organization, coordination and communication in the national level that caused confusion on provincial level. This means that solid and integrated organization, coordination and communication at both national and provincial levels should be established.

Although there are sufficient number of laws, regulations, and decrees related to forest and land fire, harmonization among legislation is needed. Socialization of all legislation to government, private institution as well as all citizen in order to be understandable hold an important role to the success of forest and land fire control.

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THE FIVE MANAGEMENTS AND THE FIVE LEVELS OF ORGANIZATIONAL LIFE
OF FORTUNE 500 COMPANIES

BY JOHN J. GIBSON

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THE FIRE MANAGEMENT AND PREVENTION IN COTE D'IVOIRE CASE OF SODEFOR PROTECTION PROGRAMME*)

by :

Mr. BROU OURA

ABSTRACT

The Republic of COTE D'IVOIRE is located in the central part of the upper Guinea forest bloc. It has a tropical climate characterized by three main climatic zones in relation with different types of vegetation.

- Moist evergreen forest in the south region
- Open savanna woodland and scattered pockets of dry forest in the northern region
- Semi-deciduous forest zone between the south and the north

Each type of forest contains various plant and animal species characterizing all tropical forest.

Originally estimated about 16 millions hectares of tropical rainforest, the forest area covered the half part of the country, mostly in the South from 4° 20' to 8° northern latitude.

This closed forest area has changed during the past thirty years and was opened up due to forest exploitation (logging operations) and large scale of forest was converted into agricultural land used. This led to large scale soil degradation and to the abandon of large tracts of unproductive land to bush fallow.

Today the remained forest area is estimated about 4 millions hectares the classified forest, the National park, and some forest lands altogether.

The deforestation in the south and the process of desert encroachment in the north, the climate of the forest zone has changed; the dry seasons have become longer.

Since 1982, forest fires occurred every year to increase the degradation fact. The fires go through vast area and caused very important damages and lost for the population and the government of Cote d'Ivoire. In lack of accurate evaluation, the economic lost can be estimated to several millions U.S dollars of agricultural products (coffee, cocoa, and others) and wood materials.

In order to minimize the risks and losses, the Government organizes every year a campaign of prevention, sensibilisation and fight against forest fires.

SODEFOR, the Company for the Development of Forests, in charge of management and protection of all the classified forest of the country had implemented since 1983 a program of management and forest fire prevention.

The total area to be protected against forest fires represents about 2,5 millions hectares including industrial forest plantations.

This program costs about one million U.S. dollars per year.

**) Paper presented on "International Cross-Sectoral Forum on South East Asia Forest Fire Management, Jakarta, December 7-8, 1998.*