

Forest Fire Management Approaches in East Kalimantan (Borneo) / Indonesia

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1. General Information about Indonesia

Indonesia consists of about 13.000 islands straddling the equator between Australia and the Asian mainland and hosting almost 200 million inhabitants with 300 ethnic groups, some 365 languages and dialects and an immense cultural diversity. The land area is more than 190 million ha. Indonesia is potentially one of the richest countries in the world, as it is endowed with immense natural resources. Along with its cultural diversity, Indonesia harbours one of the world's richest natural environments, with vast though disappearing tropical rain forests, with plant and animal species, which have not yet even been identified.

2. Indonesia's Forest Resources

Officially, Indonesia has 144 million ha. of forest lands, classified as follows:

Conservation	18.8	million ha.
Protection	30.3	"
Limited Production	30.5	"
Regular Production	33.9	"
Conversion	30.5	"
Total	144.0	"

It is estimated, taking into account the deforestation and changes in land use over the past two decades, that there is approximately 90 million ha left. The forests are exclusively state-owned and about 60 million ha. of classified forest land are leased to private and government owned concessions. The Indonesian forest industries produce more than 3 billion US \$ in foreign exchange and are a main contributor to the country's fast growing economy.

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3. East Kalimantan's Forest Resources

The province of East Kalimantan (211,440 km²) is one of the most resource-rich provinces of Indonesia, with enormous coal, crude oil, natural gas and forest resources. These forests contain a high amount of valuable timber, mostly dipterocarps, which are commercially known as *meranti*. In the late sixties commercial logging and opening up of the hitherto almost undisturbed tropical rain forests began.

4. Man, Climate and Fire in East Kalimantan

The "El Niño" Southern Oscillation and the 1982/83 Fires

Dry spells or full blown droughts are a climatic pattern typical for these rain forests. This phenomenon is closely linked with the "El Niño Southern Oscillation" (ENSO), which roughly seems to occur every 4-5 years and in an extreme form about every 80-100 years.

The old travel literature about Borneo mentions such a severe 9-months drought in the year 1878, but there is no mention of large fires. One hundred years later in 1982/83, during a severe "El Niño" drought with essentially no significant amount of rain from June to Nov. 1982 and again from Jan. to May 1983, Kalimantan experienced the most extensive ever recorded forest fires. This was due to the fatal combination of climate and human presence, of opening up, logging and converting forests, of settlers and transmigrants from other overpopulated or poor islands, following the newly established roads, clearing land and trying to earn a living. In East Kalimantan alone, around 3.5 Million ha of forest land was burned in 1982/83, and it has been estimated to be 5 mill. ha on the whole island of Borneo. This is certainly also a memorable time for Australia as this country also experienced the worst fire events in this century.

Causes and Consequences of Wildfires

Since 1982/83, fire has become a constant feature in this part of the world. Once invited by man, fire returned soon again to Kalimantan in 1987, 1991 and 1994. The fires within the rural and wild land areas of Indonesia are almost 100 % human caused. Only in very limited areas of East Kalimantan, burning coal seams, mostly ignited by the 1982/83 fires, have some significance. It is *estimated* that 60 % of all ignitions result from escaped agricultural burns. Fire is the cheapest and only available tool for smallholders to reduce vegetation cover and to prepare and fertilise the extremely poor soils. To an increasing extent the causes of fire and smoke emission have been ascribed to large scale forest conversion and land clearing activities (pulp wood, rubber tree and oil palm plantations) over the last couple of years.

The process of forest degradation can be observed in many places when travelling through East Kalimantan. The visitor will still find vast areas of virgin rain forest (if he has enough time to go there) but will also see millions of hectares of land converted into grassland by man and fire. While virgin *Dipterocarpus* forests will normally not carry any significant amounts of fire, the widespread *imperata cylindrica* grassland will burn again virtually every year. No other vegetation can compete with this grass as long as fire is not excluded. In between these two extremes of vegetation, every form of transition can be found in Kalimantan.

5. Political Developments and Upcoming Fire Management Activities

Since the 1987 fires Indonesia has been at odds with neighbouring Malaysia and Singapore, as the hazy smoke from these fires covered the South East Asian region for weeks and caused health problems and disruption of shipping and aviation, even culminating in the closing-down of international airports. In 1991 Indonesia asked for international help.

The German Agency for Technical Cooperation (GIZ) has been engaged in development activities for more than 20 years now, supports roughly 1000 projects world wide and employs about 3000 persons, around half of them in the Headquarters in Germany, and half of them as field staff in project activities. GIZ has been engaged in development projects in Indonesia for many years. In 1992 the National Planning Agency of Indonesia (BAPPENAS) and GIZ organised a conference, which brought the relevant Indonesian Government officials together with international fire experts and representatives of the donor countries. In this conference, known as the Bandung Workshop, the outline of a long-term integrated fire management program for Indonesia was agreed upon and the international donor agencies each took a share of the responsibility.

The German Agency for Technical Cooperation (GIZ) then hired international fire experts to prepare and implement the support for a fire management programme in East Kalimantan. The European Union runs a similar project on the island of Sumatra, FAO located a fire expert at the central level in Jakarta, the USA has in the past conducted suppression training courses and Australia has also proposed a fire project to the Indonesian Government. JICA (Japan) is supporting fire prevention in Sumatra and West Kalimantan. Through the cooperation of all fire management activities in Indonesia together with research campaigns (SEAFIRE) it is hoped to accumulate the means and methods necessary to help protect Indonesia's forests from fire in the future.

6. Support to the Integrated Forest Fire Management System in East Kalimantan

The German Input

The GIZ sponsored project "Integrated Forest Fire Management" (IFFM) has been operational since April 1994 and is based in the provincial capital Samarinda, East Kalimantan, the province most seriously hit by the fires of 1982/83. The contribution of the German Government is 9 Million DM in phase I+II of this technical cooperation. This comprises seconded long and short-term personnel, hardware, counterpart training, scholarships, travel and local personnel. This first phase is scheduled to be completed in February 1997, with a second three-year phase ending in the year 2000. There is a good chance that the German Development Bank will provide an additional 10 Million DM grant to Indonesia to purchase fire suppression equipment and to finance counterpart training abroad.

Expected Project Outputs in phase II

Output 1:

Fire management center further developed and required personnel prepared for their tasks.

Output 2:

Fire prevention programme introduced.

Output 3:

Prescribed burning techniques introduced.

Output 4:

Suppression capabilities strengthened (pre-suppression).

Output 5:

Fire management organisational structures and working mechanisms facilitated.

Output 6:

Mechanisms for the exchange of experience and the coordination of fire management approaches and concepts promoted at the national and ASEAN levels.

The pilot project area "Bukit Soeharto" and planned extension to other fire prone areas in East Kalimantan

During the first phase the project operated on a 80,000 ha pilot area in a nearby forest reserve (Bukit Soeharto), developed the infrastructure and determined the type and amounts of equipment, hardware, training, prevention, research and facilities needed to institute an appropriate level of forest fire protection.

The forest guards there were trained in basic fire behaviour and suppression, use of engines and pumps and safety considerations. This "local fire center" was equipped with hand-tools and protective gear for a 20 man crew, two slip-on pumper units, two crew carriers, two trail bikes, two portable pumps and plenty of hose. A radio communication system is just being installed. It will link the local fire centers with the provincial fire center in Samarinda and be integrated into the national radio network of the Ministry of Forestry.

During the second phase up to a total of 20 areas might be added in a joint implementation with the German Development Bank. It is estimated that each of these "local fire centers" at the sub-district level will provide protection to some 100,000 ha., depending upon the population density, the level of human activities, the transportation infrastructure and the forest fire work-load. While this is only approximately 10-15 % of the total area within the province, it does cover essentially all of the area affected by wildfires to any significant amount.

Provincial Fire Center:

At the same time with this first local fire center, the provincial fire center based in the capital Samarinda is being set up to provide fire intelligence and is to serve as a dispatch and coordination center in the future.

Dr. John Deeming from the US developed an excellent and easy-to-handle fire danger rating system for the coastal areas of East Kalimantan. The fire danger is calculated on a weekly basis during the wet season and on a daily basis when it gets to medium or high fire danger. Fire danger can soar from low to high within less than two weeks in East Kalimantan.

For the last six months we have run a NOAA satellite receiving station to detect and monitor hot spots over the island. By accumulating the information, we expect to get valid information about where the most fire prone areas are.

We produced some fire hazard maps for our pilot area but we discovered that this is basically too expensive to be reproduced for other places.

We have prepared some reports with the help of short-term consultants, among them how to handle the burning coal seams in our project area, a study about economical aspects of fire management and a fuels analysis. Please refer to the literature list in the annex.

Training activities

Training activities are a major focus of the IFFM project approach and have been carried out at all levels. Several crew training sessions have been conducted for forest guards and villagers, government officials have been trained in-house and abroad, our counterpart Mrs. Yurda has been on a 3 months fire training in the US, next year 4 forest guards will hopefully be placed on "hot shot"- crews in the US and provide a pool of local trainers by the time they come back. The provincial chiefs of the Department of Forestry and the responsible officials for forest protection and fire from the Ministry of Forestry (MoF) have been on a 2 week information tour about fire management in the US. Only a month ago a junior lecturer of the Faculty of Forestry in Samarinda was sent to Canberra/Australia with a scholarship from GTZ to earn a Master's Degree and a Ph.D. in Fire Management and Sciences. This will make sure that this field of knowledge becomes a substantial part of the forestry curriculum at the University.

Fire Prevention

The Ministry of Forestry (MoF) has designed a national forest fire prevention symbol, an orangutan, but other than that there is little or no adequate or effective campaign programmes for public awareness and concern over the danger of forest fire. The project has just recently initiated prevention activities and, for example, published a comic book with an Indonesian remake of the American Smokey Bear story, using the mentioned ape instead of the bear.

By the same token, on the village level, 20-30 selected people of each village in and around the project area received basic training in fire suppression, controlled burning and hand-tools to organise village response teams. The idea is to set up a community based fire management and link this to the Department of Forestry.

These village people use fire but according to their ethnic origin, they have very different knowledge about the use of fire and different attitudes towards their surrounding environment. Native Dayak tribes are normally in-tune with their natural environment in Kalimantan and have strict rules and long traditions concerning the use of fire. The Bugis settlers from Sulawesi don't necessarily use fire safely and neither report an escaped fire to the forest guards nor are concerned about what happens to the adjacent public forests. The efforts to control fires are more based on the fear of burning a neighbour's land. When they burn and their fires escape, they usually run away and hide in the forests for some weeks.

We have a socio-cultural study on-going in these villages, including a project impact study, and the feedback we get from there is very positive. However a community-based fire prevention and management system will only outlast the limited time-span of project activities if suitable mechanisms can be developed that **also** meet the needs of the farmers. Thus one of the purposes of the prevention part of the fire management equation is to build up an interest in the adjacent public forest. A social forestry expert will be employed in phase II for this purpose.

7. Difficulties and bottlenecks

The fire problem has caught Indonesia virtually unprepared. Guidelines and standards which define operating procedure, safety, equipment and qualification of fire fighters are non-existent. The MoF lacks sufficient authority and infrastructure to respond effectively in the event of a forest fire emergency. The linkages to the regions, to other government ministries and to the private sector are weak; there is no inter-agency or interdisciplinary approach, no person to effectively manage or coordinate an emergency response to a large fire incident, no dispatch centers and no clear line of command.

Moreover, only two bad fire years per decade can be expected, which means that the motivation and alertness diminishes after one or two fire free years. With salaries for the lower ranking levels such as forest guards being extremely low, there is also little or no incentive to engage oneself beyond the absolutely necessary and many are forced to supplement their salary by taking a second job.

Finally, foreign contribution in the form of a development project cannot solve the fire problem of Indonesia. It can only give support and technical inputs and serve as a catalyst. The problem must be solved by the concerned parties themselves.

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