

Extinguishing the 1998 forest fires and subsequent coal fires in the Sungai Wain Protection Forest, East Kalimantan, Indonesia

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Abstract

During the 1997/98 El Niño drought, the Sungai Wain Protection Forest in East Kalimantan, Indonesia, caught fire in early March 1998. Fires entered the 10,000 ha primary forest reserve from the neighbouring INHUTANI I logging concession and subsequently from agricultural areas in or around the reserve. The Sungai Wain Protection Forest (Hutan Lindung) is the last patch of primary forest between Balikpapan and Samarinda with a large number of rare and endangered wildlife species. The area was established as a reserve in 1934. Since 1992 the forest has been used as an orangutan reintroduction site and various long-term research projects have been carried out in the reserve. It has also served as a water catchment for the oil industry in Balikpapan, the second largest refinery in Indonesia, since 1947.

In theory, responsibility for forest fire management of a protection forest falls under the regional forestry department. In reality, however, firefighting is not a high priority for the department's staff. When the fires broke out in the reserve, other research and project staff in the area recruited up to 80 local people per day for two months to construct firebreaks and extinguish the fires. Villagers were paid daily wages and provided with food and other essentials. About 40 percent of the reserve was saved.

Seventy-three coal fires were further located in approximately 5,000 ha of burned forest. Again, local villagers were recruited. Two and a half years later, 61 coal fires had been put out, 8 had gone out by themselves and 4 still need to be extinguished. In addition, a firebreak was made around the whole reserve during the 1999 dry season.

1. Introduction

The rapid disappearance of natural forests due to conversion to agricultural land, poor management practices, illegal logging and a lack of law enforcement in East Kalimantan (Rijksen and Meijaard, 1999), underlines the importance of protecting the few remaining pristine forest areas. The Sungai Wain Protection Forest is the last primary forest area remaining between Balikpapan and Samarinda, the two major cities in the province. Established as a reserve in 1934 by the Sultan of Kutai, it contains a large number of rare and endangered species and has been a reintroduction site for orangutans from the Wanariset Orangutan Reintroduction Project since 1992. The area has served as a water catchment for Balikpapan and the oil industry since 1947, and extensive research has been carried out in the reserve over the last 10 years (Fredriksson and de Kam, 1999).

2. The fires of 1998

During the 1997/98 El Niño drought, the Sungai Wain Protection Forest caught fire in early March 1998. The fires originated in the adjacent INHUTANI I logging concession and spread to surrounding areas (Figure 1). Despite existing communication services, the fires were not reported, and subsequent fires entered the reserve from neighbouring agricultural areas.

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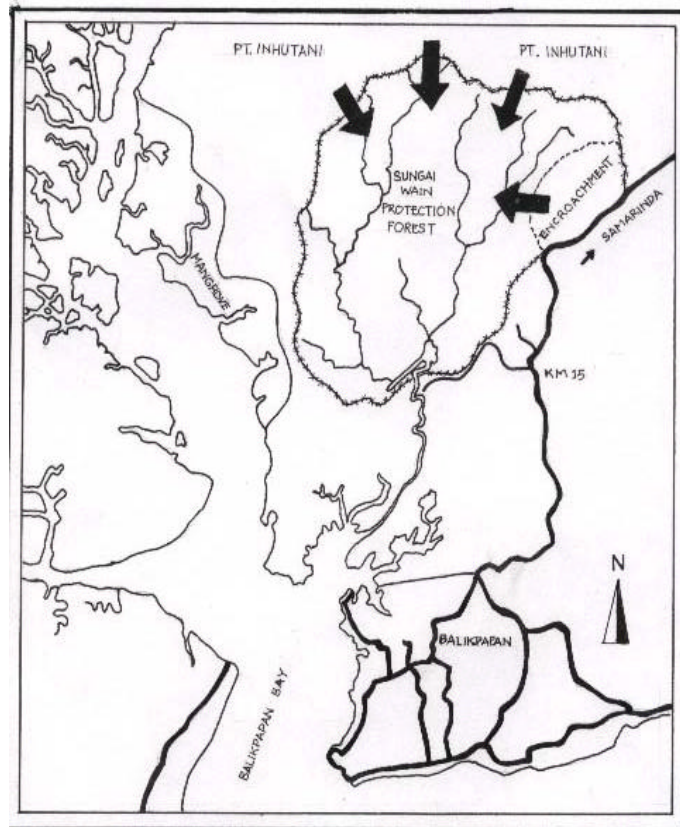


Figure 1: Location of the Sungai Wain Protection Forest and the 1998 fires that entered the forest reserve

Although responsibility for forest fire management in a protection forest theoretically falls under the regional forestry department (PP 62/1998), in reality departmental personnel are unlikely to be active firefighters in the field. Their main task is to control the logging concessions under their jurisdiction. Managing protection forests is an added assignment of low priority mainly because of the lack of financial incentives that can be tapped from protection forests aside from payments extracted from illegal loggers. Due to the low awareness and concern for forest conservation in Kalimantan, pressure from the central government or the public on the forest department to patrol or fight fires is minimal.

Hence, when fires broke out in the reserve, other research and project staff in the area initiated emergency measures by employing local residents to counter the fires. However, no one was willing to work for the normal daily wages (about Rp10,000 per day, the equivalent of approximately US\$1.50 at that time) and a 150 percent increase in wages to Rp25,000 was agreed upon due to the urgent situation. Food and cigarettes were additionally supplied. Funds for the firefighting efforts were provided by the Orangutan Reintroduction Project (Balikpapan Orangutan Survival Foundation).

The local firefighters were divided into groups of 5-10 people with one "leader" (usually a research assistant from the projects). Each group would spend up to a week in an area, with three members cutting down the larger vegetation with hand machetes within a 2-metre strip, and the rest of the group clearing away the debris with palm fronds, until they reached the firebreak of an adjacent group. Each group would construct a firebreak of approximately 2-3 km per day. The firebreaks were usually made as close as possible to the fire front, sometimes only a few metres away, hence covering a large distance due to the irregular front line of the fire. Occasionally, when there were fewer people in an area, the firebreak would be made in a straight line further

away from the fire front, and back fires would be lit to burn the vegetation between the firebreak and fire front. Eventually a continuous firebreak was made, surrounding the unburned forest core in the reserve. Each group was equipped with basic firefighting equipment (machete, brooms made from palm leaves, entrenching tools or cangkul), cooking and camping equipment, food (rice and noodles) and other essentials. The leaders were each given a compass and a communication radio (ICOM V-68), on loan from the research projects. Work continued throughout the day and night until the fires were under control. Another two weeks were spent checking the firebreaks and ensuring that no remaining embers caused a new fire.

Workers from the oil refineries and PERTAMINA provided no assistance to the firefighting efforts even though the forest reserve has been a water catchment area for the oil industry for the last 54 years. PERTAMINA is the biggest state-owned oil company in Indonesia and has freely operated in the field with virtually no payments to the local governments for environmental services (e.g. the supply of fresh water). The impacts of forest fires on the catchment area and the consequent environmental damages are not well understood or recognised, and responsibilities are not shared among the various institutions that might have an interest in the forest.

3. Coal seam fires

Shortly after the forest fires had been extinguished, a burning coal seam was discovered in the burned forest. Having expended so much effort to put out the surface fires, the firefighting teams decided that the coal seam fire must also be extinguished. Funds from the Orangutan Reintroduction Project and USAID project collaborating with the Ministry of Mines, focussing on the coal fire problems in Indonesia (Sumatra and Kalimantan), were secured to continue the activity.

More burning coal seams were detected, until a total of 73 were identified in 5,000 ha of burned forest. (Figure 2). All coal fires started near small streams where coal layers are found at the soil surface. From there the fires spread underground depending on thickness of the coal layer, depth and available oxygen. Some coal fires had moved more than 300 m during the course of two years, leaving behind large areas devoid of trees, which had all died due to the heat damaging the root systems. The remaining seams that are still burning are relatively large in size (up to 1,000 m²).

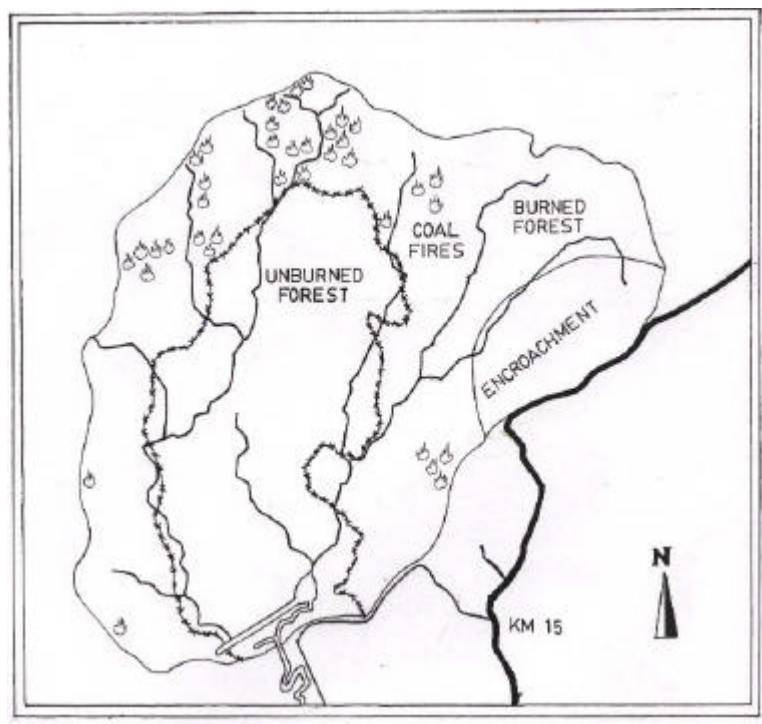


Figure 2: Burned and unburned forest and location of coal seams

Again the local communities were hired to extinguish the coal fires. Initially, a group of about 20 people received daily wages, but eventually was given a “lumpsum” payment for working on a certain number of coal seams identified earlier. The number of people soon decreased to eight. A contract was signed by the leader who was appointed by the group, and all remaining financial and logistical matters were arranged among the group members.

Pumps, hoses and other small equipment were provided. Manual labour was used to put out the coal fires with the assistance of water pumps (Wajax) and hoses borrowed from the German Agency for Technical Co-operation (GTZ)’s Integrated Forest Fire Management (IFFM) project in Samarinda. First, the coal seam at the front line would be dug out and isolated from the coal layer. Occasionally this would mean digging 8 m into the soil. The burning coal embers would be hosed down and excess soil would be washed away. Then, the burning middle section of the coal seam would be extinguished by digging out the remaining burning coal layers. The biggest problem encountered was a shortage of water or a water source that were too distant.

The effort to extinguish the coal fires is ongoing. A total of 61 coal fires have been put out, 8 went out by themselves, and 4 still need to be extinguished. A separate independent team has verified that the burning coal seams have been adequately extinguished.

4. Fire prevention: experience from 1999

In August and September 1999, during the height of the dry season, a firebreak was made around the entire reserve boundary to prevent the entry of fires. Again about 30 people from surrounding villages were employed and divided into small groups (7-10 people). People were paid the “normal” daily wages (then about Rp15,000 per day or US\$2). Each group was equipped with a handheld communication radio, food and camping supplies.

5. Discussion of firefighting/control activities

5.1. Community involvement

The forest fires were put out after six weeks of firefighting. Another two weeks were spent checking on the remaining embers and firebreaks. Villagers considered firefighting in a protection forest to be the responsibility of the local forestry department, and hence were not willing to help fight fires without being paid higher wages.

According to the ethnic composition of the communities living close to the Sungai Wain Protection Forest, and assuming that Dayaks, Pasirese and Banjarese are native inhabitants of Kalimantan, less than 20 percent of the people are from East Kalimantan. Since most inhabitants are migrants from other islands, it is likely that they have little sense of ownership of the forests. Especially when they are not allowed to collect wood or other forest products (although they continue to do so at the risk of being caught), the economic impact of a fire in the reserve, is less significant to them. Another explanation for their disinterest in fire suppression or prevention is the poor understanding about the direct and indirect consequences of forest fires.

5.2. Ministry of Forestry (non) involvement

The local forestry department is under little pressure to promote forest conservation practices, partially because these are low priority issues to the regional constituency and the higher echelons at the Ministry of Forestry. There is also an enormous lack of awareness of the negative environmental impacts of forest loss, whether due to over-harvesting or forest fires.

The local forestry department seems to be sufficiently equipped and staffed, at least in the small Balikpapan municipality, for firefighting activities. Large numbers of firefighting tools and additional equipment (e.g. pumps and vehicles) have been distributed to the local forestry departments by the IFFM-GTZ project in East Kalimantan. It is, however, quite probable that the central government did not allocate sufficient funds to the provincial forestry department (TK I) and even less to the regional forestry department (TK II) for fighting forest fires for extended periods of time.

5.3. PERTAMINA (non) involvement

The PERTAMINA refineries in Balikpapan have been using water from the Sungai Wain Protection Forest since 1947. One reason the company provided no assistance during the firefighting activities could perhaps be traced to an ignorance of environmental functions and processes. Water pumped from the reserve is stored in a lake at the edge of the forest. PERTAMINA might be unaware of the impact of forest fires on the catchment area and the water supply to the lake, and thus was not concerned enough to take action. Secondly, the company denies responsibility for the entire catchment area, claiming to be responsible for only 3 ha covering the lake and its immediate surroundings.

5.4. INHUTANI involvement

The fires originated from the INHUTANI I logging concession bordering the reserve. The cause of the fires in INHUTANI I (and also other concession/plantation areas) could not be determined due to the absence of hard evidence. Arson to destroy proof of embezzlement of funds has been suggested as one possibility. These fires then spread beyond the intended boundaries due to the severity of the drought, compounded by inadequate preparation of firebreaks.

No logging concessionaires and plantation owners have been made accountable for the fires that spread from their concession areas, making it very difficult to tackle the underlying causes of the 1997/98 fires in East Kalimantan. In 2001, a new government regulation (PP 4/2001) stated that any person responsible for commercial activities that can affect the environment (e.g. concessionaires or plantation owners) will be responsible for the occurrence of forest and land wildfires in that site and shall be obliged to conduct mitigation. Although the effectiveness of this regulation in punishing offenders has yet to be tested, at least it provides an avenue for victims who seek compensation.

6. Coal seam fires

Extinguishing coal seam fires is a demanding task that lasted more than 3 years. Various schemes of organization and payment were tested. Paying daily wages and supplying food and equipment resulted in poor performances. Agreeing on a "lumpsum" payment for a number of seams seemed to improve productivity, although this only seems to work if there is sufficient respect between the leaders and workers, and among the workers themselves.

7. Firebreaks during the 1999 dry season

During the 1999 dry season, local villagers were employed to assist in making a firebreak around the reserve in August and September at a time when people were burning their swiddens next to the reserve. These areas were highly flammable, as they were damaged by the 1998 fires and contained high fuel loads.

Although there was a high fire risk in 1999, the firebreak effectively prevented fires from entering the reserve, even in high-risk encroachment areas. Making the firebreaks also paved the way for outreach programmes towards the local communities to help reduce the risk of fires and raise awareness of the effects of fires and danger posed by uncontrolled burning. Farmers were also asked to report burning of their swiddens so that people making the firebreaks could prevent the fires from spreading.

8. Cost estimate

The total direct costs of putting out the fires, extinguishing coal fires and making a firebreak in 1999 was about US\$33,700 (Table 1).

Table 1: Costs of firefighting activities in the Sungai Wain Forest Reserve

Activity	Cost in US\$ (US\$1 = Rp10,000)
Firefighting	9,002.50
Fighting coal seam fires	21,337.75
Making firebreaks	3,376.50
Total	33,716.75

9. Conclusions

The main problem of the fires in the Sungai Wain Forest Reserve was the unwillingness by any government organization to take responsibility for forest fire management. The lack of co-ordination or collaboration among the various organizations during the emergency also hampered the efforts. Other problems were mainly logistical and relatively easy to solve. Sometimes, travelling to the fires required an 8-hour walk from the village but people were quite willing to spend a month sleeping in the forest, eating only rice and noodles if they were being paid and cigarettes were available, as long as everybody received the same treatment.

Key factors for the successful firefighting efforts in Sungai Wain in 1998 were:

- ◆ commitment and desire of a few individuals working in the reserve to control and put out fires;
- ◆ sufficient funds to pay people to work under arduous conditions for extended periods of time;
- ◆ clear, strong leadership and co-ordination;
- ◆ ability of the co-ordinator to motivate people; and
- ◆ availability of communication equipment from the research projects in the reserve, making co-ordination of firefighting efforts more efficient.

It is also far more cost effective to actively prevent fires from entering the forest than putting out fires or subsequent coal fires. Another positive aspect of making a firebreak during the height of the dry season was raising the awareness among farmers to ensure that fires do not spread from their burning fields.

The firefighting activities in the Sungai Wain reserve during the 1998 fires depended heavily on the commitment of a few individuals and their ability to secure funds. To overcome these weaknesses in the future, a large effort has been made to establish a multi-stakeholder management unit for the reserve, with an "independent" executive committee, responsible for the management of the reserve, including firefighting. Government and donor funds will be channelled directly to the management unit to carry out all necessary activities. Clear action plans will be prepared for emergencies, with a main focus on fire prevention.

References

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