

fires, and lack of awareness to others. However the larger fires tend to result from commercial land clearance for plantation crops. In recent years this has also brought increasing numbers of land ownership conflicts that result in arson and yet more fires. There is a pressing need to re-examine land-use policy and also government policies that unintentionally provide incentives to use fire.

FFPCP and IFFM stress fire prevention in their daily work; in particular through targeted campaigns such as environmental awareness campaigns with schoolchildren and the work with forest concession holders (Nicolas and Beebe, 1999).

Within the context of *firefighting*, a broad framework is proposed within which the training of forest firefighters in Indonesia can be developed and implemented. Trained ground crews come first. Until they are in place and fully equipped throughout Indonesia, there is no place for, and no need to dream of, the use of helicopters and fixed-wing aircraft to detect and fight forest fires. Priority is given to the basics and the report is intended to draw attention to these elements that must be included in future teaching exercises. These can be summarized as the training of:

- fire crews – 5 to 20 people organized to work as a unit,
- the crew boss – the man-in-charge of a fire crew, and
- the fire boss or incident commander – the man responsible for all suppression and service activities at a fire.

The report gives guidelines on the topics that need to be addressed during Province and Regency level training. It includes chapters on organization and command structures, the theory of firefighting and on the training of firefighters under field conditions. The safety of men must prevail and a short additional chapter outlines these training needs. Fire terminology is covered in an appendix.

The report is not intended to, and is not, a substitute for an over-due national programme in firefighter training. This task needs to be taken in hand by an appointed government institution.

Action at field level is an urgent necessity and must depend upon the simple and clear training of firefighters as well as on appropriately adapted but inexpensive equipment.

Background

The basic tactics and strategies developed in temperate countries with a long history of vegetation fires – and thus extensive experience of their control – are also applicable to tropical Indonesia. They do however, need some adaptation to take into account differences in vegetation types and the limited infrastructure within the country. Examples of publications that deal with the fundamentals of tactics and strategy and which can be consulted for further details, include; Canada and USA (Perry, 1990). Australia (NSW Government, 1989), southern Europe (Nicolas, 1982).

Some of the differences between the tropics and the temperate zones make firefighting less difficult: the high humidity ($\geq 55\%$) and low wind speeds ($\leq 25 \text{ km.h}^{-1}$) reduce the speed of fire spread. But others make fire control much more difficult. Problems caused by the large size of Indonesia and the lack of access (few roads, and by rivers in the wetland) are not easy to overcome, and the hot damp climate makes firefighting enervating. The major difficulty, however, is the weakness of the institutions – now worsened by the deep economic crisis – responsible for fire prevention and control.

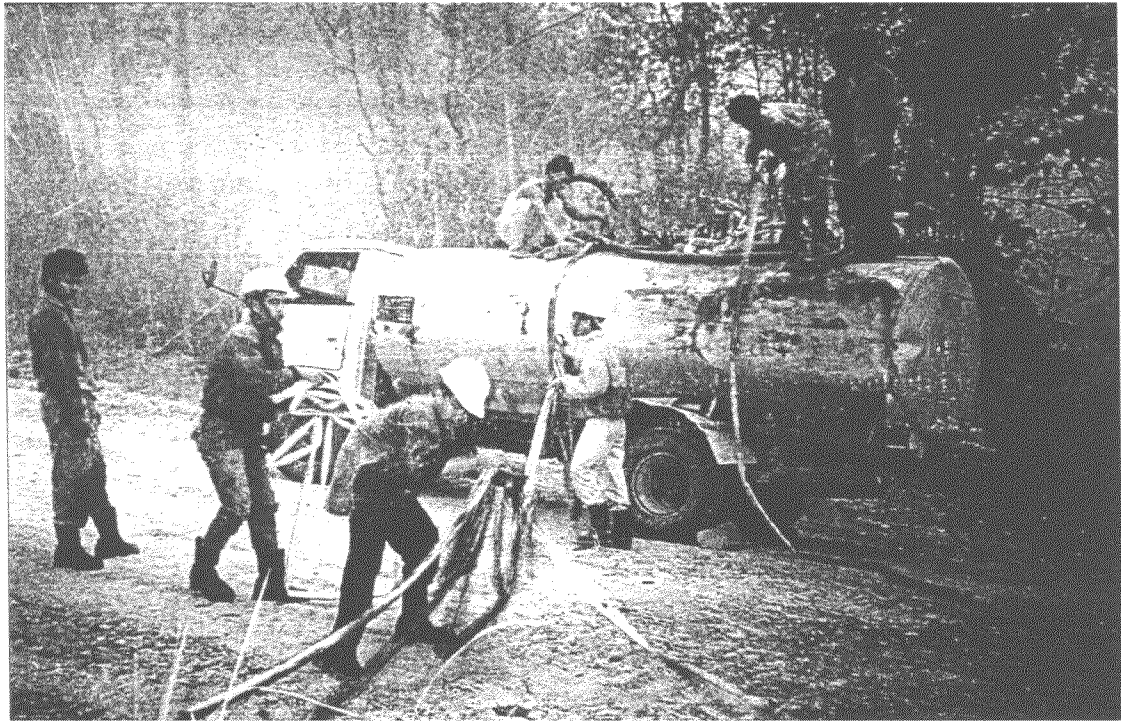


Plate 1 Forest fire covering 1 300 ha. in the HPH, PT. Inhutan V, South Sumatra province. October 1997.

FFPCP in South Sumatra and IFFM in East Kalimantan have identified the provision of support to Regency Forestry Head Offices (*Cabang Dinas Kehutanan Tingkat II*) as the most effective way to strengthen fire fighting capacity - and fire prevention - in the immediate and near future. The areas at risk are large, resources limited, and a selective approach to firefighting is fundamental. Three categories of land need priority protection, each has a particular fire management requirement:

- Virgin forests and conservation areas: forest guards from the Ministry of Forestry and Estate Crops (*Kanwil Kehutanan dan Perkebunan, Dinas Kehutanan and Dinas Perkebunan*).
- Commercial forest areas with *HPH*, *HPHTI* and estate crops: private firefighters assisted by paid volunteers.
- Zones near to villages: paid volunteer firefighters and NGOs.

Fire Crews

Fire crews are the foundation of any system to prevent and control forest fires. In Indonesia, the primary need is to form, train, and equip crews at Regency level. As the crews, the crew bosses and the fire bosses become more successful, they will earn the recognition from the authorities and the community that is so necessary to gain and maintain high motivation and good results.

While MoFEC staff must form the backbone of the system, people from many other institutional agencies should also be involved in the formation of fire crews. Private firefighters from the timber concessions constitute an important resource (Nicolas and Beebe, 1999) and volunteer firefighters and members of NGOs have a part to play: not least because villagers have an extensive knowledge of fire as used in traditional land clearing. But all have to be part of the official structure, and be commanded by well trained fire bosses.

In 1998, IFFM trained officers and enlisted men of the armed services (ABRI) stationed in East and West Kalimantan. FFPCP supported similar training in North and South Sumatra. There is a long tradition in Indonesia of the military being used to help fight forest fires. The training in 1998 was an attempt by the two projects to provide ABRI with more in-depth knowledge of firefighting techniques and fire behaviour before they took the field. The discipline, morale and strong command structure inherent within the armed services make ABRI a logical institution to tap into in times of fire emergency.



Plate 2. Training in firefighting for officers and enlisted men of the armed services (ABRI) by IFFM and FFPCP, near Lake Toba, North Sumatra province, March 1998.

Equipment

Field experience gained by FFPCP and IFFM has shown the necessity to keep equipment simple, compatible and adaptable. (Nicolas, 1998; Schindler, 1998). Overly complex equipment is never used or is quickly broken. Equipment, especially pumps, should not be distributed without training in its use. Firefighters need proper protective clothing to minimize personal risk.

There is an urgent need to form at national or ASEAN level, a group to determine appropriate standards for:

- individual protective equipment (helmets, clothes, boots, gloves),
- robust, simple, and effective handtools (especially for fire line construction),
- backpack pumps,
- motorized pumps, fire hoses, and fittings (all compatible),
- slip-on tank units, and
- adaptable fire tankers (small trucks).