

FIRE SUPPRESSION AND ENVIRONMENTAL MANAGEMENT TRAINING

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**COMMUNITY EMPOWERMENT EXTENSION
ON THE DANGER OF
FOREST FIRES**

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COMMUNITY EMPOWERMENT EXTENSION ON THE DANGER OF FOREST FIRES¹

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I. BACKGROUND

During 1997/98 Indonesia and especially the province of East Kalimantan experienced a drought lasting more than 10 months caused by ESNO (El Niño Southern Oscillation). With only two weeks of rainfall in December 1997, the potential for forest and grassland fires was extremely high. Triggering the worst fires on record in East Kalimantan. Efforts to overcome the fires at this time did not give optimal results. At the peak of the fires specifically in 1998, the citra satellite system showed that there were more than 2000 hotspots of various sizes scattered throughout East Kalimantan. Results of a recent study (SIEGERT & HOFFMAN, 1999, in press) showed that more than an area of more than 5 million-hectares has burnt in East Kalimantan. This means that the fires of 1998 were much worse than the fires of 1982/83 when an area of only 3.5 million hectares was burnt (LENNERZ & PANZER, 1984).

The immediate negative effects of the fires were huge, and were not only felt by Indonesians but also in neighbouring countries. Smoke and haze brought negative effects for people's health as well as disturbances to international and domestic flights and shipping. The 1997/98 fires also destroyed large amounts of Indonesia's unique tropical forests, bringing the threat of extinction and reducing the potential for regeneration. This in turn will cause a quickening of the "savannazation" process, with negative effects on soil fertility, distribution of nutrients, capacity for water retention, local climate etc. A non-direct effect from the forest and grassland fires is their influence on global warming and global change.

In May 1998, the rains returned to East Kalimantan and have continued until now. Still, it must be noted that the "El Niño" phenomenon will come again, and there are indicators that the next El Niño will be strong, bringing with it the possibility of further extensive forest and grassland fires.

II. MANAGING FIRE BY INCREASING PREVENTION EFFORTS

In East Kalimantan, fires are never caused by natural phenomenon such as lightning strikes. Burning coal seams can cause forest fires but usually fires that are already burning start coal seam fires. So it can be said that almost 100% of fires in East Kalimantan occur because of the human factor, be it intentional or otherwise.

However, fires caused by humans can be prevented and reduced, whereas fires from natural causes cannot or only with a sophisticated and expensive technical approach. Apart from that technical approaches can usually only detect the symptoms of fires

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caused by the human factor but can't solve them. Because of that, fire prevention concepts have to be developed and forest fire management has to be socialized through environmental education activities like campaigns, training and extension programs. FIRE PREVENTION IS BETTER THAN FIRE FIGHTING AT HIGH COST.

Further, fires are usually connected to a community's limited knowledge of, the forest itself, forest functions and the negative effects of forest fires. The reason for this is that community awareness about fire and the importance of prevention is still very much lacking. This was often seen during the drought of 1997/98, in the villages within the fire danger zone it was as if the people just watched the fire happen, even though it was close to their own houses. On average when asked, school children did not know much about fire. Examples like these occurred frequently during the extension activities run by IFFM/gtz in villages within the Balikpapan, Samarinda and Bontang municipalities in 1998.

Another matter to consider is that the approach taken for the native peoples of East Kalimantan must be different from that for the immigrants to East Kalimantan. Native peoples have inherited environmental and fire management experience over hundreds of years. Also they are very aware of the conditions in East Kalimantan. Meanwhile the immigrants have experience and knowledge from a different environment that often is not conducive to local conditions. Thus where possible using indigenous knowledge programs increasing knowledge about forest functions and effects of forest fire for all communities need to be intensified through campaigns and extension.

The El Niño phenomenon will occur on average every 3-4 years in the future and will be at its worst at 10-15 year intervals, bringing an extended drought and the possibility of extensive forest fires if no preventative measures are taken. The rich variety of species in East Kalimantan will be reduced continually and people in both villages and cities will feel the negative effects if preventative measures through, education, technical implementation, regulations and legislation are not increased. Community perceptions need to be changed through continual environmental education programs so that people are motivated to participate in national resource conservation activities, especially forest fire prevention.

III. FIRE PREVENTION THEORY

There are three parts to fire prevention:

- a) education
- b) field activities/technical implementation
- c) law enforcement

Education

Generally, education programs to increase people's awareness of fire prevention need to be continual. Education about fire management can be both formal and informal, it can be included in school programs, extension and awareness activities, campaigns, training etc.

Field activities (technical implementation)

The activities undertaken directly in the field include:

- ◆ making a fire break
- ◆ maintaining a fire break
- ◆ making a green break
- ◆ using fire safely for land clearing (management)
- ◆ repairing installations that may cause fires
- ◆ reducing fire danger by neutralizing fire sources for example by putting out burning coal seams, etc
- ◆ controlling access to fire sensitive areas

Law enforcement

A case where legislation has been strengthened in connection to an environmental problem related to forest fires has almost never been heard of. This is in conflict with what has occurred in Indonesia where almost 100% of forest fires are the result of humans and where legislation for handling these problems is already complete. This is a big question mark for those people who care about the environment, especially where forests and forestry are involved. Following are several examples of how, in practice, to increase law enforcement in the field:

- ◆ Regulations for the use of fire in a fire sensitive area which also includes forbidding the use of fire at times of high fire danger;
- ◆ Monitoring in areas (villages) with the potential to cause fires and requesting those responsible to take control of the situation if necessary;
- ◆ Checking of all equipment used in field operation activities;
- ◆ Checking on/patrolling all visitors to public forest areas and other public areas;
- ◆ Patrolling as a preventative activity where immediate action is taken if any wrong doing is found;
- ◆ Controlling of occurrences through immediate firm legal action taken;
- ◆ Closure of roads/access to fire sensitive areas at times of high fire danger.

IV. FIRE PREVENTION EXTENSION EFFORTS

Extension Terminology

GBHN stated in 1993 that development in the forestry field needs to be supported by education, extension and research (FORESTRY DEPARTMENT 1996), which means that extension is differentiated from education. Within fire management terminology and in accordance with what is widely understood, extension is one element of education. Education is all activities both formal and informal that directly or indirectly increases knowledge or experience of a certain matter. Thus communication in general can become an educational activity. In this context it could be via radio, television or newspaper as well as exposure through putting up roadside billboards.

Target Groups

In accordance with what has already been clarified that is, that most fires occur due to humans, the main target group is the people that utilize fire for land clearing. that is Communities living in or near forests. Further, extension also has to be done for the

community at large, both those living in villages near forests and those living in cities. In all these areas understanding of fire prevention is still lacking.

Another aim is to have extension for school children in villages as well as in cities through a forest fire prevention education program.

Fire Prevention Extension Materials

Extension materials are one of the main elements in extension activities. These materials will determine the innovation process of the target community. Because of this the choice of materials must be agreeable to the target community.

The main materials for fire prevention are as follows:

- ◆ forest functions
- ◆ fire causes
- ◆ effects of fire
- ◆ early warning system

Fire Prevention Extension Methods

There are several methods that are useful for socialization of fire prevention matters including the following elements:

- a) Extension for a village community in a fire sensitive area:
 - ◆ extension that is direct and participative
 - ◆ fire prevention training
 - ◆ " road side" campaigns

Extension that is direct and participative means that villagees in a fire sensitive area are visited and invited to participate in fire prevention extension. Extension meaning increasing community knowledge and awareness of fire prevention is an integral part of IFFM/gtz's program in connection with training, an example can be seen in section VII.

Fire prevention training is a more intensive and practical than extension. Training in a target community is usually restricted to a specific group for example community organizations or designated fire fighters etc. The aim of this fire prevention training is that they later, at a time of high fire danger can become a mediator group who perform extension in their own villages.

" Road-side " campaigns can be effective to give information to the community in a fire sensitive area about fire danger during drought periodes. This could be through giving out stickers, brochures and other information materials to passengers in cars, buses or trucks that pass through the area. This was done on the Bontang-Sangatta road that goes into Kutai National Park, with this and other messages: "There is high fire danger now, don't throw cigarette butts just anywhere".

- b) Extension for the community at large:
 - ◆ advertisements on TV, radio and in newspapers;
 - ◆ community announcements via a loudspeaker on top of a car;

- ◆ billboards, posters and other materials (brochures, stickers, keyrings, pens etc.)
- ◆ patrols in a fire sensitive area during times of high fire danger, to provide information to people met on the road or on a farm;
- ◆ public events (presentations, exhibitions, quizzes, shows, public competitions like sports events etc.);
- ◆ formation of an environmental club or a specific program for the general public (a nature camp).

Table 1: Several examples of extension.

No.	Aspect	Example
1.	Advertisement	<ul style="list-style-type: none"> ◆ commercialization of a forest fire management mascot "Si Pongi" through story books, TV programs etc. (see below), ◆ make a story (drama) about fire, that can be broadcast on TV or radio, ◆ make a "TV spot" about the forest fire problem that can be broadcast on national TV several times a day during the dry season, ◆ make a "Si Pongi" comic series that can be routinely put into a newspaper, ◆ display "Si Pongi" on boxes of milk or other food/drinks.
2.	Information announcements	<ul style="list-style-type: none"> ◆ use a loudspeaker on a car to remind of fire danger in a fire sensitive area, ◆ broadcast information about fire danger levels after news broadcasts on radio or TV.
3.	Information materials	<ul style="list-style-type: none"> ◆ brochures, posters, stickers, key rings, pens etc. that can be given out in front of a shopping center or during extension activities in a village or by the side of the road or during a sporting event etc, ◆ interesting visual materials made for extension activities etc.
4.	Public events	<ul style="list-style-type: none"> ◆ give presentations during forestry activities in cities and the villages, ◆ expose information about fire during exhibitions, ◆ make a quiz for the general public via newspaper or other information sources, ◆ hold a children's coloring and drawing competition, ◆ make a "Si Pongi" show for children, ◆ using the "Si Pongi" costume, give out stickers at a strategic place in the city.

c) Extension for school children

- ◆ as part of a formal school program (one hour packet)

- ◆ as part of an informal school program (shows, coloring/drawing competitions, "nature walks/camping" etc.),

Environmental education programs for fire prevention can be seen in section VI.

V. "SI PONGI" – THE FOREST AND GRASSLAND FIRE MANAGEMENT MASCOT

"Si Pongi" has been introduced to the community as the forest and grasslands fire management mascot. The message from "Si Pongi" is *"Let's all help prevent forest and grasslands fires"*. The orangutan (*Pongo pygmaeus*) is one of the best known animals from the forests of Kalimantan (and Sumatra) but is also an endangered species. Forest fires have been one of the causes behind the gradual reduction of their habitat. Until the situation now where their very existence is greatly dependent on efforts for environmental protection, including forest fire prevention.

Messages to the community through the "Si Pongi" mascot need to be spread as widely as possible. Because of that IFFM/gtz has made a lot of "Si Pongi" promotional materials like, story books, dolls, cassettes with a "Si Pongi" song, hats, T-shirts, pens, writing books, key-rings, posters, mugs etc. The "Si Pongi" mascot is suitable as a fun figure for children and is also acceptable to adults.

VI. ENVIRONMENTAL EDUCATION PROGRAMS AS FIRE PREVENTION EXTENSION FOR SCHOOL CHILDREN

During the dry season of 1997/98 fire prevention extension was often carried out together with relevant agencies. At that time, the IFFM/gtz team together with other agencies visited several schools to introduce "Si Pongi" and talk about forest fire. The experiences gained from these activities, as well as from meeting children on the side of the road during field visits, was that most often children indeed do not know much about the forest itself never the less forest fire in East Kalimantan. Because of this the idea came about that besides the other activities there was a need for fire prevention programs suitable for school children. It is hoped that later as youths and then adults these children will have a greater understanding about fire and that this will have a positive influence on their environmental perceptions. As children they will also take the knowledge home to their parents, so the "Si Pongi" activities can become extension for the parents in a non-formal fashion.

When organizing the program, Dr. Seto Mulyadi ("Kak Seto") was identified as a suitable mediator to introduce "Si Pongi" and his message. Kak Seto's character "Si Komo" is widely recognized in Indonesia and also has an environmental education message for children. An initial meeting between IFFM/gtz and Mutiara Indonesia Foundation (Kak Seto) was held in August 1998, to discuss cooperation and initial steps to be undertaken. It was expected that through a show in Samarinda "Si Pongi" would become a friend of "Si Komo". The show was held on the 11th of April 1999 with the theme "Love our forests with Si Komo and Si Pongi", during the show "Si Pongi" materials like dolls and music cassettes were being sold. It is hoped that through this show and with Kak Seto as the MC "Si Pongi" would become famous throughout Indonesia.

Development of a “Si Pongi” theatre show for schools in East Kalimantan

The second step of the plan is a play/theatre show to be presented at several primary schools and kindergartens by a team of actors from East Kalimantan. This is yet to be developed. This play will present a story of forests, forest fire and its effect together with several figures in costume, children will be able to join in the story participatively. Besides this play there will also be coloring and drawing competitions, quizzes and games about the forest and the problem of forest fire.

Other programs being planned for the future

IFFM/gtz is developing the school direction as one of the main areas for fire prevention education. Considering that education in schools is a very effective way to get the message into people's houses in an indirect way. Fire prevention is one aspect of nature conservation, and it can give a good example for further discussion and learning about how important nature conservation is overall. Experiences from this type of program can become guidelines for development of similar programs in other regions.

IFFM/gtz is also planning to develop “One hour Environmental Education Lessons” for schools as well as several other forest fire prevention materials. Another aim is for fire prevention training to be included in scout activities. It is hoped that trained scout groups would be able to present study programs or fire prevention campaigns in schools. Several members of the Girl and Boy Scout movement have already joined training about fire management held by IFFM/gtz. Generally, every school in East Kalimantan has a scout group therefore this is very strategic way to spread the “Si Pongi” message.

In the future, 'Forest visits ’ and “Nature camps” will also be developed by IFFM/gtz. Forest visits means taking schoolchildren into the forest to help them gain an understanding of the forest as a living organism by using their senses (sight, hearing, smell, feelings/emotion and touch,). This could be made more intensive through a “nature camp”. By camping in the forest for several days, the school children can learn about forest functions in a simple hands on way.

VII. THE FIRE DANGER RATING SYSTEM AS THE BASIS FOR ALL FIRE PREVENTION ACTIVITIES

The fire danger rating system is one element of the fire information system (FIS) that has been developed by IFFM/gtz. This is a systematic method for evaluating the level of fire danger as low, medium and high. The FIS in general and the fire danger rating system specifically are very important for planning forest and grasslands fire prevention activities. The following questions must be answered when planning these activities:

- **What** has to be done?
- **Where** should a fire prevention activity be carried out?
- **When** should this activity be carried out?

IFFM/gtz has developed a Fire danger Rating System for East Kalimantan that is based on the Keetch Byram Draught Index (KBDI). The data needed for this model is:

- Average yearly rainfall (mm)
- Total daily rainfall (mm)
- Maximum daily temperature (°C)

This data is available from several meteorological stations, it then becomes input for a simple spreadsheet where the daily dryness index and the fire danger rating can be calculated. Theoretically the highest level for the KBDI is 2000, the points from 0 – 2000 are divided into three classes of fire danger rating:

- 0000 to 999 low fire danger (green)
- 1000 to 1499 medium fire danger (yellow)
- 1500 to 2000 high fire danger (red)

More information can be found in the thesis “ Integrated Forest and Grasslands Fire Management. Two aspects of a fire Information System: Remote Sensing and Fire Danger Rating” by ANJA A. HOFFMANN & DORIS WEIDEMANN (1999).

Fire prevention activities based on the fire danger rating system

Table 2: Several examples of Standard Operational Procedures for fire prevention (an extract, not complete!)

<p>Low fire danger; Index < 500; El Niño not expected</p>	<ul style="list-style-type: none"> • Evaluate fire danger rating each week • Hold fire prevention and fire fighting training • Increase equipment according to the needs of a forest area/a concession/a timber estate/a plantation • Check equipment, proceed with necessary maintenance • Make fire breaks, combine rehabilitation activities with fire break planning and preparation • Build watch posts in strategic locations • Prepare information and advertisements for prevention activities
<p>Low fire danger; Index < 500; Strong El Niño expected</p>	<ul style="list-style-type: none"> • Evaluate fire danger rating each week • Hold fire management training, fire simulation • Prepare fire management organization • Maintain fire breaks • Extension activities are planned and prepared • Billboards with prevention messages are prepared for placement in strategic locations • Patrol planning is prepared
<p>Low fire danger; Index between < 500-1000; Strong El Niño expected</p>	<ul style="list-style-type: none"> • Evaluation of fire danger rating at least 3 times a week • Community is informed of the FDR level • Communications planning and equipment are prepared and activated • Campaign and extension activities prepared • Begin patrols in fire sensitive areas • Fire breaks are cleaned and controlled

<p>Medium fire danger; Index between < 1000-1500; Strong El Niño, fires occurring</p>	<ul style="list-style-type: none"> • The fire danger rating is renewed every day • Fire prevention campaigns and extension carried out in villages near fire sensitive areas • Advertisements broadcast on radio and television • School programs activated • Billboards placed in strategic locations begin distribution of other materials
<p>High fire danger; Index < 1500</p>	<ul style="list-style-type: none"> • Roadside campaigns activated • TV spots broadcast several times a day • Promotion of “zero burning” (“don’t burn now”) • All prevention and pre-fire fighting activities are intensified

VIII. STEPS UNDERTAKEN BY IFFM/gtz FOR FIRE PREVENTION ACTIVITIES AT THE COMMUNITY LEVEL

Below is an IFFM/gtz program made up of several parts like, observation/identification, extension and training to become a concept for fire prevention.

A. Observation/ Identification

1. Visits to related government agencies like the local forestry offices and village government organizations. These visits were undertaken to gain information about fire causes, areas that are fire sensitive (especially near viallges) as well as what action had been taken by local officials. These visits are also intended as an initial step towards further cooperation with the related agencies. Visits were also undertaken to villages that would be programmed into the packet of activities, to gain further information about the social-economic situation in the villages. The approach used among others was to make contact with the traditional/ethnic community figures. These are the key people that could make any approach to the community easier and ensure the smooth running of the planned program.
2. Socialization about the panned program of technical training in fire prevention and forest and grasslands fire management was given for the local community.

(Figure 1: Stages and results of the fire prevention program undertaken by IFFM/gtz)

B. Extension

Table 3: Material and methods used by IFFM/gtz in extension activities

No.	Material	Method	Media
1.	Introduction of IFFM and the Forest and Grasslands Fire Information Center	- Speeches - Discussion	Flipchart, prevention promotion materials, transparencies, brochures
2.	Introduction of the Fire danger Rating System; talk	- Speeches - Discussion	Flipchart, transparencies, quiz

	about weather and the dry season in general		
3.	<p>Causes of fire:</p> <ul style="list-style-type: none"> - throwing away a cigarette butt - using fire to clear a field in an unsafe manner - burning rubbish in an unsafe way - making a fire in the forest (for cooking etc) - children playing with matches - purposely burning the forest 	<ul style="list-style-type: none"> - Discussion - Visualization 	Flipchart, pictures
4.	<p>Forest Functions:</p> <ul style="list-style-type: none"> - hydrological function (controlling water flow) - Climate control function - Environmental function - As a source of bio-diversity - Production function (as a source of daily needs) - Eco-tourism - Esthetic function - Security function 	<ul style="list-style-type: none"> - Speeches - Discussion - Visualization 	Flipcharts, posters, transparencies, samples of forest products etc, distribution of posters, brochures etc
5.	<p>Effect of forest and grasslands fires:</p> <ul style="list-style-type: none"> - smoke - health problems - disturbances for land, sea and air transportation - destruction of natural resources - Reduction in bio-diversity - Increased CO₂ in the air - Erosion - Soil fertility reduced (in the long term) - Losses for the timber industry - Living conditions for the people living inland increasingly difficult; economic losses for village communities - Community fruit farms 	<ul style="list-style-type: none"> - Speeches - Discussion - Visualization - Games 	Flipcharts, posters, visualization (lost forest products, burned objects)

	<ul style="list-style-type: none"> - are often destroyed - Reduced number of animals for hunting - 		
6.	<p>Methods for forest fire prevention:</p> <ul style="list-style-type: none"> - burning field in a safe manner - informing other people - following existing regulations - don't burn if the fire danger level is high - solve problems together with the government and private sector - put out cigarettes before throwing them away - form an organization at the village level - introduce the "Si Pongi" mascot 	<ul style="list-style-type: none"> - Speeches - Discussion - Visualization - Games 	<p>Flipcharts, posters, transparencies, forest fire prevention promotional material</p> <p>Distribute the "Si Pongi" story book</p>
7.	Existing fire and forest sustainability Regulations and legislation	<ul style="list-style-type: none"> - Speeches - Discussion 	Flipchart, transparencies
8.	Extension on farming techniques	<ul style="list-style-type: none"> - Speeches - Discussion 	Flipchart, (depending on the ability of the PPL people who join the extension)
9.	Formation of fire fighting teams; preparing the teams for training at a later time	<ul style="list-style-type: none"> - Approach community figures - Discussion 	Forest fire prevention promotional material, posters, leaflet, booklets, flipchart
10.	An entertaining film		Fire fighting truck Department of Forestry

During this extension fire fighting teams were formed at the village or sub-village level. So when the training was to be undertaken their teams and work groups were already prepared. Using these existing work groups and teams, activities connected to community welfare programs could be more easily developed.

Training in forest and grassland fire management

After receiving extension about prevention and management of forest and grassland fires and the work groups were formed a training-program in prevention of forest and grasslands fires followed. The training material was mostly to do with techniques for forest and grassland fire prevention and management as well as how to organize a fire fighting team. During this training the community was also given material about

forestry regulations and legislation concerned with forest protection in Indonesia. It is hoped that this will increase the community's knowledge/awareness of the importance of the forest and grassland fire prevention program.

IX. A BRIEF INTRODUCTION TO THE INTEGRATED FOREST FIRE MANAGEMENT PROJECT (IFFM/gtz)

IFFM/gtz is a technical cooperation project under bilateral agreement between the governments of Indonesia and Germany. The project is under the authority of the Ministry of Forestry and Estate Crops (MoFEC, Directorate General of Forest Protection and Nature Conservation), and is carried out by the two provincial forestry agencies. *Kanwil Kehutanan*, the MoFEC representative office in East Kalimantan is responsible for policy formation and *Dinas Kehutanan*, the provincial forestry agency is responsible for field operations. The project began in 1994 and is planned to operate for 6 years. In the second phase (1997-2000), IFFM also became a cooperation project with *Kreditanstalt für Wiederaufbau KfW* (German Development Bank). The German Agency for Technical Cooperation (gtz), that has overall responsibility, supplies long and short term consultants as well as holding necessary training and extension and other facilities.