



**BACKGROUND AND JUSTIFICATION  
FOR INTENSIFIED  
FOREST FIRE CONTROL ACTIVITIES**

# **1 BACKGROUND AND JUSTIFICATION FOR INTENSIFIED FOREST FIRE CONTROL ACTIVITIES**

## **1.1 General**

The rapid increase in human population is a major problem in most of the developing countries in Africa and South East Asia. In these developing countries forest produce has contributed to about 90% of domestic fuel for cooking, for drying of fish, meat and tobacco, for brick making, boat building, tool and weapon handles, and furniture making to mention just a few. This pressure on forests has resulted in a degradation of forest and other plant communities around the inhabited areas.

More land is required for growing agricultural crops to meet the needs of the increasing population. Likewise, more fuelwood and other forest produce is required to sustain the needs of the people. Larger areas are also required for feeding the expanded herds of livestock. The ecological imbalance is further aggravated by the uncontrolled ways of using fire as a means of clearing land and forests for human activities.

The main drawback which has not been significantly realized is the haphazard disappearance of both naturally existing and newly planted trees as a result of wildfires. Most of the wildfires are man-made and caused by various human activities. It is very seldom that wildfires are caused by nature (e.g. lightning). The most unfortunate existing situation is that to date most of the developing countries take forest fires as a surprise whenever they occur, though in tropical countries fire seasons occur regularly once or twice a year.

Forest fires have many times destroyed existing vegetation which unfortunately involved various investments in planting and caretaking. It is common that most developing countries have tree planting strategies and activities, but very few amongst those have any budget proportionally justifying the protection of the planted trees from possible fires.

## **1.2 Environmental Impacts of Forest Fires**

When fire burns it has a number of effects which are negative to the environment, as described in the following sections.

### **1.2.1 Nutrient stability**

When fire burns it burns off a number of nutrients which are volatile and these either evaporate or are easily leached. The end result is a lack of nutrients at the site in question. The situation gets worse with subsequent burnings.

### **1.2.2 Flora and fauna**

As a forest fire burns it kills most of the microflora and microfauna within the top soil layer. Vegetation on the forest floor is in most cases completely burnt off. Most of the microflora and microfauna have a function of nutrient re-yielding. Once these are killed by excessive temperatures then the nutrient cycling is jeopardized.

### **1.2.3 Soil texture**

As temperature rises and then falls the soil texture may be changed. This can even be accelerated by the change in nutrients, as mentioned earlier.

As the heat of the fire changes the soil texture, the small porous cavities in the soil are gradually filled with loosened soil. The reason for this is that many of the micro-organisms living in the top layers of the soil are killed by the heat. These organisms create the cavities in the soil which then absorb much of the excess water during rains. The absence of cavities in the soil reduces the water retaining capability of the soil. Repeated fires destroy the natural soil texture, which leads to escalated water run-off. Fast run-off of water is in fact to a large extent responsible for causing the excessive flooding in many areas in Southeast Asia.

### **1.2.4 Ecological stability**

By a change of nutrients, flora and fauna, and soil texture, the ecology is checked by changing the environment to suit a different type of species community. This is very much pronounced when there is a lot of fuel (i.e. woody plants) on the ground.

### **1.2.5 Global temperature**

Accumulation of pollutant gases after burning, as mentioned earlier, is a growing global concern. This has caused the global temperature to rise. This raise of temperature will in the long run have a very negative effect on living organisms and plants. Fire is therefore an enemy to the environment and hence also to human life.

## **1.3 Social and Traditional Beliefs and Practices**

In most developing countries, the local communities take fires as a natural seasonal happening and believes that fires have to be lit. The following sections describe some beliefs or reasons that make some communities burn vegetation.

### **1.3.1 Rains**

Local communities in some countries in Africa believe that when the drought is extreme burning forests and/or grassland will form a large smoke cloud. This smoke is believed to combine with dew clouds in the sky, or will actually make a cloud formation and hence bring rain.

### **1.3.2 Range management**

This is practised by both range management professionals and by some locals. The professionals find it most efficient to have late burning, which clears almost all the old grass, giving room for new grass to germinate.

Local tribes like the Masai herdsmen in Eastern Africa practice the same, though no control is made and it is unfortunate that most of those people practising it do not pay attention to the negative effect of fire as mentioned in section 1.2. The new grass seems good for animals but in the long run the fertility of the soil is very much deteriorated.

In areas where there is a local community that keeps cattle, and also where wildlife exists, there is a possibility of wilde-beasts (gnu) and zebras coexisting with domestic animals. This is common in Masai areas. The Masai believe that when wilde-beasts have calves the after birth carries some bacteria that exist symbiotically. These bacteria then multiply and if the cattle graze within this area they pick up the bacteria, which are toxic to them. The Masai therefore burn the grass to destroy the bacteria wherever the wilde-beasts have been grazing. These fires may then grow wild.

### **1.3.3 Prestige**

Some local communities burn in order to compete. This competition is only geared to see who had lit a fire which destroyed the largest of the areas. It makes the competitors satisfied and nothing else.

### **1.3.4 Agriculture**

Clearing of areas for cultivation, especially shifting cultivation, is a common practice in developing countries. In most of these countries fire is used to burn the existing vegetation, as an easy practice which does not involve much labour. This also has a significant negative impact on desertification and ecology.

### **1.3.5 Beekeeping**

Local beekeeping practices in developing countries use smoke to clear bees and make them less aggressive during the harvesting of honey. When honey hunters or collectors get their honey they may not bother to extinguish the fire they started to smoke out the bees. This may then cause a severe fire to spread in a forest.

## **1.4 Fire Prevention Background**

By establishing a sound forest fire control strategy and executing it individually in each developing country, more seeds are going to germinate and survive naturally and money intended for reforestation or afforestation could be better invested.

When current burning practices are correctly identified as damaging and causing large scale deforestation, as in the case of most wildfires in Africa and Asia, the measures taken to combat them are often ineffective. The motive for burning must be removed, such as land speculation, tax or other incentives, and land documentation criteria that reward deforestation.

Prohibiting burning and attempting to enforce this through inspection and punishment is bound to fail. The above practice is one of the reasons for the failure to educate the masses about the negative effects of burning in most developing countries, with large scale deforestation as an end result. Forest fire control is one of the recognized forestry sciences in many countries where forestry has a high national priority. In these countries special academic degrees can be obtained in forest fire control. It would consequently be expected therefore that this also would apply in most developing countries, but this is not the case.

Australia, Canada, the UK and USA offer degree courses in this field. Technical level education in forest fire control is not available anywhere however. The reason is that fire-sciences are available internationally, but only for fire-men, not for forestry people. Additionally, fire brigades in developing countries are financed by the communities or by national airport authorities, and they only have mandates to operate in the near vicinity of their fire station. Their training does not include the combat of forest fires, nor is their equipment suitable for off-road activities.

Consequently therefore, forestry people are forced to form the core of any organisations combatting forest fires in almost all developing countries.

To remedy the present situation, the introduction of the Thai system of continuous education and training programmes and proper follow-up in localities that can have a positive response to forest fire prevention and control is needed.

This could be done by bringing about the proper knowledge and awareness to the foresters and the general public. This includes a massive effort of educating all students and teachers already at primary school level. Involving the media and press to its fullest extent will result in massive pressure from the public towards the government and the political leaders.

In Thailand this public education programme has had a widespread effect, and it has resulted in a reduction of haphazard burning in the country by 30%. This proves that massive campaigns are possible to execute. In some countries like those of Tanzania and Indonesia a positive response from the government has been assured and the public awareness is growing in a positive direction with the aid of decision makers, the media, and forestry personnel.

The long term efforts by Finland in providing training in prevention of forest fires justifies the continuous support by the Finnish Government. More than 25 years of training and education activities in this field, provided for by Finland, is now showing great promise for the future in some of the developing countries of Africa and South East Asia.

The training will also include the production of training material and teaching aids. The national forest fire control chiefs will of course also need national trainers and instructors for the further training of voluntary (village) fire brigades.

Apart from the institution building efforts in establishing special forest fire control units in each country the already existing ones need to be further strengthened. This institution building process requires not only sufficiently well trained personnel but also financial resources and basic tools and equipment available at reasonable cost.

The recent disastrous forest fire in China (3 million hectares) was to a large extent caused by lack of voluntary fire brigades and suitable fire control tools. Another giant forest fire in Kalimantan, Indonesia in 1983, which also scoured 3 million hectares of tropical rainforest in Bukit Soeharto was established as having been caused by arson.

An ITTO project has now been established to look into the rehabilitation of the above burnt forest. The large forest fires in Spain in 1989 (which resulted in scouring of close to half a million hectares of mixed scrub/pine forest, IFFN) were caused by lack of knowledge in how to control and educate the enormous amount of tourists and campers touring the region.

It is also very important to establish operational units in each country to cater for all forest fire activities. In some other countries the existing organisations would need strengthening, and the division of responsibilities between urban and rural fire organisations would need to become established.

Accidental fires do occur naturally, but more than 95 % of all forest fires are related to human activities. Consequently therefore, many fire situations may be completely avoided if appropriate training is provided. Additionally, communication equipment and appropriate tools are required to achieve acceptable levels of preparedness before the annual fire seasons occur.