

4. PREVENTION OF FUTURE HEALTH-AFFECTING EVENTS

4.1 THE SOURCE: LAND USE AND FIRE POLICIES

In evaluating the 1997-98 fires and smoke episodes during an expert consultation the FAO evaluated those public policies which affect forest fires. The expert consultation concluded (FAO 1998):

The present status of national policy development in response to wildfires and land-use fires is often characterised by an ad hoc reaction to a situation that has already developed, rather than proactive mitigation before the emergency arises. Frequently policy development does not consider the underlying causes of fire incidence and spread, which may lie outside the forest sector. For example, rural poverty and deprivation or the effects of other public policies related to land use and incentives. Sometimes forest fire incidence and spread may be caused by ill-conceived forest management policies, in particular policies of total fire exclusion that have led to fuel accumulation and catastrophic fire outbreaks.

In general, land-use policy development is rarely based on reliable data on the forest-fire extent or causes. Nor has it involved consultative or participatory processes with those most closely involved and affected. Even where policies linked to reducing the incidence and damage of forest fires are in place, there may be institutional weaknesses that do not allow them to be enforced. These could arise from a shortage of public funding due to political instability or economic weaknesses.

Preliminary action needed to develop public policies related to fire management and sustainable land use practices:

There is a need for reliable and up-to-date systems for national, regional and global fire reporting, analysis and storage of data. Such data, and information on fire causes and socio-economic and environmental effects, are required as a sound basis for policy making. Linked to these is the requirement for international agreement on terms and definitions, as a basis for information sharing and communication.

Information on resource management alternatives and their consequences is essential for the involvement of all stakeholders in policy formulation and development.

Conclusions and recommendations to member countries regarding policy principles for sustainable land or forest use:

No single formula can cover the wide range of ecological, socio-economic, and cultural conditions that exist between and within regions, nor the different objectives that different societies will decide. Certain broad principles exist, however, that are common to all situations and objectives. These principles include the following:

- ❑ The formulation of national and regional policies specifically addressing forest fires, as an integral component of land-use policies, where they previously did not exist.
- ❑ Flexibility in policy implementation, and the capability to review and revise fire-related policies
- ❑ Clear and measurable policy objectives and implementation strategies are needed to minimise the many adverse effects of uncontrolled fires and to maximise the benefits from fire prevention, or from the controlled use of fire. Such objectives and implementation strategies would provide for sustainable land use practices, compatible inter-sectoral policies, joint fire management responsibilities at the community level, and the participation of the private sector and NGOs.
- ❑ Involvement of all stakeholders in policy development, especially through devolved or community forestry approaches. Recognition by decision-makers that sustainable land management may in many instances only be attained through devolution of control of forest resources and the involvement of the communities adjacent to or within forest in all aspects of management and fire protection. Such devolved approaches will require the revision of existing policies and laws and introduction of appropriate land-tenure arrangements to provide incentives for equitable local/community based participation in forest management and fire protection and control.
- ❑ A favourable policy environment must be created for all aspects of systematic fire management (prevention, detection, suppression, prescribed fire, post-fire rehabilitation etc) and for an appropriate balance between prevention, suppression and prescribed fire use, based on local conditions. Such an environment should attempt to quantify the monetary and non-market values in order to emphasise the costs and benefits to society and to decision-makers.
- ❑ Policies are required for other forms of land-use: in particular credit policies should encourage land-use options that do not further contribute to deforestation.
- ❑ Policies that tend to increase forest fires must consider public health effects. Policies concerned with maintaining the health of ecosystems that are fire-adapted may have to balance public health and forest health issues

Some technical aspects may support policy formulation and implementation. They include:

Systematic or Integrated Fire Management:

- ❑ devote more human and financial resources on fire prevention than at present in order to reduce the subsequent need and expense for fire suppression;
- ❑ policies should promote and regulate prescribed fire for a variety of land management purposes, including the reduction of hazardous fuels, and should promote public understanding of the purposes of prescribed burning. It should be noted, however, that prescribed fires are caused by humans and thus count as emissions against a country's carbon balance, while a disastrous fire that arises naturally because of a failure to reduce fuel loads does not (Kyoto Protocol, UN 1997).
- ❑ policies should define the process whereby fire management plans are developed to achieve the resource management objectives of conservation units;
- ❑ develop educational, extension, and public awareness programmes on fire in general and on policy-related matters in particular, appropriate to the needs of various stakeholders;
- ❑ vigorous training programmes in all aspects of fire management and at all levels including volunteer community fire-fighting brigades and the training of farmers in safe fire use;
- ❑ integration of fire management planning with inter-sectoral resource planning;
- ❑ encourage silvicultural practices that sustain healthy ecosystems which in turn reduce the impacts of fires;
- ❑ develop policies for a fire command structure that clearly delineates authorities and responsibilities of the various agencies involved;
- ❑ considering the threat from fires burning in radioactively contaminated vegetation a special fire management programme must be developed for the radioactively contaminated regions in Russia, Ukraine and Belarus with high priority. This would include also careful recording of data and experience for any future similar emergency.

Institutional Co-operation:

- ❑ encourage fire management cost-sharing among all relevant stakeholders at all levels
- ❑ develop inter-sectoral co-operation at national and local levels
- ❑ develop international agreements that facilitate the exchange of expertise
- ❑ develop capacity building in fire management

Restoration/rehabilitation:

- ❑ Salvage useable resources following fires;
- ❑ Encourage natural recovery through protection whenever possible for the purpose of maintaining genetic integrity;
- ❑ Undertake re-stocking where necessary;
- ❑ Restore the infrastructure and rehabilitate local communities.

Technology/Research/Information:

New technologies offer the means to introduce new and more environmentally and socially acceptable land use management policies; particular attention is drawn to “zero-burning” land clearing techniques.

Fire research at national and regional levels needs to be strengthened to support development of fire policies and fire management capabilities, especially related to investigations into socio-economic and cultural aspects of fire outbreaks. Fire research is needed into a number of topics:

- ❑ The development of new dedicated space-borne remote sensing technologies for improving decision support in fire management including sensor technologies for fire detection and early warning of fire.
- ❑ Post-fire recovery techniques and fire effects and ecosystem recovery processes.
- ❑ The impact of climate change on fire regimes and fire severity.

Existing experience should not be neglected, and local indigenous knowledge should be acquired on traditional fire-related cultures and customs as a guide for fire management practices and policies.

Evaluation systems should be developed to assess fire damage and benefits and to draw attention to the true costs and benefits of fires.

Policies and techniques that aim to increase agricultural productivity, while providing and enforcing disincentives for reckless programmes, will slow forest conversion for unsustainable agriculture and will thus reduce forest fire damage.

Conclusions and recommendations to International Organizations:

There are many international organisations, including FAO, UNDP, UNEP, WHO, WMO, other UN-agencies and non-governmental organizations (NGOs), involved in forest fire-related activities at global and regional levels. Continued and improved collaboration and coordination are urged. Transboundary or regional agreements for collaboration in fire management need to be developed, with the technical and financial support of international organisations.

International organisations are further urged to support the design and implementation of a global fire inventory or reporting system, in close collaboration with the fire science community and end-users. An internationally harmonized fire management terminology is required to support such global or regional fire reporting systems.

A global fire information system is needed to provide immediate access to real-time data and information on current fires, archived information, and other sources which are needed by countries to develop fire management programmes, increase preparedness and to respond to outbreaks at national, regional and global levels.

All interested International Organizations should play a catalytic role in the establishment of networks, to promote the sharing of information and knowledge and technical cooperation between developing countries. Sufficient resources should be allocated for these purposes.

Guidelines and codes of practice for fire prevention and control are also required, not only in the forest sector, but in any sector that could have an impact on forest fires (e.g. road alignments, power lines).

Technical assistance, from International Organizations, is still required, particularly in institutional support and capacity building.

Development of other Guidelines:

The International Tropical Timber Council (ITTC) identified forest fires as a major problem since it started operation in 1986. Pursuant to a decision of the ITTC, the International Tropical Timber Organisation (ITTO) undertook the development of a set of international guidelines for the protection of tropical forests against fire. This resulted in the publication "ITTO Guidelines on Fire Management in Tropical Forests" in 1996 (Annex E). The guidelines contain 29 principles and recommendations: Policy and Legislation, Strategies (Fire Management Planning, Fire Management Options, Fire Suppression, Role of Communities in Fire Protection), Monitoring and Research, Institutional Framework and Capacity Development, Socio-economic Considerations, Land Resources Management and Utilisation, and Training and Public Education

At the FAO consultation "Public Policies Affecting Forest Fires" involving the regional group Europe and Temperate/Boreal Asia it was clearly recognised that the ITTO had taken a lead role in designing a framework for national fire management policies and strategies. Consequently the group recommended:

"Following the example of the ITTO Guidelines on Fire Management in Tropical Forests, the FAO is encouraged to support the development of similar guidelines for the boreal and temperate regions."

The ITTO Guidelines on Fire Management in Tropical Forests are attached in Annex E.

4.2 RECOMMENDATIONS

- To assess the potential for national, regional, and global fire and smoke pollution, it is urgently required that the Global Vegetation Fire Inventory (GVFI) be implemented.
- Centres of Excellence need to be strengthened in their capabilities to monitor, archive, and disseminate information, and to forecast fire and related hazards.
- The UN agencies and other international organizations and programmes, particularly the WHO, WMO, FAO, UNEP, UNESCO, IDNDR, and ITTO, are urged to synergistically cooperate in the field of fire and smoke disaster prevention, management and mitigation.
- Special attention must be given to fire-generated radioactive emissions from terrain contaminated by radionuclides.
- Additional research is needed to develop source information for fires in different ecosystems, such as emission factors, emission ratios, and other data for flaming and smouldering combustion (e.g., particle size distribution, composition, toxicological properties, etc.). There is a need to determine the range of emission factors and emission ratios, as well as the variability and stability of the ratios and emission factors over time and by vegetation type
- Additional research is needed on the physical/chemical factors contributing to changes during transport (local meteorology, plume concentration, etc.).
- Compilation of information pertaining to levels of exposure and fire activity is needed, in conjunction with past fire and smoke episodes
- Research on mitigation approaches should be conducted Specifically:
 - Assessment of the feasibility of different arrangements for "haze shelters" (in private homes, schools, hospitals, old age homes, and appropriate public buildings); and assessment of the actual haze protection provided by air filtration, sealing of rooms, etc

- Evaluation of the most effective approaches for managing future haze emergencies, in terms of arranging transport to “haze shelters” for vulnerable groups, provision of masks to key outdoor workers, and other mitigation methods.
 - Evaluation of the effectiveness of remaining indoors, including an assessment of the impact of outdoor particles on indoor air concentrations in different building types.
 - An assessment of the effectiveness of dust mask use by the general population, including a consideration of compliance by individuals in wearing masks, the fitting of masks, the effectiveness of the various types of masks that are available and the use of education to improve mask effectiveness.
 - An investigation of the availability of alternatives to masks which could be effective as personal protective equipment in mitigating health impacts.
- Research relating to the health impacts of biomass smoke:
 - The delineation of health impact mechanisms associated with biomass smoke.
 - Assessment of the impact of biomass smoke on mortality within the general population
 - Future work to elucidate health effects of vegetation fires should also address factors that influence health outcomes. The available literature for the most part focuses on total emissions and health; however, this is only a partial view of the range of issues involved in health effects from vegetation fires.
 - Future work should include factors that affect exposure of populations to emissions from vegetation fires. Knowledge of the chemical and physical features of emissions that affect human exposures will allow for the prediction of disease or death in future fire episodes. For example, variations in vegetation and moisture content influence the release of carbon monoxide in different areas of the world.
 - Future work to establish the biological mechanisms by which vegetation fire emissions affect human health should be encouraged in the scientific community. This is necessary to determine the linkage between cause and effect, and will strengthen any results of ecological studies that have been done to date. Knowledge of biological plausibility will assist in identifying pertinent factors affecting human health in vegetation fires.
 - The health community should be encouraged to look beyond its immediate area of expertise to explain health effects arising from vegetation fires. Fire episodes and responses to such events are multi-sectored; as such, they require a multidisciplinary approach for mitigating measures and for the prevention of future disease and death.
 - The new approach of having national and local authorities make their own decisions about the levels of particulate matter, and about public advisory or mitigation activities, may be difficult at the beginning. It may require special explanation and a workshop to address this issue.

- A working group may be needed to reach agreement on the levels of particles that should trigger international action for vegetation fire preparedness and control.
- These Health Guidelines for Vegetation Fire Events should be updated every few years to reflect new scientific evidence on particulate matter and health effects.