

INTERNATIONAL CROSS SECTORAL FORUM ON FOREST FIRE MANAGEMENT IN SOUTH EAST ASIA

AN OVERVIEW OF INTERNATIONAL GUIDELINES : THE ITTO GUIDELINES ON FOREST FIRE MANAGEMENT

By

Prof. Johann Georg Goldammer

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Prof. Johann Georg Goldammer

Johann G. Goldammer

International Tropical Timber Organization (ITTO) and

Global Fire Monitoring Center (GFMC)

@ Fire Ecology Research Group

Max Planck Institute for Chemistry

c/o Freiburg University

D-79085 Freiburg, GERMANY

1. Introduction

In the recent 20 years forest fires influenced by climate variability and rapid demographic changes have become a major problem adversely affecting the sustainable management of tropical forests. Hazards to human health, the destruction of valuable forest resources and biodiversity, accidents and difficulties for land, water and air transportation, the disruption to the lives and livelihood of millions of people and the far-reaching negative impact to several sectors of the economy, have all been widely reported. This problem is not only confined to Southeast Asia but also in many other parts of the world. Obviously, forest fire management is a new dimension which must be accorded urgent and utmost attention and vigilance.

Forest fire was identified as a major problem by the International Tropical Timber Council (ITTC) since it started operational activities in 1986. Pursuant to a Decision of the International Tropical Timber Council, 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. The Guidelines contain 29 Principles and recommended actions: 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 Utilization, and Training and Public Education.

The guidelines which are targeting tropical countries in general offer a framework of criteria for the development of national guidelines which need to be fine-tuned and more specific in accordance with the socio-economic, cultural and vegetation conditions. Based on the ITTO guidelines, a specific national project has been developed in Indonesia ("Integrated Forest Fire Management in Indonesia: Phase I -- National Guidelines on Forest Protection Against Fire"), while a similar initiative is at an early stage of preparation in Namibia.

At the recent consultation on "Public Policies Affecting Forest Fires" by the Food and Agriculture Organization of the United Nations (FAO) it has been suggested that equal/comparable guidelines for other regions of the world (boreal, temperate areas) be developed with reference to ITTO guidelines. The ITTO is now enhancing cooperation with several regional, international and UN organizations and agencies, notably ASEAN, FAO, the World Health Organization (WHO), ADB and World Bank to jointly develop fire policy and management capabilities and strengthen the local capabilities. Inputs from the fire science community and the Global Fire Monitoring Center (GFMC) ensure that guiding recommendations and technical projects are based on updated state of research and development.

2. Activities of the ITTO in Forest Fire Management

2.1 Fire Inventory of the 1982-83 Fire Episode in Indonesia

Forest fire was identified as a major problem by the International Tropical Timber Council (ITTC) since it started operational activities in 1986. Indeed a small mission was undertaken in 1987 to Indonesia to examine the extent and ecological and economic consequences of the fires of 1982-83 which burned more than 5 million ha on the Indonesian and Malaysian territories of Borneo.

The findings of the project revealed that on the mapped study area of 4.7 million ha the total burned area was 3.2 million ha (thereof rain forest damaged by fire: 2.7 million ha). The loss of timber values amounted to ca. US\$ 8.3 billion, and the total loss of timber and non-timber values and rehabilitation costs was estimated at US\$ 9.075 billion. The project is summarized by Schindele (1989) and Goldammer et al. (1996); see also complete list reports in the list of ITTO references.

2.2 Rehabilitation of Fire-Damaged Dipterocarp Forests

As a consequence of the fire inventory of 1988-89 a project entitled *The Establishment of a Demonstration Plot for Rehabilitation of Forests Affected by Fire in East Kalimantan* (PD 84/90 [F]) was initiated in 1992 in Samboja, East Kalimantan in co-operation with a local research institution under the Ministry of Forestry. The project aimed at developing a methodology for rehabilitating forest areas damaged by fire, study its natural succession, and establish a demonstration area for research and training purposes. The project's outputs include:

- *Detailed experimental design of forest inventory for areas affected by fire and related classification of degree of degradation;
- *Technical Guidelines on proposed silvicultural options for rehabilitating such forests devastated by fire depending upon degree of degradation;
- *Detailed growth and yield data of the stands after various silvicultural treatments; and

- *Systematic analysis of volumes and distribution of natural and planted species in the forest areas affected by fire.

In continuation of this ITTO project which was finalized in 1994 the project "Promotion of Sustainable Forest Management Systems in East Kalimantan" (SFMP) - a cooperation between the Indonesian Ministry of Forestry and Estate Crops and Germany (through the German Agency for Technical Cooperation - GTZ) launched a special component addressing the problem of rehabilitation of fire-damaged forests (von Gemmingen 1998). The purpose of this new component of SFMP is on a pilot basis, to assist forest enterprises (private and state-owned), and local people to implement the necessary steps to rehabilitate fire-affected forests and to integrate them into their management systems. In addition to this, applied technology is being further developed in selected fields as well as with the Forest Research Institute of Samarinda (FRIS) in a demonstration plot for future dissemination.

The continuation of the ITTO project through joint German-Indonesian sponsorship demonstrates the ability of various agencies and international donors to collaborate and to add sustainable values to tropical forest protection projects.

2.3 Integrated Forest Fire Management Project in Indonesia

In January 1992, ITTO conducted a consultative mission to Indonesia to identify priorities and initiate an integrated forest fire management system. The resulting project ***Integrated Forest Fire Management in Indonesia: Phase I -- National Guidelines on Forest Protection Against Fire*** (PD 12/93 Rev.3 [F]), is currently being implemented in collaboration with the Directorate General of Forest Protection and Nature Conservation of the Ministry of Forestry and the Bogor Agricultural University. The project co-financed by the ITTO and the Common Fund for Commodities has engaged local and international consultants to develop a draft of national Guidelines on integrated forest fire management. In the process it involved intensive consultations among the national institutions involved and two international workshops. The first workshop was held in 8 and 9 December 1997 in Bogor (ITTO 1998), while the second workshop will be convened in March 1999.

The project also reviewed and developed the following draft publications:

- *Appropriate mission and organizational structure of central forest fire management organization
- *A fire incident monitoring and reporting system
- *A national network for communication on forest fire
- *National standard on forest fire equipment
- *A national forest fire prevention education programme with the involvement of local people
- *A national and regional coordination guide to prevent and suppress forest fire involving related agencies and local people

In addition, reports on the following issues are under preparation:

- *Social-economic aspects of forest fire
- *Traditional shifting cultivation system
- *Rehabilitation of forests degraded by fire

The National Guidelines for Indonesia are expected to be finalized in early 1999.

2.4 ITTO Guidelines on Fire Management in Tropical Forests

Pursuant to a Decision of the International Tropical Timber Council, 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 (ITTO 1997a,b). The Guidelines contain 29 Principles and recommended actions: 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 Utilization, and Training and Public Education.

The synthesis of the ITTO Guidelines is as follows:

2.4.1 Scope

Since the very beginning it was recognized that these Guidelines would have to address a wider range of issues than just the suppression of wildfires in tropical forests. The guidelines were subsequently "upgraded" to address issues at a fire management level rather than protection only. This improvement has increased the value of its contents.

The Guidelines target tropical timber producing countries which have decided to develop fire management programmes but have little experience in this area. To this end, the global community will benefit from the success of such efforts.

It must be understood that all of the recommended actions listed in these Guidelines will not necessarily be implemented in any one country. Some may be very necessary in some countries; whilst unnecessary and/or impossible to implement in others.

The ability of any given country to finance a recommended action was not a consideration in preparing these guidelines. If an action was deemed to be necessary to accomplish a goal, it was presented with the understanding that it might be beyond the present means of some countries. Other countries may have that same problem, and have the financial means to implement the recommended actions. While proposing the necessary measures and actions, it is hoped that other, more affluent countries, could be brought into the effort to help fund such necessary actions.

The Guidelines contain 29 principles, with each principle containing several relevant recommended actions. Eight appendices were included in the Guidelines.

2.4.2 Policy and Legislation

Broad-based support from all sectors of society is the main issue concerning policy and legislation. Given that in most tropical timber producing countries, the government assumes a major role in establishing the framework within which a fire management programme would have to operate, the emphasis of the Guidelines was directed towards encouraging governments to develop the necessary policies and legislation for such a programme to work. The Guidelines are based on the concept that, when establishing such a programme, persuasion is often more effective than legislation.

The principles and recommended actions presented in this chapter are based on the concept that the resources to be protected are important to all segments of society, and that the population will readily support the required sacrifices which may be necessary.

2.4.3 Strategies

This section provides the foundation for the Guidelines, because it addresses the four main components of a fire management programme:

- "Fire Management Planning,
- "Fire Management Options,
- "Fire Suppression, and
- "The Role of Communities in Fire Protection.

The principles and recommended actions which accompany them, form the basis for the success of any forest fire management programme. It is in performing these tasks that the timber producing countries will have to meet the challenge. If this portion is not carried out appropriately, the entire programme could be at risk of failure.

2.4.4 Monitoring and Research

This chapter of the Guidelines recognizes the fact that a great deal of information is needed before a fire management programme can be established. This information will involve items such as a history of fires, weather variables, fuel modeling, and other data which are unique to the country in which the programme is being developed. Development of models to evaluate damage and losses of burnt areas are also important for establishing fire management programmes.

The proposed recommended actions can be implemented with the cooperation of the global community. Much of the work has already been carried out elsewhere, especially in developed countries; it simply needs to be modified or adapted to the conditions of the countries involved.

2.4.5 Institutional Framework and Capacity Development

Four principles and a large number of recommended actions are contained in this chapter. This indicates the importance of building a stable foundation upon which to base a fire management programme. The chapter is divided into two sections:

A. Institutional Development.

A fire management programme cannot exist without the institutional structure with which to carry it out. The governments of tropical timber producing nations must establish, staff, and fund the agencies through which they will implement fire management programmes. These agencies must be directed to cooperate and function throughout the entire realm of human interaction, from the top government agencies to the smallest communities. Although the establishment of this structure will be from the top down, its operation must begin at the community level and progress upwards; and

B. Funding and Implementation.

This is an important issue for almost every nation that has tropical forests. Funding for a fire management programme should be high on the priority list. The financial resources of many producer nations are already strained to meet other challenges, and the addition of a fire management programme, no matter how important, may stretch those resources to a breaking point. Because the protection of the tropical forests is an international issue, it is proper to ask that other countries, including those far away from the tropics to cooperate in such efforts.

2.4.6 Socio-Economic Considerations

This Chapter is based on the fact that any programme must meet the needs of people in at least two major areas: their need for financial security, and the security they have grown to expect from their customary life-styles.

Two principles are directed at identifying the need to point out the financial damage resulting from wildfires, and in showing how the prevention of these fires can improve everyone's quality of life. Any economic evaluation of the proposed actions must address both the costs of the programme and their benefits. Ideally, the benefits will outweigh the costs, and the course is clear. In the case of fire management programmes, however, where the costs are fairly easy to tally, the benefits are sometimes difficult to identify properly. This seems to be true even for some of the most valuable benefits. Care must be taken to identify those benefits clearly, otherwise the more easily identifiable costs will heavily influence decisions.

Another two principles address the fact that in many instances, cultural, religious, and traditional values often outweigh financial reasons for dealing with wildfires, and that these same values tend to complicate the solutions. The recommended actions suggest ways of exploiting these values to the advantage of the fire management programmes. Emphasis is placed on consulting with local leaders and women in a community in order to obtain their perspectives on the problem.

2.4.7 Land Resources Management and Utilization

Two major forces are at work in tropical forests that affect fire management. These are forest management (including the management of other land-based resources), and forest utilization. Methods used in each of these disciplines strongly affect on how a fire management programme is designed and carried out. In addition to these categories, we recognize that there are long-standing, and other more recently developed "other uses", to which tropical forests are subjected to. It is also important to remember that savannas and grasslands are important ecosystems, usually interrelated with forest lands, and therefore a fire management plan must take them on consideration.

2.4.8 Training and Public Education

This chapter addresses the fact that, for any programme to work, there are a number of people who will have to be trained and informed about the purpose and process of the programme. In the case of a fire management programme, this includes the managers of the various activities in the forest, as well as the communities in the area. Emphasis should be given to environmental education at primary and secondary school levels.

3. Recent Initiatives

In May 1998, the ITTC adopted a decision to undertake additional initiatives including the dispatch of Missions to affected countries and also to convene a technical consultation at the earliest opportunity in cooperation with all relevant international and national organizations, non-governmental organizations and individual experts. An expert mission was undertaken from 9 to 15 September 1998 in Indonesia and from 16 to 19 September 1998 in Sarawak, Malaysia. The mission report by Chandrasekharan (1998) recommends the following activities by the ITTO:

- *Assistance for preparing national forest fire plan
- *Rehabilitation planning for fire affected forest areas
- *Pilot demonstration and practical training in forest fire management
- *Community participation in forest fire management
- *Manuals covering aspects of forest fire management (for ASEAN countries)
- *Support for selected components of capacity building
- *Integrated Forest Fire Management for eastern Indonesia (Maluku, Irian Jaya)
- *Expand into the scope of model forest management in Sarawak to include FFM.
- *Support to and collaboration with national, regional and global initiatives on technology development, and building strategic partnerships with relevant agencies.

The mission concluded:

The land and forest fires that ravaged large areas of Sumatra and Kalimantan in 1997 and East Kalimantan in 1998 have added new urgency to the issue of forest fire prevention and management. The emergency caused by the forest fires, and the associated transboundary haze problem, are now over. The damages and negative impacts caused by the fire events are considerable and

their scars remain. Investigations carried out so far on relevant causes, consequences and constraints provide reasonable insight into the serious lapses of the past and the potential fire threats looming over the future. Actions are urgently required to avoid further recurrence of the devastation from forest fires, and also the complacency and lack of compliance as in the past. There is considerable interest to address the situation on the part of international community, which need to be channelled in a coordinated manner; and new assistance needs to be sought for bridging vital gaps. ITTO should play its mandated role to provide needed support.

Furthermore it was planned that ITTO, in cooperation with JICA and other interested bodies, convene this "International Cross-Sectoral Forum on South-East Asia Forest Fire Management" with the following scope:

- *Examine the report by the Mission undertaken in Indonesia and Malaysia focusing on:
 - -the extent and causes of forest fires during 1997-1998, and
 - -national and international initiatives being undertaken;
- *Assess various measures on prevention, detection, fire-fighting and remedial measures;
- *Discuss training needs and public education campaigns;
- *Assess the applicability of the ITTO Guidelines on Fire Management in Tropical Forest and other relevant initiatives; and
- *Develop a draft ASEAN Integrated Action Plan for Forest Fire Prevention and Management.
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4. Collaboration with other International Initiatives

The ITTO acknowledges and is appreciative of the work being undertaken by various organizations and bodies in forest fire management; prevention, detection, fire-fighting and remedial measures. WHO, UNEP, FAO, and the World Bank, among others, are undertaking similar initiatives. The ITTO seeks to fully work together and cooperate with these organizations including national and non-governmental organization in the field of forest fire management to ensure the conservation, management and sustainable development of tropical forests. The main international activities are described briefly in the following:

As a consequence of the 1997-98 events several international initiatives were taken by the UN and other institutions. One of the major issues was the problem of human health affected by smoke from vegetation fires. The World Health Organization (WHO) reacted immediately by calling for an international expert team to write the *WHO Health Guidelines on Episodic Vegetation Fire Events* (Schwela 1998). At the time of writing this paper these guidelines are still being finalized (publication expected in early 1999). The guidelines summarize the state of knowledge on the effects of air pollution from vegetation burning on human health and safety.

4.1 Envisaged Activities of the FAO

In October 1998 an expert consultation on *Public Policies Affecting Forest Fires* was convened by the Food and Agriculture Organization of the United Nations (FAO). Based on five reports which analyzed the role of public policies on fire occurrence and fire management in the regions Asia-Pacific, Europe and temperate-boreal Asia, Africa, the Americas, and the Mediterranean the objectives of the consultation were to

- *identify, analyze and discuss the public policies which contribute to forest fires
- *collate information from institutions dealing with forest fires
- *produce recommendations on planning and policies for fire prevention, control, mitigation, rehabilitation measures
- *provide a strong message to member countries through FAO (as neutral forum) on policy issues related to fire

- *suggest actions to be taken by countries through a statement to the forestry ministers who will meet in Rome in March 1999.

Conclusions of the expert consultation on "Public Policies Affecting Forest Fire"

The present situation of national policy development in response to wildfires and land-use fires is often of *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, such as 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 seldom based on reliable data or information on the implications of 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, arising from 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 involvement of all stakeholders in policy formulation and development.

Conclusions and recommendations to member countries regarding the principles for policies for sustainable land or forest use related to the reduction, mitigation and control of wildfires and the use of prescribed fires

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. But there exist certain broad principles common to all situations and objectives, which 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.

Land-use policies may have to consider the need for appropriate incentives and subsidies to promote fire prevention.

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;
- *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 in order 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 accumulated 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 FAO and international organisations

There are many international organisations, including FAO, other UN-agencies and NGOs, involved in forest fire-related activities at global and regional levels. Continued and improved collaboration and co-ordination 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 harmonised 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 respond to outbreaks at national, regional and global levels.

FAO and other international organisations should play a catalytic role in the establishment of networks, to promote the sharing of information and knowledge and technical co-operation 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 impact on forest fires (e.g. road alignments, power lines).

Technical assistance, from FAO or other international organisations, is still required, particularly in institutional support and capacity-building.

Development of Guidelines

At the FAO consultation "Public Policies Affecting Forest Fires" the regional group Europe and Temperate/Boreal Asia it was clearly recognized 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."

4.2 UN International Decade for Natural Disaster Reduction (IDNDR)

On 11 December 1987 at its 42nd session, the General Assembly of the United Nations designated the 1990's as the International Decade for Natural Disaster Reduction (IDNDR). The basic idea behind this proclamation of the Decade was and still remains to be the unacceptable and rising levels of losses which disasters continue to incur on the one hand, and the existence, on the other hand, of a wealth of scientific and engineering know-how which could be effectively used to reduce losses resulting from disasters.

The UN World Conference on Natural Disaster Reduction which was part of a mid-term review of Decade activities, was held in Yokohama (Japan), 23-27 May 1994. The UN-FAO/ECE/ILO Team of Specialists used the opportunity to express its views on global fire to the IDNDR (Goldammer 1994).

In 1997 close links were established between the IDNDR Secretariat in Geneva and the Global Fire Monitoring Center. In July 1997 the GFMC was entrusted with the formation of a ***Working Group Fire and Related Environmental Hazards*** of the IDNDR Early Warning Programme. The recommendations of the report which was submitted to IDNDR in 1997 (Goldammer 1997d; see also GFMC website) were incorporated into the Report of the UN Secretary General

"Improved effectiveness of early-warning systems with regard to natural and similar disasters".

Recommendations by the IDNDR Early Warning Working Group on Fire and Other Environmental Hazards

In accordance with the conclusions and recommendations given by the various international initiatives, the IDNDR Early Warning Working Group on Fire and other Environmental Hazards comes to the following recommendations for priority activities:

- i) A global fire inventory must be designed and implemented, producing a first-class product in the very near future, in order to provide a basis for early warning systems. Subsequently, this product then must be improved for standardized application over the next decade.

Fire inventory data is necessary to provide the basic inputs into the development of a future relational (geo-referenced) global fire database within the proposed Global Vegetation Fire Information System (GVFIS). FAO should take the initiative and coordinate a forum with other UN and non-UN organizations working in this field, including various scientific activities of the International Geosphere-Biosphere Programme (IGBP) and the mechanisms of the Intergovernmental Panel on Climate Change (IPCC).

- ii) A timely process to gather and share real-time information about ongoing wildfire situations on a global basis is required.

This follows a proposal to create the World Fire Web in which a network of centres with facilities to receive and process fire observation data from satellites will be connected via the World Wide Web (WWW). Through the World Fire Web scientists, managers, and policy makers can have instant access to local, regional and world data so that they can exchange experiences, methods and trouble-shoot with each other. The World Fire Web, in conjunction with the space borne evaluation of vegetation dryness, fire-weather forecasts and the possibility of forecasting fire danger and fire behaviour may provide a powerful early warning and disaster preparedness and management tool at national, regional and global scales. The information network should include the resource status by continuously monitoring the disposition of suppression resources. This includes the location and status of individual resources as well as potential availability for inter-agency and international mobilization.

- iii) Technology transfer and information exchange on early warning and fire management decision support systems must be provided through international collaborative agreements or technical assistance programmes. Such programmes must support countries in fire-prone regions of the tropics and subtropics where advanced fire management systems are not yet fully available.
- iv) The development of space borne sensor technologies devoted to the specific tasks of recognizing wildfire disaster precursors, fire activities, and the impacts of fire (ecological, atmospheric, chemical) must receive high priority.
- v) Additional fire research is needed in those locations where existing early warning systems cannot be applied due to the particular relationships between vegetation, local/regional weather and prevailing socio-economic or cultural conditions which contribute to wildfires and their secondary damages, such as atmospheric pollution.

South East Asia is one of the less explored regions in which fire research must receive adequate attention as proposed by the ASEAN Transboundary Haze Pollution initiative as well as by the IGBP global-change oriented science programmes. These include the South East Asian Fire Experiment (SEAFIRE) and the SARCS Integrated IGBP/IHDP/WCRP Study on Land-use Change in Southeast Asia.

- vi) Policies and agreements on environmental protection at international levels should ensure that in the implementation of Agenda 21 for forests, due attention is given to forests fires in relation to arrangements that may be developed to harmonize and promote international efforts to protect the world's forests.
- vii) ***The suggestion of ITTO to establish a UN-sponsored facility for global fire research and management is endorsed to facilitate the development of the proposed Global Vegetation Fire Information System. This is considered essential in order to provide support on request to any nation in early warning, prevention, management and mitigation of wildfire disasters.***

4.3 The Global Fire Monitoring Center

It evident that in many countries of the developing world the state of scientific and technical knowledge is either not known or readily accessible for developing

adequate measures in fire policies and management. The fire and smoke episode of 1997-98 in South East Asia was a good example that existing fire information systems or fire management expertise was utilized to a limited extent only. These circumstances led to confusion at national and international decision-making levels and led to the delay of response by a series of national and international projects, some of them even missing the targets. This can be explained by the lack of an information system which is accessible globally.

Consequently, an information and monitoring system was needed which national and international agencies involved in land-use planning, disaster management or in other fire-related tasks can utilize for planning and decision making.

The ***Global Fire Monitoring Center (GFMC)*** has been established in June 1998 in accordance with the

- *Objectives of the UN International Decade of Natural Disaster Reduction (IDNDR)
- *Recommendations of the ITTO Guidelines on Fire Management in Tropical Forests, and
- *Recommendations of various scientific and policy conferences in the field of fire, e.g. the FAO/ECE/ILO Conference "Forest, Fire and Global Change" (Russia 1996)

For its first phase the GMFC is sponsored by the government of Germany, Ministry of Foreign Affairs, as a German contribution to the IDNDR. The fire documentation, information and monitoring system is accessible through the Internet:

- <http://www.uni-freiburg.de/fireglobe>.

The GFMC is established at the Fire Ecology and Biomass Burning Research Group of the Max Planck Institute of Chemistry, Germany. Since the begin of the 1990s the Max Planck Institute has been responsible to design, coordinate, organize and partially implement several international fire research campaigns under the umbrella of the International Geosphere-Biosphere Programme (IGBP). The institute is chairing the scientific steering committee of the fire science component within the IGBP (the Biomass Burning Experiment [BIBEX]) and hosts the BIBEX Secretariat, located at the GFMC.

Since the early 1990s the Fire Ecology Research Group in addition has taken the lead in the UN system through its role as coordinating unit of the UN-FAO/ECE/ILO Team of Specialists on Forest Fire. The UN team serves the

UN agencies and all other national and international partners in providing information and links in the field of global fire. Since 1988 the UN Team is publishing the UN International Forest Fire News (IFFN) which is distributed to nearly 1000 agencies, institutes, libraries and individuals worldwide. Starting in 1998 the IFFN is globally accessible via the GFMC Internet website.

Furthermore, the Fire Ecology Research Group is convener of the IDNDR Early Warning Programme Working Group "Fire and Related Environmental Hazards".

Following the principles which were developed for a scientific Global Vegetation Fire Information System in the early 1990s, the Global Fire Monitoring Center will document archived and provide real-time or near-real time information related to fire. This will include the interlinking with other national, regional and international information systems.

The GFMC is co-sponsored by several international and national organizations:

UN-ECE Trade Division: The UN FAO/ECE/ILO Team of Specialists on Forest Fire, an activity of the UN-ECE Trade Division, Timber Section (Geneva), is the main co-sponsor at the UN level. The leader of the team is identical with the head of the GFMC. The UN-ECE fire team produces the IFFN which provides the core of archived fire documentation.

International Decade of Natural Disaster Reduction (IDNDR): The UN decade has already agreed to be co-sponsor and put its logo on the homepage of the GFMC. The GFMC directly contributes to the overall IDNDR objectives, particularly within the frame of the IDNDR Early Warning Programme.

The International Union of Forestry Research Organizations (IUFRO):
Through the IUFRO Subject Group S8.05-00

The International Boreal Forest Research Association (IBFRA):
Through the Fire Working Group

The International Geosphere-Biosphere Programme (IGBP): Through the International Global Atmospheric Chemistry (IGAC) Project, the Biomass Burning Experiment (BIBEX)

The U.S. Bureau of Land Management (BLM): As financial sponsor of the UN-FAO/ECE International Forest Fire News

4.4 Economic Commission for Europe (ECE) and the UN-FAO/ECE/ILO Team of Specialists on Forest Fire

One of the main activities of the Economic Commission for Europe (ECE) in the field of forest fires in the periodic collection and publication of fire statistics of the member states and the establishment of the FAO/ECE/ILO Team of Specialists on Forest Fire.

The fire statistics are collected and evaluated by the UN-ECE Trade Division, Timber Section, Geneva. The statistic include all Western and Eastern European countries, countries of the former Soviet Union, the U.S.A. and Canada. The last data set covers the period 1994-96: For more information see:

<http://www.unece.org/trade/timber/ff-stats.html>.

As a result of reduced secretariat resources, countries members of the Joint FAO/ECE/ILO Committee on Forest Technology, Management and Training, have taken the challenge to undertake more work themselves, by entrusting to Teams of Specialists several of its activities, especially those where specific expertise is required. The Team of Specialists on Forest Fire was reorganized in 1993.

The team's main task is to provide a critical link in communication and cooperation between fire scientists, managers and policy makers. The main activities embrace (1) the production of International Forest Fire News (IFFN), (2) organization of seminars, and (3) promote synergistic collaboration between governments, non-government institutions, and individuals.

International Forest Fire News

International Forest Fire News (IFFN) is published bi-annually since 1988. It initiated a steadily increasing communication process in international fire matters. Since then IFFN provides an international information platform on which advances in fire research, technology and policy development are reported and disseminated. Currently the printed version of IFFN is subscribed by ca. 1,000 agencies, research laboratories and individuals all over the world. Starting with its 19th issue (August 1998) the IFFN is available on the homepage of the Global Fire Monitoring Center. This includes all past issues (since 1988) which are organized into country files and several other special files.

5. Conclusions and Outlook

It can be concluded from this summary review of activities of international organizations in the field of forest fire management that the ITTO has taken a lead role in assisting tropical countries to identify and manage their forest fire problems. The most challenging task is still ahead: The transfer of scientific knowledge, policy concepts and philosophies - including the ITTO fire guidelines - into operational, implementable and sustainable systems.

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