

Forest Fire Problems in South East Europe and Adjoining Regions: Challenges and Solutions in the 21st Century

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Abstract

The demographic, socio-economic and political changes in many countries of Southeast Europe and its adjoining regions have resulted in an increase of wildfire occurrence, destabilization of fire management capabilities and increased vulnerability of ecosystems and human populations. The causes of increasing occurrence of wildfires in forests and other wildlands, including the underlying reasons for increasing human-caused fires, vary within the region. Main reasons include (1) the transition from centrally planned to market economies, (2) national to regional conflicts, creation of new nations, involving political tensions and war, (3) land-use changes, and (4) regional climate change towards increase of extreme drought occurrence. New solutions are required to address the increasing fire threat. Cooperation in fire management between the South East European countries, particularly on the Balkan, is essential to overcome the economic constraints and to improve political relationships between the governments and friendship between people in the region. A proposal is made for setting up a Regional Wildland Fire Network which will be part of a worldwide network under the auspices of the United Nations and the Global Fire Monitoring Center (GFMC).

1. Rationale: Towards International Cooperation in Managing Forest Fire Disasters in the Mediterranean Region and Adjoining South East Europe

Growing concern about the trend of increasing vegetation destruction by fire application and wildfires has led to a number of international cooperative initiatives in wildland fire science, management and policy development. In the 1990s a number of international and interdisciplinary fire research programmes contributed to a better understanding of the impacts of fire on ecosystems, biogeochemical cycles, atmosphere and climate. The development and improvement of the utilization of operational spaceborne sensors for wildland fire early warning, detection, monitoring and impact assessment resulted

in enhanced capabilities to obtain detailed and comprehensive information on the extent of wildland fires occurrence and consequences. A large number of bilateral technical cooperation projects in fire management between the industrial and developing countries have resulted in an increasing expertise in technology transfer and methodologies to address local target groups and approaches in fire management. However, the worldwide fire crisis during the El Niño episode of 1997-98 and a number of large fire disasters on the Balkan, in the Mediterranean Region, North America, Europe, Australasia and Africa between 1998 and 2001 revealed that an international wildland fire network was needed for facilitating information sharing and wildland fire disaster assistance. The Global Fire Monitoring Center (GFMC) was founded in 1998 in the aftermath of the Southeast Asian fire and smoke crisis as an activity of the UN International Decade for Natural Disaster Reduction (IDNDR). The GFMC mobilized an international expert pool that was organized in a "Working Group on Wildland Fire" within the United Nations Interagency-Task Force for Disaster Reduction, UN International Strategy for Disaster Reduction (ISDR) (1). The Working Group, through the GFMC, is facilitating the establishment of a global network of "Regional Wildland Fire Management Networks". These regional networks will consist of a number of dedicated regional activities or sub-nets, e.g. wildland fire early warning, monitoring, information (data) management, science, fire management, and national to multilateral cooperative policy development. It is envisaged to activate regional networks or regional precursor initiatives in preparation of the 3rd Global Wildland Fire Conference and Summit (Sydney, Australia, 2003). The Balkan countries and the countries bordering the Mediterranean Basin are currently involved to set up multinational to regional cooperation programmes that would be candidate arrangements to build up a Regional Mediterranean Wildland Fire Management Network.

2. Introduction

Fire is the most important natural threat to forests and wooded areas of the Mediterranean basin and its adjoining neighbour nations in South East Europe. Unlike other parts of the world, where a large percentage of fires are of natural origin (lightning), the Mediterranean basin is marked by a prevalence of human-caused fires. Paradoxically, the fundamental cause of forest fires is linked to increased standards of living among the local populations. Far-reaching social and economic changes in Western Europe have led to a transfer of population from the countryside to the cities, a considerable deceleration of the demographic growth, an abandonment of arable lands and a disinterest in the forest resource as a source of energy. This has resulted in the expansion of wooded areas, erosion of the financial value of the wooded lands, a loss of inhabitants with a sense of responsibility for the forest and, what is important, an increase in the amount of fuel (2).

A recent regional situation analysis published in the frame of the FAO Global Forest Fire Assessment 1990-2000 (3) reveals that the average annual number of forest fires throughout the Mediterranean basin is close to 50 000. In those countries where data have been available since the 1950s, a large increase in the number of forest fires can be observed from the beginning of the 1970s: Spain (from 1 900 to 8 000), Italy (from 3 000 to 10 500), Greece (from 700 to 1 100), Morocco (from 150 to 200) and Turkey (from 600 to 1 400).

The average annual accumulated area burned by wildfires for the Mediterranean countries is approximately 600 000 ha. This number is also almost twice as much as during the 1970s. The trend observed is, however, much less uniform than for fire numbers.

Table 1 gives an overview on recent fire statistical data of the Mediterranean countries and its neighbours in SE Europe collected by the GFMC from various national and international sources.

Table 1. Fire statistical data of the Mediterranean countries and its neighbours in SE Europe. Source: GFMC.

Country	Time period	Average number of fires	Average area burned, ha
Albania	1981-2000	667	21 456
Algeria	1979-1997	812	37 037
Bulgaria	1978-1990	95	572
	1991-2000	318	11 242
Cyprus	1991-1999	20	777
Croatia	1990-1997	259	10 000
France	1991-2000	5 589	17 832
Greece	1990-2000	4 502	55 988
Israel	1990-1997	959	5 984
Italy	1990-1999	111 163	118 576
Lebanon	1996-1999	147	2 129
Morocco	1960-1999	n.a.	2 856
Potugal	1990-1997	20 019	97 175
Romania	1990-1997	102	355
Slovenia	1991-1996	89	643
Spain	1990-1999	18 105	159 935
Turkey	1990-1997	1 973	11 696

The example of Bulgaria shows that an explosive increase of wildland fires have affected the country around the turn of the century. Why is this so?

The trend of increasing fire occurrence, fire damages and fire severity is a consequence of the changing rural and urban space due to the economic transition. Unprecedented numbers of catastrophic fires and areas affected by fire have been observed in the South East European countries due to the following reasons:

- Traditional, centrally managed structures for forest fire protection have been replaced by decentralized structures that are not prepared or equipped to manage the fire problem. Lack of advanced knowledge and technology support for fire management (creation of numerous new independent states).
- People are abandoning the agricultural sector (rural exodus), especially young people move to towns, resulting in an over-aging of rural populations. Consequently there is a sharp decrease in people available for fire fighting in the countryside.

- Economically motivated arson, e.g. for land speculation (construction of buildings) or for obtaining permits to cut and sell fire-damaged timber, and lack of spatial planning of structures, esp. in the wildland/urban interface (development of tourism).
- Increasing fire hazard due to a decrease of land-use intensity (less biomass is utilized through agricultural use, pastoralism, and for households, e.g. cooking and heating). As a consequence wildland fires are more intense and more difficult to control.
- Decreasing general interest of the urbanized public in the protection of forest against fire and a lack of coordination between states in SE Europe.

The policies adopted until recently have given priority to firefighting (and the preparations for related activities, i.e. pre-suppression) to the detriment of efforts aimed at prevention or control. Paradoxically, in some areas, successful prevention efforts have resulted in an increase of fuel loads and therefore an increase of the risk of more severe wildfires that will be difficult to control.

Policies affecting wildland fires are numerous and many of them are beyond the direct control of the forest sector. National and international politics that influence political changes and create tensions, unrest, and war, and policies that determine rights of ownership and use of land, employment, urbanisation and agricultural subsidies all have an impact on wildland fires. It is in these areas that a "solution" to the forest fire problem may be found.

3. International Cooperative Approaches in Forest Fire Management

On 26 November 1993 a Workshop on Forest Fires was held in the European Parliament, Brussels, Scientific and Technological Options Assessment (STOA) (4). The STOA programme is the official organ for the evaluation of scientific options of the European Parliament. It provides scientific and technical advice to the members and the commissions of the European Parliament. The project "Forest Fires in Europe" was devoted to closely investigate the fire problem of Southern Europe on a political level. The meeting revealed that proposals to overcome the deficiencies of cooperation and coordination within and between the Mediterranean nations are abundant. Two main points were raised to highlight the crucial weaknesses of Mediterranean fire protection. First, it was stated that there are the internal problems within the nations. These are largely caused by the splitting of responsibilities in wildfire prevention and control between a variety of agencies involved, resulting into weakening of the efficiency of national fire management capabilities. Second, there is still a lack of joint, multinational efforts in sharing fire management resources. Thus, it was concluded that in the early 1990s Mediterranean Europe was still suffering by national boundaries and administrative competition (5).

In the 1990s, however, a large number of EU-funded forest fire research projects had been launched and successfully implemented, including projects on fundamental fire research, fire monitoring, early warning and definition of a common terminology (6, 7).

The spirit of cooperation through these multinational European research projects received support by a number of initiatives that called for sharing fire management resources between European countries. These initiatives included the recommendations by the following international expert meetings and conferences:

- Euromediterranean Wildfire Meetings 2000, Hyères, France, 24-27 October 2000 (8)
- FAO/ITTO International Expert Meeting on Forest Fire Management (FAO, Rome 7-9 March 2001) (9)

- International Conference "Forest Fires 2001: Operational Mechanisms, Firefighting Means and New Technologies" organized by the Ministry of Public Order (Athens, Greece, 13-16 March 2001) (10, 11)

A number of currently ongoing processes are highlighted below that demonstrate the willingness of the European Mediterranean countries and their neighbours to improve the cooperation in fire management and mutual fire emergency support.

3.1 Conference on Management of Forest Fire Emergencies and International Cooperation in the Eastern Mediterranean, Balkans and adjoining Regions of the Near East and Central Asia (Turkey, April 2003)

The Eastern Mediterranean Region, including the Balkan countries, the ECE member states of the Near East and Central Asia, and other neighbouring countries of Central Asia, e.g. Mongolia and China, have recently suffered major forest and other wildland fire problems. The causes of an increasing occurrence of wildfires in forests and other wildlands, including the underlying reasons for increasing human-caused fires, vary within the region and are due to:

- transition from centrally planned to market economies
- national to regional conflicts, creation of new nations, involving political tensions and war
- increasing population growth and land-use pressure
- regional climate change towards increase of extreme droughts

It has been recognized that no regional activity is underway to establish cooperation in wildland fire management, including wildland fire science.

Rationale

Several reasons support the idea for holding a regional conference. First, the Balkan countries, some of them being in a post-war situation and under reconstruction, as well as the South Eastern European countries which are still in economic and political transition, have not participated in recent activities of the ECE/FAO Fire Team of Specialists on Forest Fires and other international wildland fire research and development projects. Second, the neighbouring countries of Turkey, such as the Caucasus states, Iran, Turkmenistan, Uzbekistan, and Kazakhstan, have been quite isolated from recent scientific and technological developments in fire management. Third, the fire problems in Mongolia and northern China, and to a limited extent in Afghanistan, call for cooperation with the ECE region.

From the point of view of the ECE/FAO/ILO Team Specialists on Forest Fire (12) and the Global Fire Monitoring Center (GFMC) (13), which coordinates the work of the team in the ECE region and keeps close contacts with non-ECE countries, the countries listed above deserve full attention and support to bring them into the family of the international community of forest fire scientists, managers and policy makers.

Objectives of the Conference

The regional conference will possibly be conducted jointly with a regional exercise on forest fire management entitled: "Eastern European, Near East and Central Asian States

Exercise on Wildland Fire Information and Resources Exchange - EASTEX FIRE 2003" (the exercise has not yet been confirmed at time of finalizing this paper).

The objectives of the conference are to:

- Provide (a) a forum in the Eastern Mediterranean, Balkan and adjoining Regions of the Near East and Central Asia, (b) prepare mechanisms for information and resources exchange in forest and other wildland fire management within the region, including the establishment of partnerships for joint activities in fire research, training and policy development, and (c) prepare proposals to governments and international organizations of the region to establish mechanisms for sharing resources in large fire emergencies in accordance with existing international procedures.

In addition to the regional focus on the Eastern Mediterranean, Balkan and adjoining regions of the Near East and Central Asia the conference will:

- Compile an ECE-wide database on fire management capabilities in order to support the overall objectives of the conference and to facilitate international cooperation in management of fire emergencies;
- Conduct EASTEX FIRE 2003 (to be confirmed) - a bi-lateral or multinational fire-fighting exercise in which cooperation of ground and aerial fire fighting forces of two or more countries (to be determined) of the Eastern Mediterranean, Balkan and adjoining regions of the Near East and Central Asia, including participation of commercial wildland fire suppression operators, will be exercised.

The conference objectives are in line with the scope of work and recommendations of various international organizations including:

- the Global Fire Monitoring Center (GFMC) (13);
- the ECE/FAO/ILO Team of Specialists on Forest Fire (12);
- the Interagency Task Force for Disaster Reduction of the United Nations Strategy for Disaster Reduction (ISDR) and its Working Group on Wildland Fire (WG-4 under the ISDR Inter-Agency Task Force for Disaster Reduction) (1);
- the FAO, in accordance with the recommendations of the fire expert consultations on "Public Policies affecting Forest Fires" (1998) and "FAO/ITTO International Expert Meeting on Forest Fire Management" (2001) (9, 14);
- the United Nations Office for the Coordination of Humanitarian Affairs (UN-OCHA) and its joint UNEP Environment Unit, Emergency Services Branch (15);
- the United Nations International Search and Rescue Advisory Group (INSARAG) (16, 17);
- the European Commission in the frame of the Mediterranean Disaster Information Network (MEDIN) and the overall scope of the Global Disaster Information Network (GDIN) International (18, 19);
- the European Council in the frame of the European Open Partial Agreement (EUR-OPA);
- the International Institute for Disaster Risk Management (DRM) and the World Bank Disaster Management Facility (DMF) with its ProVention Consortium on Technological and Natural Disasters (20); and
- the World Health Organization (WHO) and the World Meteorological Organization (WMO) (21, 22).

The ECE member states and other invited countries will be invited to present "Country Profiles" that will be discussed and processed during the meeting to build a database on site during the conference.

3.2 Europe-Africa Fire Management Initiative of the UN International Search and Rescue Advisory Group (INSARAG)

Until recently the mandate of the International Search and Rescue Advisory Group (INSARAG) of the United Nations has focussed to the "classical" SAR cases such as saving lives after earthquakes (16). However, experience has shown that secondary effects of natural and technogenic disasters require additional specialist advice in conjunction with SAR response and other humanitarian aid missions. The INSARAG family offers an appropriate structure.

At a regional INSARAG Europe-Africa meeting in December 1999 (Germany) a first proposal was elaborated to establish an INSARAG Fire Group consisting of three elements (17):

- Wildland Fire
- Hazardous Materials (Hazmat)
- Industrial Fire

At a meeting at the UN Office for the Coordination of Humanitarian Affairs (UN-OCHA) in January 2000 it was agreed that the original mandate of INSARAG which in addition to search and rescue would also covers wider aspects of disaster/emergency response. This could include a variety of natural and human-made disasters, including wildland fires. INSARAG would assist in strengthening UN-OCHA's role by:

- Governmental experts advisory support in case of a major emergency
- Advisory experts to be provided out of the INSARAG family covering many fields of disaster relief

At the 5th INSARAG Regional Europe-Africa Conference (Hammamet, Tunisia, November 2000) the establishment of the *Working Group Fire* was formally decided. The terms of reference of the group include:

- Implementation of fire and HAZMAT topics into the INSARAG Guidelines as required
- Establishment of a database of human resources, equipment, information sources, evaluation of missions
- Facilitation of continuous exchange of information through the Internet, initially utilizing the OCHA Relief Web and other homepages and networks such as GFMC
- Support OCHA/UNEP by providing expertise and knowledge of its members

Between December 1999 and the Hammamet Regional INSARAG Conference the GFMC facilitated the work of the provisional Fire Group, including its participation at BALTEX FIRE 2000. In February 2001 it was agreed between the joint UNEP-OCHA Environment Unit, Emergency Services Branch, and the GFMC to cooperate in the frame of agreed interface procedures. In future the INSARAG Wildland Fire Subgroup may operate at the interface between the UNEP-OCHA Environment Unit, Emergency Services Branch, the GFMC and INSARAG (consultation process is ongoing at the time of finalizing this paper).

3.3 EUR-OPA Major Hazards Agreement

Within the frame of the European Open Partial Agreement on the Prevention of, Protection Against and Organization of Relief in Major Natural and Technological Disasters (EUR-OPA Major Hazards Agreement) (23) the 8th Ministerial Meeting (Athens, February 2000) supported the proposal of Greece to establish a European Centre at the General Secretariat for Civil Protection in Athens for coordination in the area of preventing and combating forest fires, to be a focal point of a network bringing together the main participants in the area, at both national and European level.

Using the new communication and information technologies, this focal point will collect useful data in order to facilitate cooperation in the area of preventing and combating fires.

On the occasion of a meeting held at the General Secretariat for Civil Protection on 8 March 2002, the participants presented the proposal to create a European structure on Forest Fire Management that will have the coordination function of a network of national structures officially in charge of management of forest fires, ensuring:

- Continuity in the partnership and programs
- Strengthening the cooperation between EU and the other countries of Europe and the Mediterranean basin
- Working in a decentralised way using new technologies of information and communication, e.g. Electronic Discussion Groups for Risk Management EDRIM (24)
- Facilitating the setting up and use of specialised databases concerning forest fires purposes
- Proposing training programs on forest fires using existing national facilities and distant educational systems
- Playing a role of "mediation" in cooperation with the EU Joint Research Centre (JRC) in the system of help for decision making for risk management in the framework of EUR-OPA Major Hazards Agreement.

The Euro-Mediterranean Fire Network will be created under the umbrella of the General Secretariat for Civil Protection. A Euro-Mediterranean board will be set up representing all national structures participating in the network as well as competent international and European organizations, and an executive secretariat in charge of the implementation of the program will be appointed by the General Secretariat for Civil Protection. Activities are initiated in 2002. Following a proposal of the Council of Europe the Global Fire Monitoring Center (GFMC) through its global network of "Regional Wildland Fire Networks" will cooperate with this initiative.

3.4 The Mediterranean Disaster Information Network (EU-MEDIN)

An Expression of Interest for "Integration and Networking of Natural Disasters Studies in Europe" within the 6th EU Framework Programme has been submitted by a number of European institutions in June 2002. The envisaged project will be the initial core activity to build the Mediterranean Disaster Information Network (EU-MEDIN) (19). EU-MEDIN represents the European contribution to the Global Disaster Information Network (GDIN-International). GDIN International is an initiative of the US State Department to foster rapid and improved emergency assistance in the event of natural and technological disasters (18).

The proposed project seeks to make major advances in the development of integrated approaches to disaster mitigation and management. The purpose of EU-MEDIN is to develop and maintain and sustain a European infrastructure and network for integrated disaster research and for the dissemination of disaster-related information to research and user communities, in order to improve disaster preparedness, early warning, communication, rapid exchange of data and knowledge. A series of integrated risk assessment and risks management research projects, which draw on the multi-disciplinary and multi-hazard character of the proposal, are considered an essential and integrating part of the proposed activities. EU-MEDIN will seek not only to generate new research results, but also to make the body of existing European disaster research available. This will be achieved by developing web services that will provide the "backbone" to the network of researcher, operational users and a key means of dissemination of results, methods, tools, case studies, dataset, recommendations, etc. The project places emphasis on natural hazards that have significant impact on Europe. Forest fires are a key issue in the proposed structure. The Global Fire Monitoring Center (GFMC) will provide the information and communication tools for fire early warning, monitoring, data archiving and distribution, and technology and science transfer.

3.4 A Proposal: The South East European Fire Management Network (SEEFIRE)

Among the areas supported by the EU INTERREG IIIB programme is the Central Adriatic Danubian South-Eastern European Space (CADSES) (25). CADSES is a region that has faced a number of natural and human-made disasters with transnational dimension over the last decades. The nuclear fallout of Chernobyl nuclear power plant, flooding and poisoning of several rivers like the Danube, the eutrophication of the upper Adriatic sea, and border-crossing forest fires have received high transnational public attention. To a large extent concepts for the prevention of disasters are focused at the national level.

Those disasters causing high damages and losses of human lives demonstrate that measures for risk prevention are transnational tasks. Large forest fire situations often exceed national response capabilities. Forest fires and other wildland fires are often crossing national borders.

Consequently, plans of action are to be drawn up on a transnational and regional basis for risk management in areas threatened by disasters. Existing risks should be reduced by specific regional development policies and land use measures (e.g. agriculture, forestry, urban planning, recreation and water supply). Coherent and comprehensive transnational strategies and programmes should be elaborated for the whole functional area defining the instruments required for and the costs arising from the implementation of the proposed measures.

Within the Priority Area 4 "Environment Protection, Resource Management and Risk Prevention" a preliminary proposal has been submitted by the Global Fire Monitoring Center (GFMC) in June 2002 to promote cooperative transboundary wildland fire risk management and prevention of disasters under the "South East European Fire Management Network" (SEEFIRE). Envisaged participating countries include Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Hungary, the Former Yugoslav Republic of Macedonia, Romania, Serbia and Montenegro, and Slovenia.

The SEEFIRE Network will be developed to address the problem of wildland fires (forest fires and fires in other vegetation types) that are increasingly observed in the SE European transition countries.

Within Priority 4 "Promoting risk management and prevention of disasters" SEEFIRE will establish an interactive network of institutions of all countries listed below that are involved in the prevention and control of wildland fire. The network will support the transnational cooperation by facilitating the exchange of information and data in the field of early warning, monitoring and management of wildland fires, including transnational cooperation in fire management and improve the integration of fire protection plans in spatial planning. It will provide the basis for the implementation of spatial development plans.

SEEFIRE will take advantage of existing projects that address the fire problem at national levels.

SEEFIRE, logistically supported and coordinated by the Global Fire Monitoring Center (GFMC) as a module, will:

- Improve the prevention of forest and vegetation fire disasters at transnational level by facilitating bilateral and transnational communication (harmonize communication and information flow and procedural matters; e.g., incident command systems);
- Assist the set-up of early wildland fire warning systems (satellite sensors);
- Address the challenge of spatial dynamic (rural migration and urbanization), which increase the fire risk; and
- Provide inputs for the elaboration of transnational programs on risk management in areas threatened by fire disasters.

The module will have the advantage to draw experiences from previous initiatives and projects, e.g., Balkan Federation of Firefighting Services or the NATO / Euro-Atlantic Disaster Response Co-ordination Centre (EADRCC) Regional Forest Fire Exercise in Croatia, May 2002 (cf. below).

3.5 Euro-Atlantic Disaster Response Coordination Centre (EADRCC) of the North Atlantic Treaty Organization (NATO)

Since the early 1990s the Global Fire Monitoring Center (GFMC) and its predecessor institution, the Fire Ecology Research Group, has cooperated with the NATO Scientific Affairs Division (26-30).

The Euro-Atlantic Disaster Response Coordination Centre (EADRCC) was created in 1998 as the focal point for coordinating disaster relief efforts of the 46 Euro-Atlantic Partnership Council (EAPC) nations in case of natural or technological disasters within the EAPC geographical area (31). The forest fire community is linked through the websites of the GFMC and the EADRCC (32).

For the first time a large multinational forest fire exercise has been conducted in May 2001 under the auspices of EADRCC. The field exercise "Taming the Dragon - Dalmatia 2002" (33) was a Croatian contribution to the Partnership Work Programme (PWP) and was primarily conducted as a PWP Euro-Atlantic Disaster Response Coordination Centre (EADRCC) and Euro-Atlantic Disaster Response Unit (EADRU) activity. It also involved other existing networks and organizations such as the Disaster Preparedness and Prevention Initiative (DPPI) of the Stability Pact, the United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA) and the South East Europe Group (SEEGROUP). The GFMC supported the exercise (34).

4. Conclusions and Outlook

Within a relatively short period between 1999 and 2002 the countries of the European Union and several international consortia involved in forest fire management, in conjunction with its neighbouring regions, have taken the initiative to push the development and partially the realization of concepts for cooperative projects in forest fire management, disaster networking and research devoted to improve common capabilities in fire disaster response. Under the light of the increasing hazard and risks of forest fires and other wildland fires in the region, the limited financial capabilities of the countries concerned as well as the large total length of common borders this development is overdue. It is hoped that the various initiatives will develop synergistic mechanisms for cooperation and sharing of human, technological and information resources.

In this context the Mediterranean countries are urged to systematically develop bilateral and multilateral cooperation agreements for fire emergency management such as those between Bulgaria and its neighbour countries, or between Greece and Albania.

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