International Cooperation in Wildland Fire Science and Management under the UNISDR Global Wildland Fire Network and the Regional Caribbean Wildland Fire Network

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Abstract

Over the past decade, many regions of the world have witnessed a growing trend of excessive fire application in land-use systems and land-use change, and an increasing occurrence of wildfires of extreme severities. Some of the effects of wildland fires cross borders, for example smoke pollution and its impacts on human health and safety, loss of biodiversity or site degradation at landscape level leading to desertification or flooding. The depletion of terrestrial carbon by fires burning under extreme conditions in some vegetation types, including organic terrain in peatland biomes, is one of the driving agents of disturbance of global biogeochemical cycles, notably the global carbon cycle. This trend is stirring the international community to address the problem collectively and collaboratively. In 1998 the Global Fire Monitoring Center (GFMC) was founded with the objective to provide an international portal for wildland fire monitoring, early warning and a clearing house for worldwide wildland fire data and information sharing. Mandated by the United Nations International Strategy for Disaster Reduction (UN-ISDR) the GMFC began to facilitate the establishment of the Global Wildland Fire Network which is operating primarily through Regional Wildland Fire Networks and the UN-ISDR Wildland Fire Advisory Group. Currently the GFMC / GWFN are supporting the preparation of the 4th International Wildland Fire Conference (Sevilla, Spain, 13-17 May 2007) in which the GWFN representatives recommend further steps for enhancing international cooperation in wildland fire management.

1. RATIONALE FOR SETTING UP REGIONAL WILDLAND FIRE NETWORKS

In many vegetation types of the world, the application of fire in agriculture and pastoralism and the occurrence of natural wildfires (natural fire regimes) are established (sustainable) elements in traditional land-use systems, natural ecosystem processes and biogeochemical cycles. However, excessive application of fire associated with rapid demographic and land-use changes in some regions, leads to destruction of productivity, reduction of carrying capacity and biodiversity of the vegetation cover. In some ecosystems, e.g. in the tropical montane forests, lowland rain forests and in forest plantations, wildfires burning under extreme weather conditions have detrimental impacts on economies, human health and safety, with consequences which are comparable to the severity of other natural hazards. Climate variability, such as periodic extreme droughts and extremely wet periods

caused by the El Niño-Southern Oscillation (ENSO) phenomenon and the associated La Niña episode, contribute to the severity of fire impacts. Fires are also leading to secondary natural disasters such as landslides and floods, downstream of fire-denuded landscapes.

Fire management strategies which include preparedness and early warning cannot be generalized due to the multidirectional and -dimensional effects of fire in the different vegetation types and the large variety of cultural, social, and economic factors influencing them.

However, unlike the majority of the geological and hydro-meteorological hazards, wildfires represent a natural but predominantly human-influenced hazard which can be predicted, controlled and, in many cases, prevented.

The current state of wildland fire science and atmospheric sciences research of the last two decades potentially provide sufficient knowledge for fire management decision support and development of policies affecting the occurrence and consequences of human-caused fires. However, in many countries or localities in Africa, the requisite knowledge is either lacking or is not readily accessible for developing adequate measures in fire policies and management.

In response to the strategic goals of the UN Convention on Combat of Desertification (CCD), Convention on Biological Diversity (CBD), and the UN Framework Convention on Climate Change (UNFCC), the Ramsar Convention on Wetlands, the UN Forum on Forests (UNFF), the Millennium Declaration of the UN General Assembly, and the objectives of the work of the Global Fire Monitoring Center (GFMC) and the World Conservation Union (IUCN), the UN-ISDR Inter-Agency Task Force for Disaster Reduction in 2001 established a Working Group on Wildland Fire. This Working Group was coordinated by the GFMC.

One of the priority fields addressed by the Working Group on Wildland Fire was the establishment of, and operational procedures for, a global network of regional- to national-level focal points and network structures for early warning of wildland fire, fire monitoring and impact assessment, aimed at enhancing existing global fire monitoring capabilities and facilitation of international cooperation in fire management.

2. HISTORY, *MODUS OPERANDI*, STATUS AND VISIONS FOR BUILDING THE REGIONAL WILDLAND FIRE NETWORKS

2.1 History

In keeping with the work of the Working Group on "Fire and Related Environmental Hazards" established under the IDNDR programme on Early Warning, the presentations and recommendations of the IDNDR Programme Forum 1999, and in accordance with the Framework for the Implementation of the International Strategy for Disaster Reduction (ISDR), the World Conservation Union (IUCN) and its associated partner, the Global Fire Monitoring Center (GFMC) as well as the UN-

FAO/ECE/ILO Team of Specialists on Forest Fire, suggested, in 2000, to create an interagency "Working Group on Wildland Fire".

This proposal was in line with several declarations made in international conferences during the last five years and is intended to bring together both the technical members of the fire community and the authorities concerned with policy and national practices in wildland fire management to realise their common interests of fire risk management and disaster reduction at global scale. The Inter-Agency Task Force for Disaster Reduction (IATF) at its second meeting on 11 October 2000 agreed to establish the Working Group on Wildland Fire (Working Group 4 [WG-4]).

Through the Working Group it was envisaged to establish an interagency and inter-sectoral forum of UN and other international agencies and programmes, and mechanisms of information and task sharing in the field of reducing the negative impacts of fire on the environment and humanity.

One of the priority fields of activity to be addressed by WG-4 was:

> *Establishment of, and operational procedures for, a global network of regional- to national-level focal points for early warning of wildland fire, fire monitoring and impact assessment, aimed at enhancing existing global fire monitoring capabilities and facilitating the functioning of a global fire management working programme or network.*

At the 2nd meeting of WG-4 (3-4 December 2001) it was decided to give priority to the establishment of the "Global Network of Regional Wildland Fire Networks".

It was aimed to build regional networks on existing formal or informal networks structures and initiatives. The "Global Wildland Fire Network" would consist of a set of Regional Networks that are in place or will be initiated during the process of formation. A regional network may consist of several subnets or cooperative activities, e.g. in wildland fire science, fire monitoring, early warning, management or policy development.

2.2   Endorsement by the International Wildland Fire Summit

The envisaged timeframe for setting up the network was January 2002 - July 2003. The 3rd Global Wildland Fire Conference and the International Wildland Fire Summit (Sydney, 3-6 and 8 October 2003) was used as a platform to convene representatives from regional networks.

The strategy agreed by the Summit ("Strategy for Future Development of International Cooperation in Wildland Fire Management") includes the following agreement:

> *"The Regional Wildland Fire Networks will be consolidated, developed and promoted through active networking in information sharing, capacity building, preparation of bilateral and multilateral agreements, etc. This process will be facilitated through regional Wildland Fire Conferences and*

Summits in cooperation with the International Liaison Committee and the UN-ISDR Working Group on Wildland Fire".

For details of the preparation and outcomes of the International Wildland Fire Summit see:
http://www.fire.uni-freiburg.de/summit-2003/introduction.htm

2.3   Formation of the UN-ISDR Wildland Fire Advisory Group

As a side event of the International Wildland Fire Summit a meeting was held with the regional fire management groups mandated under the auspices of the UN (ISDR Working Group on Wildland Fire, ECE/FAO/ILO Team of Specialists on Forest Fire, Fire Management Working Group, FAO North American Forestry Commission [NAFC] and the Forest Fire Group of FAO *Silva Mediterranea*). This was the first joint meeting of the four UN groups. A key output of the joint meeting was the recommendation to maintain a body under the auspices of the UN to enable the international community to maintain a unifying platform for the UN and jointly with non-UN groups and agreements.

The recommendation to maintain an advisory body for the UN must be understood i.a.w. the constitution of the IATF and the expected lifetime of a Working Group of ca. two to three years. Following these rules of the IATF the Working Group 4 on Wildland Fire finished its work by end of 2003 and transited to an active outreach programme, the Global Wildland Fire Network (GWFN). To support the work of the GWFN the IATF accepted the proposal to create a **Wildland Fire Advisory Group** (WFAG) under the auspices of the ISDR. The WFAG represents an advisory body to the UN system aimed at providing technical, scientific and policy-supporting advice to the UN family through the International Strategy for Disaster Reduction (UN-ISDR) and the IATF, and acting as a liaison between the United Nations system, the Global Wildland Fire Network and its supporting partners. The participation and support from following bodies is essential: UN agencies and programmes, other international organizations, non-government organizations, notably the IUCN-TNC-WWF Global Fire Partnership, government agencies, inter-governmental institutions and agreements, civil society, academia, the International Liaison Committee (ILC) of the series of International Conferences on Wildland Fire and the Global Fire Monitoring Center (GFMC) (to act as convener and secretariat).

The "Work Programme for the IATF for 2004" reflects the overall intent to work together in the Global Wildland Fire Network and the Wildland Fire Advisory Group. This programme includes a table in which the outcomes and follow-up arrangements for the four Working Groups are summarized (see Table 1).

In the transition stage from WG-4 to the WFAG the GFMC continued to facilitate the dialogue and direct interaction between the partners involved. The GFMC continues working through the IATF as a member and representative of civil society, ensuring appropriate information flow from the Global Wildland Fire Network to the ISDR Secretariat and the IATF, and providing advisory support required for the mandate of the IATF.

On 3-4 December 2004 the first meeting of the WFAG was convened at the GFMC (Freiburg, Germany). The objectives were the following:

- Constitutional: Reflect on the outcomes of the work of the former ISDR-IATF Working Group on Wildland Fire (WG-4) related to global wildland fire issues; define WG-4 transition to and *modus operandi* of WFAG, including membership with regional representation of the Global Wildland Fire Network
- Global situation assessment: Report on key issues on wildland fire in the regions of the Global Wildland Fire Network, notably the results of the consultations of the Regional Wildland Fire Networks in 2004; key scientific and other thematic issues.
- Technical: Thematic presentations and discussions on
  - Participation of Regional Wildland Fire Networks and GOFC / GOLD in the Global Forest Fire Assessment
  - Review of a proposed international standard for statistical reporting of wildland fires, including the FAO Forest Resources Assessment 2005 (FRA 2005)
  - The role of the United Nations University in capacity building in advanced wildland fire management
  - Innovative technologies for remote sensing of wildland fires and fire impacts
- Roadmap for 2005-2007
  - Evaluation of the regional consultations in 2004 and the GFMC/ISDR/FAO "Framework for the Development of the International Wildland Fire Accord" (May 2004)
  - Formulation of a recommendation of the WFAG / Global Wildland Fire Network for the Development of the International Wildland Fire Accord, directed to the FAO and UNFF Ministerial Meetings (March 2005 / May 2005), and the UN World Conference on Disaster Reduction (WCDR), Japan, January 2005
  - Initial discussion about the role of wildland fire and fire management in the implementation of the Kyoto Protocol
  - Discussion on the participation of the Global Wildland Fire Network at the 4th International Wildland Fire Conference (Sevilla, Spain, 13-17 May 2007)

Results of the discussions and the recommendations to the ministerial meetings can be found on the website of the Global Wildland Fire Network:
http://www.fire.uni-freiburg.de/GlobalNetworks/RationaleandIntroduction.html

Table 1 Extract of the final version of the *"Work Programme for the IATF for 2004"* released by the ISDR Secretariat on 23 November 2003

WG focus 2001-2003	Outcome end of 2003	Follow-up arrangements- 2004
WG4: Wildland Fire, chaired by: the Global Fire Monitoring Center (GFMC)	International dialogue on cross-cutting wildland fire issues fostered at UN inter-agency level and with international organizations and civil society	Formation of a **Wildland Fire Advisory Group** under the auspices of the ISDR-IATF and GFMC
	Establishment of Regional Wildland Fire Networks, including inter-regional cooperation	ISDR / IATF endorsement and support of the **Global Wildland Fire Network** (*IATF information updates to be provided*)
	GFMC-ISDR global wildland fire information system, web portal and pragmatic outreach to user community consolidated (including dedicated journal and book publications) <www.gfmc.org>	Cooperation with the ASEAN Center for Emergency Response and Strategic Planning for Environmental Disasters
	Support of preparation, facilitation and implementation of the first International Wildland Fire Summit (October 2003), including preparation of the Summit paper *Strategy for Future Development of International Cooperation in Wildland Fire Management*	ISDR / IATF endorsement of the outcomes of the **International Wildland Fire Summit**. Preparation of a **Global Wildland Fire Summit under the auspices of the UN**, i.a.w. recommendations by the 2003 Summit (tentatively in 2005-2006)

2.4 FAO Ministerial Meeting on Forests and 17th Session of the FAO Committee on Forestry (COFO)

The Ministerial Meeting on Forests held at the FAO, Rome, 14 March 2005, attended by more than 120 countries, released a statement in which the need for international cooperation in wildland fire management was stressed. The ministers agreed to

> **call on** *FAO, in collaboration with countries and other international partners, including the International Strategy for Disaster Reduction, to develop a strategy to enhance international cooperation on wildland fires, that advances knowledge, increases access to information and resources and explores new approaches for cooperation at all levels,*

Following the Ministerial Meeting on Forests, the 17th Session of the Committee on Forestry (COFO) was held in Rome, 15-19 March 2005. International cooperation in wildland fire management was discussed in several sessions. The main recommendations in the final report include:

28. The Committee further noted that fire management was a national responsibility. It called on FAO to facilitate enhanced international cooperation on forest fires and <u>requested</u> FAO, in collaboration with countries and other international partners, including the United Nations International Strategy for Disaster Reduction, to develop a strategy to enhance international cooperation on wildland fire. It noted that the template for international cooperation in wildland fire management, as presented at the International Wildland Fire Summit in Australia in 2003, could be used by countries wishing to cooperate in this area.
35. The Committee also <u>recommended</u> that FAO should inform the fifth session of the United Nations Forum on Forests of the importance attached by the Ministerial Meeting on Forests and by the 17th Session of the Committee to international cooperation on forest fire management.

SHAPING AN ACTION PROGRAMME FOR FAO IN FORESTRY *(Item 9)*

53. The Committee <u>recommended</u> that FAO continue its support for regional and national networks to combat fire as well as insects and disease, in collaboration with relevant organizations such as the United Nations International Strategy for Disaster Reduction and the Global Wildland Fire Network, and further <u>requested</u> that FAO work with partners to develop voluntary guidelines on the prevention, suppression and recovery from forest fire.

Both documents can be downloaded at:
http://www.fire.uni-freiburg.de/GlobalNetworks/RationaleandIntroduction.html

Between September 2005 and April 2006 FAO was supported by an international core group of experts to implement the recommendations of the Ministerial Meeting and COFO-17. The group prepared a draft "Fire Management Code" and the draft "Global Strategy to enhance International Cooperation to facilitate Implementation of the Fire Management Code". These two documents will be consolidated by the FAO Expert Consultation on Fire Management to be held in Madrid, Spain, 10-12 May 2006. After the revision and acceptance by COFO-18 (March 2007) the two documents will be submitted to the 4th International Wildland Fire Conference (Sevilla, Spain, 13-17 May 2007) where representatives of the Regional Wildland Fire Networks, countries and international organizations will be asked to discuss and endorse this voluntary international cooperative and collective process.

3. MODUS OPERANDI OF THE GLOBAL WILDLAND FIRE NETWORK

On behalf of the ISDR the Global Fire Monitoring Center (GFMC) is facilitating the functioning of the Global Wildland Fire Network by supporting the establishment or consolidation of Regional Wildland Fire Networks and enhancing inter-regional communication and cooperation.

The GFMC liaises with existing operational and proposed international networks and institutions, notably:

- FAO Forestry Department
- UN-mandated regional teams (ISDR Wildland Fire Advisory Group, ECE/FAO/ILO Team of Specialists on Forest Fire, Fire Management Working Group of the FAO North American Forestry Commission (NAFC), Forest Fire Group of FAO *Silva Mediterranea*)
- The secretariats of the three Rio Conventions (UNCDB, UNCCD, UCFCCC)
- United Nations University, Institute for Environment and Human Security (UNU-EHS); on 7 October 2005 UNU and GFMC signed an agreement in which the GFMC was appointed as an UNU Associated Institute
- Global Observation of Forest Cover - Global Observation of Landcover Dynamics (GOFC-GOLD) Fire Implementation Team (a subset of the Global Terrestrial Observing System - GTOS)
- Advisory Group on Environmental Emergencies (AGEE) and the Joint Environment Unit of the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) and the United Nations Environment Programme (UNEP)

The Regional Wildland Fire Networks may consist of focussed subnets or will be complemented by any other topical network. The harmonization with the objectives and efforts of other independent networks is desired. The regional Fire Implementation Teams of the Global Observation of Forest Cover - Global Observation of Landcover Dynamics (GOFC-GOLD) will play a key role in the formation and operational functioning of the Wildland Fire Monitoring Networks (see: http://www.gofc-fire.umd.edu/).

4. STATUS OF THE REGIONAL WILDLAND FIRE NETWORKS

Regional Networks are formed in two ways. First, independent regional initiatives that were in place before 2001-2002 and after have been contacted and encouraged to become connected to the Global Wildland Fire Network. Second, a number of activities are being initiated in those regions where no such regional efforts are in place. The following information is taken from the website of the Global Wildland Fire Network:
http://www.fire.uni-freiburg.de/GlobalNetworks/globalNet.html

Regional Subsahara Africa Wildland Fire Network
The Regional Subsahara Wildland Fire Network ("Afrifirenet") was the first regional network that has been launched formally. On 3 July 2002 the network was kicked-off at its first official meeting held in the frame of the Wood for Africa Conference (Pietermaritzburg, South Africa). As of early 2004 more than 70 representatives from 13 African countries have registered as members of the network. An Advanced Wildland Fire Management Course (a Joint UN Inter-Agency Training Course with participation of UNEP, FAO and the United Nations University, Institute for Environment and Human Security [UNU-EHS]) for the SADC Region, sponsored by the German Foreign Office, Office for the Coordination of Humanitarian Assistance, has been held in Nelspruit, South Africa, 31 May - 5 June 2004. At the training course the Wildland Fire Management Training Handbook published by the GFMC was launched publicly. Between 30 October and 12 November 2004 a joint

FAO/GFMC/UNU-EHS Training Course for Instructors in Community-Based Fire Management (CBFiM) for Subsahara Africa was held in Nelspruit, South Africa. Together with Working on Fire (WoF) – one of the official partner organisations within Afrifirenet aiming at implementing Integrated Fire Management in South Africa – two training courses "Intermediate and Advanced Incident Command System" were held in South Africa in 2005 and 2006. A website for the regional network has been established on the GFMC information system at:
http://www.fire.uni-freiburg.de/GlobalNetworks/Africa/Afrifirenet.html
Working on Fire (WoF) website: www.workingonfire.org

Regional South East Asia Wildland Fire Network
At the World Conference on Land and Forest Fire Hazards (Kuala Lumpur, Malaysia, June 2002) two significant events paved the road for improving cooperation in fire management within the ASEAN (Association of South East Asian Nations) region and at international level. Building on almost a decade of cooperation in reducing the impacts of smoke-haze from land-use fires on the region the signing of the legally binding ASEAN Agreement on Transboundary Haze Pollution (10 June 2002; meanwhile ratified and entered into force on 25 November 2003) constitutes a multinational agreement for cooperation in fire management. At the ASEAN Senior Officials for Environment (ASOEN) Haze Technical Task Force meeting (10 June 2002) and the subsequent ASEAN Ministerial Meeting on Haze (11 June 2002) it was recommended that the ASEAN nations work together with the GFMC to liaise the activities within ASEAN ("South East Asian Wildland Fire Network") into the Global Wildland Fire Network. The ASEAN Secretariat will serve as a regional network coordinator.

The last Haze Technical Task Force (HTTF) meeting and the 11th ASEAN Ministerial Meeting on Haze has been held back to back with the First Meeting of the COP to the Haze Agreement, 8-11 November 2004, Hanoi, Viet Nam. The Meeting noted the ongoing initiatives to develop the International Wildland Fire Accord. All ASEAN countries participated at the FAO Ministerial Meeting on Forests. In May 2006 a "Conference on Promoting Partnerships for the Implementation of the ASEAN Agreement on Transboundary Haze Pollution" will be held in Ha Noi Viet Nam. Partner countries and organizations are called for partnerships for the implementation of the Agreement. The GFMC will participate at the conference on behalf of the Global Wildland Fire Network.

Starting in May 2003 the ASEAN Secretariat initiated the conceptual design of the South East Asia Fire and Haze Information Center (other working title: ASEAN Center for Emergency Response and Strategic Planning for Environmental Disasters). This facility will largely take over the role of the network information system. The regional websites are:
ASEAN Haze Action Online Website: http://www.haze-online.or.id
GFMC Regional Website:
http://www.fire.uni-freiburg.de/GlobalNetworks/SouthEastAsia/ASEAN-FireNet.html

Regional North East Asia Wildland Fire Network
This network includes the participation of the Republic of Korea (South Korea), Democratic People's Republic of Korea (North Korea) (not yet confirmed), Japan and the Far East of the Russian Federation. During the International Wildland Fire Summit the representatives of the Republic of Korea have indicated a strong interest to support the formation of a regional node in South Korea. In November 2003 the Korean Forest Research Institute, Forest Fire Division, made its resources available to build the regional network. A kick-off meeting has been held in Seoul on 6 March 2004. As a follow-up activity a representative of the network stayed at the GFMC in August/September 2004. The 2nd Regional Northeast Asia Wildland Fire Network meeting was held 18 January 2005, Sendai, Japan (in conjunction with the UN World Conference on Disaster Reduction (Hyogo, Kobe, Japan, 18-22 January 2005). An International Symposium on Forest Fire Protection was be held by the National Research Institute of Fire and Disaster, Mitaka, Tokyo, Japan, Tokyo, 30 November - 2 December 2005. During a side event of the network plans for the 3rd regional meeting were consolidated (tentatively end of September 2006 in Khabarovsk, Russian Federation). Regional website:
http://www.fire.uni-freiburg.de/GlobalNetworks/Northeast-Asia/Northeastasia.html

Regional Central Asia Wildland Fire Network
Central Asia and its neighbour countries 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 (1) the transition from centrally planned to market economies, (2) national to regional conflicts, creation of new nations, involving political tensions and war; (3) increasing population growth and land-use pressure, and (4) regional climate change involving an increasing occurrence of extreme droughts. The need has been recognized to initiate regional cooperation in wildland fire management, including wildland fire science. The "ECE/FAO International 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 2004) provided an opportunity to clarify detailed objectives and modus operandi of the networking arrangement. The conference released the "*Antalya Declaration on Cooperation in Wildland Fire Management in the Balkans, Eastern Mediterranean, Near East and Central Asia*". Follow-up discussions were held in Almaty, Kazakhstan, 20-21 July 2004 (participants: Focal Points from Kazakhstan, Russian Federation and GFMC). The GFMC presented the status of the regional network and the Global Wildland Fire Network at the Regional Central Asian Forest Congress "Forest Policy: Problems and Solutions", Bishkek, Kyrgyz Republic, 25-27 November 2004. In the Resolution of the congress the forest services of Kyrgystan, Uzbekistan, Tajikistan and Kazakhstan endorsed the participation in the Global Wildland Fire Network and the support of an international wildland fire accord. The first on-site regional network meeting was held in Irkutsk, Russian Federation, 8 September 2005, in conjunction with the first Central Asia Wildland Fire Management Study Tour. Provisional regional website:
http://www.fire.uni-freiburg.de/GlobalNetworks/CentralAsia/CentralAsia.html
Results of the Antalya Conference with Antalya Declaration:
http://www.fire.uni-freiburg.de/course/meeting/meet2004_05.htm
Regional network meeting in Irkutsk, (8 September 2005):
http://www.fire.uni-freiburg.de/course/meeting/2005/meet2005_06.htm

Regional Australasia Wildland Fire Network
In 1993 the Australian Fire Authorities Council (AFAC) was established to improve the collaboration and co-ordination of efforts between those Australian agencies with a responsibility for the protection of life and property from fire and other emergencies. The membership of agencies from the greater region saw AFAC's name change to the Australasian Fire Authorities Council in 1996. The current membership of AFAC stands at twenty-four full members and eleven associate members. All Australian fire and emergency agencies are full members of AFAC, as is the New Zealand Fire Service. Among the associate members are the Hong Kong Fire Service, Singapore Civil Defence Force and the Papua New Guinea Fire Service, while East Timor, Fiji, Samoa and Tonga are in the process of lodging applications under this membership category. AFAC aims to promote and coordinate activities in fire prevention, management and research through five Strategy Groups.

This regional arrangement offers the most suitable conditions for taking the lead in building the Regional Australasia Wildland Fire Network. This suggested arrangement has been discussed in March 2003 in Melbourne at the occasion of the meeting of the International Liaison Committee (ILC) of the 3rd International Wildland Fire Conference and International Wildland Fire Summit. At the 2004 AFAC meeting (7-9 October 2004, Perth, Australia) AFAC decided to join the Global Wildland Fire Network. For more details see:
AFAC Website: www.ausfire.com
GFMC Australasia Website:
http://www.fire.uni-freiburg.de/GlobalNetworks/Australasia/Australasia.html

Regional Mediterranean Wildland Fire Network
Following the discussions with FAO *Silva Mediterranea* in 2002 the formation of a Regional Mediterranean Wildland Fire Network is practically established under the auspices of this FAO group. A Workshop "Multilateral Assistance Against Forest Fires in the Mediterranean Basin" was held in Zaragoza, Spain, 10-11 June 2003. The objectives of the workshop included to study procedures to coordinate the existing mutual agreements and common legal and logistical tools to make effective, when needed, the multilateral assistance against forest fires within the Mediterranean Basin by sharing resources. A discussion was included about the possible role of the regional network and the GFMC to facilitate this process. The workshop was a preliminary activity to prepare a future Mediterranean conference on Multilateral Assistance against forest fires. Eastern Mediterranean countries participated at the "ECE/FAO International 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 2004). The conference released the "*Antalya Declaration on Cooperation in Wildland Fire Management in the Balkans, Eastern Mediterranean, Near East and Central Asia*". For details see:
http://www.fire.uni-freiburg.de/GlobalNetworks/Mediterrania/Mediterrania.html
Results of the Antalya Conference with Antalya Declaration:
http://www.fire.uni-freiburg.de/course/meeting/meet2004_05.htm
The second seminar on "International Cooperation Programmes for Forest Fire Control in the Mediterranean Region" was held in Zaragoza, Spain, 27 September - 1 October 2004. For more information see:
http://www.iamz.ciheam.org/ingles/incenfor-04-pub-ing.htm

Regional Southeast Europe Wildland Fire Network
The first proposal for the formation of a regional network in SE Europe, particularly on the Balkan, was initially discussed by the Global Fire Monitoring Center (GFMC) in June 2002 to promote cooperation in wildland fire research and management under a "South East European Fire Management Network" (SEEFIRE). Envisaged participating countries included Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Hungary, the Former Yugoslav Republic of Macedonia, Romania, Serbia and Montenegro, and Slovenia. The SEEFIRE Network intended 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. SEEFIRE would establish an interactive network of institutions of all countries listed below that are involved in the prevention and control of wildland fire. At the occasion of the International Scientific Conference "Fire and Emergency Safety During the XXI Century - The Course of Europe" (31 October - 1 November 2002, Sofia, Bulgaria) the GFMC proposed the network formation with representatives of the Balkan Region.

A regional meeting of the International Commission for the Prevention and Extinction of Fires (CTIF) was convened in Bulgaria in February 2004 and discussed the establishment of a Regional Fire Monitoring Center. In March-April 2004 the "ECE/FAO International 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" has been held in Turkey (for details: See Regional Central Asia Wildland Fire Network). The conference provided an opportunity to clarify detailed objectives and modus operandi of the networking arrangement. The conference released the "*Antalya Declaration on Cooperation in Wildland Fire Management in the Balkans, Eastern Mediterranean, Near East and Central Asia*". In the Antalya Declaration Bulgaria offered to host the Regional Fire Monitoring Center. In implementation of the Antalya Declaration Turkey assisted Georgia and Syria in responding to large forest fires in September and October 2004.

On 4-5 April 2005 the Republic of Macedonia hosted the International Technical and Scientific Consultation "Forest Fire Management in the Balkan Region". The conference was sponsored by the UN-ISDR Wildland Fire Advisory Group / Global Wildland Fire Network through its Coordinator and Secretariat, the Global Fire Monitoring Center (GFMC). Funding of the consultation was provided by the German Foreign Office (represented by the GFMC) and contributions by the participating and contributing countries (Albania, Bulgaria, Croatia, Greece, Hungary, Macedonia, Serbia and Montenegro, Turkey). In the meeting it was decided to expand the current focus on the Balkan Region to a "Regional South East European Wildland Fire Network" and invite countries adjoining to the Balkan region to cooperate. The network is jointly co-coordinated by a representative of the wildland fire research community (University of Skopje, Macedonia), a national forest services (Bulgaria, Forest Service) and a national fire service (Croatia, Fire Service). The regional consultation was followed by the "Eastern European, Near East and Central Asian States Exercise on Wildland Fire Information and Resources Exchange - EASTEX FIRE 2005", hosted by Bulgaria, 20-22 April 2005. At the 33rd Session of the FAO European Forestry Commission the network coordinator will propose the development of a Regional Strategy for Cooperation in Wildland Fire Management in

Southeast Europe, to be sponsored by the FAO. The website for the regional Southeast Europe Wildland Fire Network is available at:
http://www.fire.uni-freiburg.de/GlobalNetworks/Balkan/Balkan.html
Results of the Antalya Conference with Antalya Declaration:
http://www.fire.uni-freiburg.de/course/meeting/meet2004_05.htm
Recommendations of the Ohrid Consultation:
http://www.fire.uni-freiburg.de/GlobalNetworks/SEEurope/SEEurope_1.html
EASTEX FIRE 2005 scope and programme:
http://www.fire.uni-freiburg.de/GlobalNetworks/SEEurope/SEEurope_4.html

Regional Baltic Wildland Fire Network
At the Baltic Exercise for Fire Information and Resources Exchange - BALTEX FIRE 2000 (Finland, June 2000) the UN ECE/ECE/ILO Team of Specialists on Forest Fires, through the Global Fire Monitoring Center (GFMC), initiated a communication and coordination process among the countries bordering the Baltic Basin. BALTEX FIRE 2000 was an initiative devoted to strengthen cooperation in forest fire management and transboundary cooperation in large fire disasters between all countries bordering the Baltic Sea. Participants were the nations bordering the Baltic Sea (Estonia, Finland, Germany, Latvia, Lithuania, Norway, Poland, Russia, Sweden) and neighbouring observer countries (Belarus, United Kingdom). The initiative is the starting point for the Regional Baltic Wildland Fire Network structures. On 10 May 2004 a Regional Baltic Wildland Fire Meeting was held in Finland (host: Ministry for Interior, Finland). The conference participants released the *Helsinki Declaration on Cooperation in Wildland Fire Management in the Baltic Region*. One major activity in the Baltic Region is the European Fire in Nature Conservation Network (EFNCN), a networking mechanism in which European Partners cooperate in research and development in cultural and natural history and prehistory of fire, application of prescribed fire in nature conservation and landscape management, and fire ecology. Other active partners include the Pan-European fire research programme FIRE PARADOX (sponsored by the European Commission (2006-2010) and the Forest Fire Commission of the Comité Technique International de Prévention et d'Extinction du Feu (CTIF).
The regional website at the GFMC is:
http://www.fire.uni-freiburg.de/GlobalNetworks/BalticRegion/BalticRegion.html
EFNCN website:
http://www.fire.uni-freiburg.de/programmes/natcon/natcon.htm
FIRE PARADOX website:
www.fireparadox.org

Regional Mesoamerica Wildland Fire Network
Several recent developments indicate the political willingness of nations in Central America and Mexico to share information and resources in fire management. An important regional initiative has been launched by the First Central Mesoamerican Meeting on Forest Fire Protection (*Primera Reunión Mesoamericana de Cooperación en Materia de Protección contra Incendios Forestales*) held in Guatemala City, 8-9 July 2002. This regional meeting was organized in the frame of the project "Prevención y Combate de Incendios Forestales en Mesoamerica" of the "Programa Mesoamericano de Cooperación 2001-2002", launched at the occasion of the 4th Tuxtla regional dialogue. Delegates of Belize, Costa Rica, El Salvador, Guatemala, Honduras, México, Nicaragua and Panamá participated in the meeting. The countries

agreed formally to launch a programme of cooperation which includes sharing of information and resources in fire management as well as in capacity building.[1]

The Mesoamerica Meeting was followed by a meeting in Honduras (*Taller para el Desarrollo de un Plan Estratégico Regional para el Manejo del Gorgojo del Pino y los Incendios Forestales en Centroamérica*, 26-30 August 2002) in which the representatives from Central America developed a strategic plan for fire and bark beetle management in Central America. The momentum created by the Mesoamerican Meeting and the Honduras Strategy is currently coordinated with the *Comisión Centroamericana de Ambiente y Desarollo* (CCAD). A Technical Commission on Forest Fires and Pests has been established under the CCAB/AP.

Based on the Regional Strategic Plan elaborated in Honduras, two workshops were held during 2004 to develop a Regional Programme for Forest Fires and Pests (*Programa Regional de Administración de Plagas e Incendios Forestales*) (26-27 April 2004, Guatemala / 8-9 July 2004, El Salvador). The programme was approved and is receiving financial support from US-AID for the next two years.

Representatives from the Technical Commission on Forest Fires participated at the Foundation meeting of the Regional South America Wildland Fire Network (17 June 2004, Curitiba) (see next paragraph). A timetable for cooperative procedures between the three regions Central America, South America and the Caribbean is given in Table 2.

The Technical Commission on Forest Fires requested the CCAB/AP (17-19 August 2004, El Salvador) to officially create the Regional Centralamerica and Mexico Forest Fire and Pest Network (*Red Regional de Centro América y México de Incendios y Plagas Forestales)* operating under the CCAD.

The recommendations of the network have been presented at the Pan-American Wildland Fire Conference on 23 October 2004, San José, Costa Rica.

At the FAO TCP/RLA/3010 Mesoamerica Subregional Technical Workshop (*Taller Técnico Subregional de Mesoamérica,* 24-26 May 2005, Panama) national fire focal points developed the first draft of the Central American Strategy on Fire Management, 2005-2015 (*Estrategia Centroamericana para el Manejo del Fuego*). During the Technical Commitee on Forestry (*Comité Técnico de Bosques, CTB*) Meeting (21-22 July 2005, Nicaragua) regional forestry directors accepted draft number 4 of the Strategy and requested the focal points to prepare an Action Plan until the next CTB Meeting to be held on 1-2 September 2005 in Costa Rica. Assistance in developing this Action Plan was provided by the Centralamerica Forest

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[1] In June 2003 consultations were held with the Government of Guatemala concerning cooperation between the *Mesoamerican Cooperation Regarding Protection against Forest Fires* and the GFMC. A Memorandum of Understanding was signed by the Mesoamerican Permanent Technical Group on Forest Fires (*Grupo Técnico Mesoamericano Permanente sobre Incendios Forestales*), represented by the President of the Coordinating Council of the *Sistema Nacional de Prevención y Control de Incendios Forestales* (SIPECIF), Guatemala, and Executive Coordinator of the Presidency of Guatemala, and the Global Fire Monitoring Center (GFMC), UN International Strategy for Disaster Reduction (ISDR), Working Group on Wildland Fire, concerning Cooperation in the Global Wildland Fire Network through active participation of the Regional Mesoamerica Wildland Fire Network.

Strategy (*Estrategia Forestal Centroamericana, EFCA*). The final version of the Strategy has been published by CCAD in March 2006.

In the frame of this Strategy it was decided to establish the Fire Management Working Group of Central America (*Grupo de Trabajo Centroamericano para el Manejo del Fuego*) (replacing the Technical Commission on Forest Fires and Pests), which has to be consolidated under the CTB of the CCAD. The Working Group will be integrated by the coordinators of the national fire management programmes of each country (acting as focal points) that need to have the official institutional support of their respective governments. The Working Group will be chaired by the focal point, whose country is holding the temporary presidency of the CCAD and co-chaired by the focal point whose country will hold the temporary presidency in the following period.

Together with the South America and Caribbean Strategies (see below) a Regional Strategy on Cooperation in Wildland Fire Management in Latin America and the Caribbeanwas finalized in a regional meeting in Santiago de Chile, 3-4 November 2005 and will be discussed and adopted by the 24th Session of the Latin American and Caribbean Forestry Commission (Santo Domingo, Dominican Republic, 26-30 June 2006). All materials on the cooperative processes in the Mesoamerica Region are available at:
http://www.fire.uni-freiburg.de/GlobalNetworks/MesoAmerica/MesoAmerica.html
Results and declaration of the Pan-American Wildland Fire Conference:
http://www.fire.uni-freiburg.de/GlobalNetworks/Panamerica/Panamerican-Conference.htm

Regional South America Wildland Fire Network
The United Nations Environment Programme (UNEP) in 2001-2002 proposed the creation of a Latin American initiative in fire management. Although this proposal had not been implemented, several regional institutions have indicated their interest to build a Regional South America Wildland Fire Network. The formation of the network was discussed at a foundation meeting which took place in tandem with the 3rd South American Symposium on Forest Fire Control (3º Simpósio Sul-Americano sobre Controle de Incêndios Florestais), 14-17 June 2004, Curitiba, Brazil, see:
http://www.fire.uni-freiburg.de/c.ourse/meeting/meet2003_14.htm

This foundation meeting was sponsored by the Global Wildland Fire Network (through GFMC), FAO, GOFC-GOLD, The Nature Conservancy (TNC) and the U.S. Forest Service. The recommendations of the Network Foundation Meeting finalized after electronic follow-up discussion by mid of July 2004) have been presented to the participants of the Pan-American Wildland Fire Conference, 23 October 2004 in Costa Rica. This conference was a joint event of the Regional Wildland Fire Networks of South America, Mesoamerica and the Caribbean as well as of the joint meeting of the members of the FAO Forestry Commissions of North America and Latin America / Caribbean. Table 2 indicates the timetable for the network formation process between the Curitiba meeting and the FAO Ministerial Meeting on Forests at which wildland fire was a major agenda item (FAO, Rome, 14 March 2005).

At the FAO TCP/RLA/3010 South America Subregional Technical Workshop (*Taller Técnico Subregional de Sudamérica,* 21-23 June 2005, Curitiba, Brazil) national fire focal points developed the first draft of the South American Strategy on Fire

Management, 2006-2010 (*Estrategia de Cooperación de América del Sur para el Manejo del Fuego*). Together with the Central America and Caribbean Strategies a Regional Strategy on Cooperation in Wildland Fire Management in Latin America and the Caribbean was finalized in a regional meeting in Santiago de Chile, 3-4 November 2005 and will be discussed and adopted by the 24th Session of the Latin American and Caribbean Forestry Commission (Santo Domingo, Dominican Republic, 26-30 June 2006).

The network is co-chaired by PREVFOGO / IBAMA (Brasilia, Brazil), the Federal University of Paraná (Curitiba, Brazil), and the National Forestry Corporation (CONAF), Chile. Information concerning the progress of forming the South America Wildland Fire Network is available on the web:
http://www.fire.uni-freiburg.de/GlobalNetworks/SouthAmerica/SouthAmerica.html
Results and declaration of the Pan-American Wildland Fire Conference:
http://www.fire.uni-freiburg.de/GlobalNetworks/Panamerica/Panamerican-Conference.htm

Regional Caribbean Wildland Fire Network
Following the initial discussions at the foundation meeting of the Regional South America Wildland Fire Network and the Pan-American Wildland Fire Conference in 2004, a FAO TCP/RLA/3010 Caribbean Subregional Technical Workshop (*Taller Técnico Subregional del Caribe)* was held in Santo Domingo, Dominican Republic, 31 May-2 June 2005. Besides a draft proposal for a "Fire Management Cooperation Strategy for the Caribbean 2006-2011" (*Estrategia de Cooperación del Caribe para el Manejo del Fuego*) the national fire focal points agreed to establish the network and request Cuba to take the lead and coordination function. Together with the Central America and the South America Strategies a Regional Strategy on International Cooperation in Wildland Fire Management in Latin America and the Caribbean was finalized in a regional meeting in Santiago de Chile, 3-4 November 2005 and will be discussed and adopted by the 24th Session of the Latin American and Caribbean Forestry Commission (Santo Domingo, Dominican Republic, 26-30 June 2006).. The network is in its foundation stage and will hold a regional meeting in the frame of the Fourth International Symposium on Sustainable Management of Forest Resources (SIMFOR 2006) / First International Workshop on Fire Management, 19-22 April 2006, Pinar del Río, Cuba. A regional website will be built in 2006. Fore the announcement of the next meeting in Cuba see:
http://www.fire.uni-freiburg.de/course/meeting/2006/meet2006_05.htm

Table 2. Timetable of action for the Regional Wildland Fire Management Networks in South America, Central America and the Caribbean

Date / Timeframe	Regional Wildland Fire Networks		
	South America	Central America	Caribbean
July 2004	Establishment of the Initial Working Group	Meeting and consolidation of Central America Network (CCAD/CCAB, Mesoamerica process, Honduras Strategy)	Preparation of network foundation meeting
August 2004	Electronic discussion		
September 2004			
21 Oct 2004 San José, Costa Rica	Regional network meeting	Regional network meeting	
22 Oct 2004 San José, Costa Rica	Morning: Continuation of regional network meeting (parallel to final COFLAC session). Meeting of the International Liaison Committee (ILC) for the preparation of the 4th International Wildland Fire Conference (Madrid 2007) Afternoon: Joint meeting of Regional Wildland Fire Networks (South America, Central America, Caribbean): Mutual information on regional network activities and development of a proposal for the Pan-American Wildland Fire Conference. Separate or joint meeting of the North American network (NAFC Fire Management Working Group - FMWG).		
23 Oct 2004 San José, Costa Rica	Pan-American Wildland Fire Conference: Definition of a Pan-American Action Plan on Cooperation in Wildland Fire Management (with the participation of all four regional networks in the Americas) Results and declaration of the conference: http://www.fire.uni-freiburg.de/GlobalNetworks/Panamerica/Panamerican-Conference.htm		
24 Oct 2004 San José, Costa Rica	Wrap-up meeting of all networks of the Americas and the Caribbean		
Nov 2004 – Feb 2005	Follow-up of the Pan-American Conference: Fundraising, preparation of FAO ministerial meeting	Follow-up of the Pan-American Conference: Fundraising, preparation of FAO ministerial meeting	Follow-up of the Pan-American Conference: Fundraising, preparation of FAO ministerial meeting
14 March 2005	FAO Ministerial Meeting on Forests at which wildland fire will be one of two agenda items		
17 March 2005	The FAO Committee on Forestry (COFO) will discuss the implementation of the recommendations of the Ministerial Meeting		
May / June 2005	TCP/RLA/3010 (C) - Support to the development of a Regional Cooperation Strategy for the Prevention, Control and Combat of Forest Fires		
	South America Subregional Technical Workshop (Curitiba, Brazil, 21-23 June 2005) South American Strategy on Fire Management 2006-2010 Fire Management Working Group of South America, COFLAC	Mesoamerica Subregional Technical Workshop (Panama, 24-26 May 2005) Central American Strategy on Fire Management 2005-2015 Fire Management Working Group of Central America, CCAD	Caribbean Subregional Technical Workshop (Dom. Rep., 31 May-2 June 2005) Fire Management Cooperation Strategy for the Caribbean 2006-2011 Fire Management Working Group of the Caribbean, COFLAC
November 2005	Regional Meeting of Latin America and the Caribbean (Santiago de Chile, 3-4 November 2005) Regional Strategy on Cooperation in Wildland Fire Management in Latin America and the Caribbean (2006-2016)		
26-30 June 2006 Dominican Republic	24th Session of the Latin American and Caribbean Forestry Commission (COFLAC)		

Regional North America Wildland Fire Network
The Fire Management Working Group (FMWG) of the North American Forestry Commission (NAFC) – established in 1961 – represents a regional network which is liaising North America's contribution to the Global Wildland Fire Network.

An initial proposal to formally join the Global Wildland Fire Network has been discussed in March 2003 in Melbourne at the occasion of the meeting of the International Liaison Committee (ILC) of the 3rd International Wildland Fire Conference and International Wildland Fire Summit. The proposal has been endorsed by the Fire Management Working Group (FMSG) in 2004. The representatives of the U.S.A., Canada and México endorsed the participation in the Global Wildland Fire Network at the Pan-American Wildland Fire Conference (23 October 2004). For details on the NAFC Fire Management Working Group see:
http://www.fs.fed.us/global/nafc/fire/aboutus.htm
http://www.fire.uni-freiburg.de/GlobalNetworks/NorthAmerica/NorthAmerica.html
Results and declaration of the Pan-American Wildland Fire Conference:
http://www.fire.uni-freiburg.de/GlobalNetworks/Panamerica/Panamerican-Conference.htm

Regional South Asia Wildland Fire Network
This regional network is currently under construction and most likely will include India, Bangladesh, Nepal, Bhutan and Pakistan. A network foundation meeting is planned for 2006.

Conclusions and Outlook

We have taken the opportunity of the First International Workshop on Fire Management held in conjunction with the Fourth International Symposium on Sustainable Management of Forest Resources (SIMFOR 2006) in Pinar del Río, Cuba, to inform representatives of fire research and management of Cuba and the Caribbean neighbour countries, as well as the participants form outside of the region, about the history and the current status of the Global Wildland Fire Network. On behalf of the Wildland Fire Advisory Group of the United Nations International Strategy for Disaster Reduction (UN-ISDR) we would like to congratulate the hosts and organizers of this workshop to provide an opportunity to share experiences with all participants. We would also express our appreciation that Cuba has been entrusted by the countries of the region and has accepted the work burden to coordinate the work of the Regional Caribbean Wildland Fire Network within the Global Wildland Fire Network.

At the eve of the development of the "Fire Management Code" and the draft "Global Strategy to enhance International Cooperation to facilitate Implementation of the Fire Management Code" – a process that in 2007 may culminate in the acceptance of these important voluntary agreements for international cooperation in wildland fire management – we would like to encourage academic institutions, government agencies and non-government organizations to contribute and to cooperate in this process.
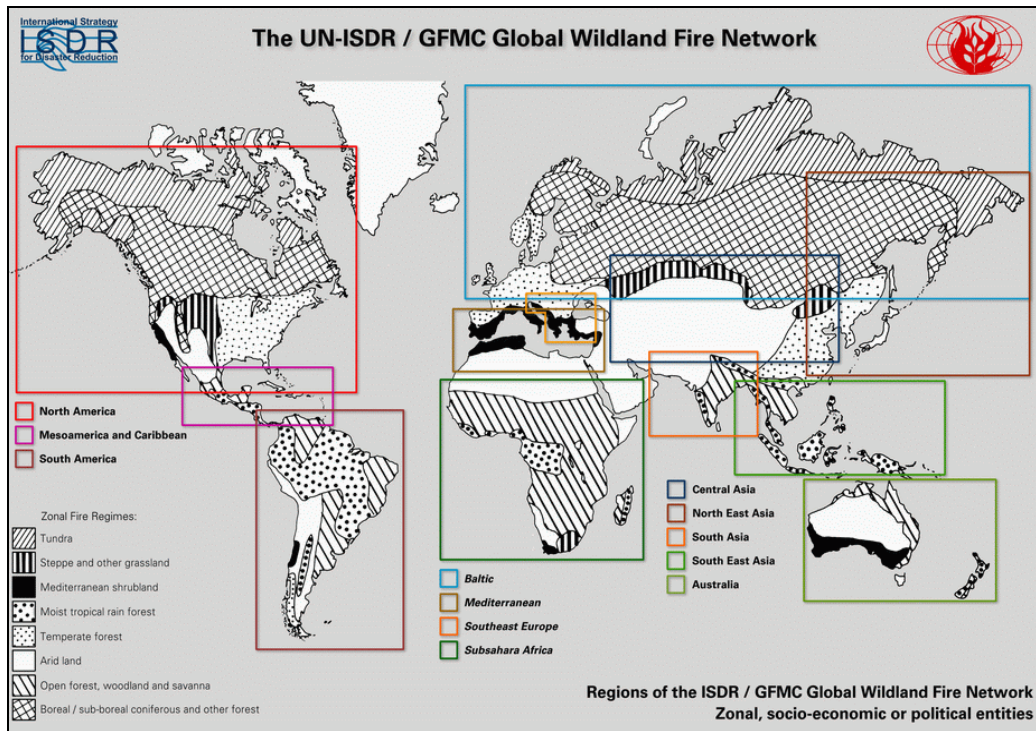
Annex 1

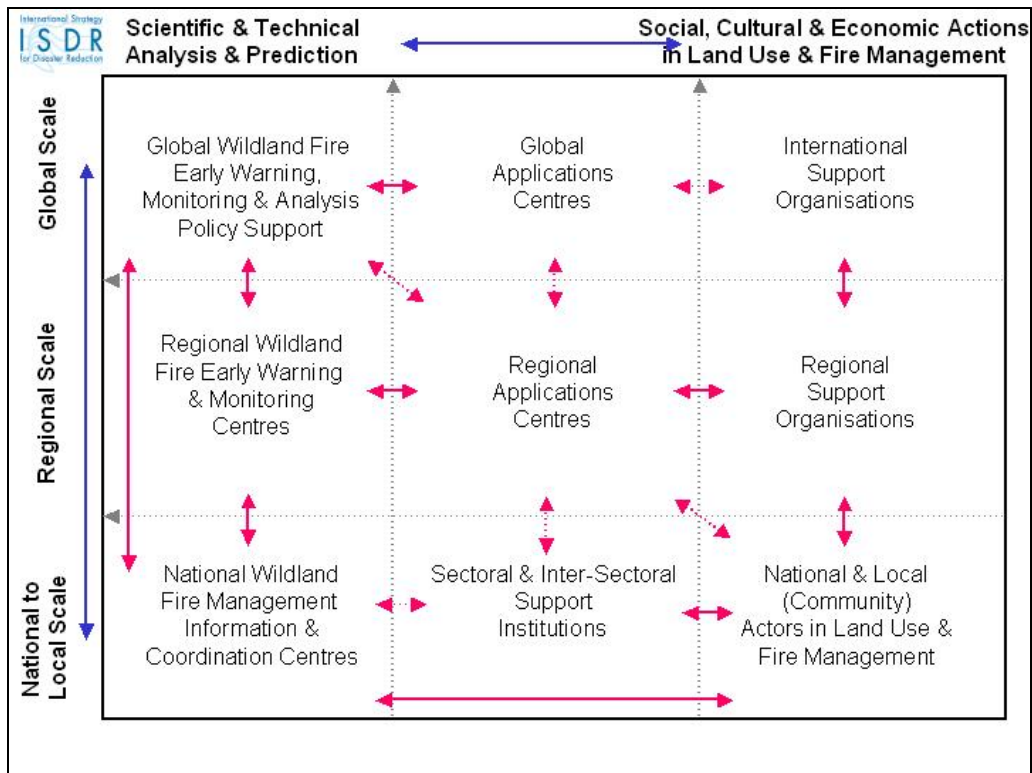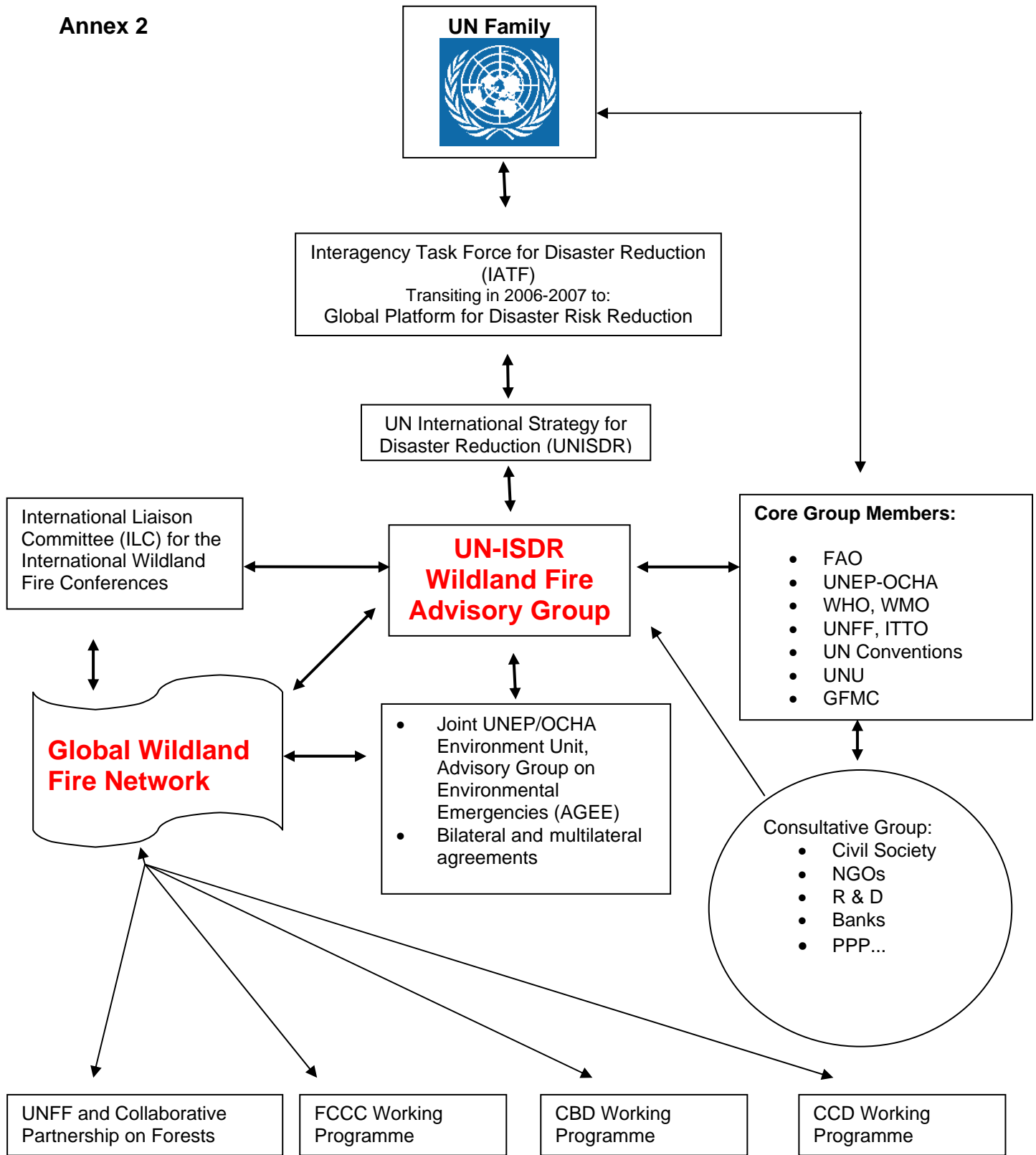**Figure 1.** Delineation of regions within the Global Wildland Fire Network

Figure 2. International networking in the wildland fire arena will involve inter-sectoral and inter-agency participation of international to local actors with responsibilities ranging from scientific and technical analysis to land users and fire management actors on the ground, i.e. the local communities.

Annex 2

UN Family

Interagency Task Force for Disaster Reduction (IATF)
Transiting in 2006-2007 to:
Global Platform for Disaster Risk Reduction

UN International Strategy for Disaster Reduction (UNISDR)

International Liaison Committee (ILC) for the International Wildland Fire Conferences

UN-ISDR Wildland Fire Advisory Group

Core Group Members:
- FAO
- UNEP-OCHA
- WHO, WMO
- UNFF, ITTO
- UN Conventions
- UNU
- GFMC

Global Wildland Fire Network

- Joint UNEP/OCHA Environment Unit, Advisory Group on Environmental Emergencies (AGEE)
- Bilateral and multilateral agreements

Consultative Group:
- Civil Society
- NGOs
- R & D
- Banks
- PPP...

UNFF and Collaborative Partnership on Forests

FCCC Working Programme

CBD Working Programme

CCD Working Programme

Figure 3. Scheme of cooperative relationships between the Wildland Fire Advisory Group, the Global Wildland Fire Network und the International Liaison Committee of the series of International Wildland Fire