

Some Reflections about the Conference

Climate Change and Forest Fires in the Mediterranean Basin: Management and Risk Reduction

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by

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Sharing of Scientific Knowledge –

In the Opening Session and Kenotes Sinaia Netanyahu, Chief Scientist, Israeli Ministry of Environmental Protection, welcomed the participants and notably the foreign guests. Netanyahu elaborated on the goals of the policy of the government of Israel to reduce greenhouse gas emissions under an Inter-Ministerial Committee founded in 2009, and a national action plan, with a commitment of \$US 620 million for greenhouse gas reduction investments. Following the wildfire, which affected the Mount Carmel Biosphere Reserve in 2010, initiative was taken to investigate the causes and consequences of wildfires, and the action to be taken.

Yael Shaltieli, Director General of the Jewish National Fund (JNF), reflected about increasing fire threats globally. The wildfire on Mount Carmel in December 2010 burned 250 homes, required the evacuation of three communities with 20,000 people. 44 people were killed during the fire. Yael Shaltieli stressed that the conference will provide a platform for exchange of experience of scientists and practitioners.

Orna Matzner, Israeli Ministry of Environmental Protection, introduced the first speaker, Tiago Capela Lourenço, **CIRCLE2 ERA-NET** Project Coordinator, University of Lisbon, Portugal. In his presentation "Climate Impact Research & Response Coordination for a Larger Europe" he introduced the objectives, structure, context and activities of CIRCLE2 ERA-NET, a network of 34 institutions from 23 countries committed to fund climate change and adaptation research. Forest fires were defined in 2011 as one of the priority areas. Israel took the lead in implementing the initiative. This meeting is aimed at exchanging views and experiences in new decision making methods on climate change adaptation and fire management & risk reduction in the Mediterranean Basin, and particularly addressing research needs, policies and networking in the region.

GFMC was kindly asked to look at **Wildland fires in the Eastern Mediterranean & Near East from the perspective of the International Strategy for Disaster Reduction**. GFMC Director Johann Georg Goldammer, who is serving also as Coordinator of the Global Wildland Fire Network of the United Nations International Strategy for Disaster Reduction (UNISDR) and the UNECE/FAO Team of Specialists on Forest Fire, reviewed the socio-economic conditions and public policies in the Eastern Mediterranean and Near East Region. Land-use change is the most prevailing and common determinant of fire use and wildfire occurrence and impacts. Rural exodus caused by urbanization of the young generation in many countries has resulted in the depletion of the rural work force and their role in land cultivation and fire protection. Rapidly growing fallow in many countries contributes to an increase of wildfire hazard. Climate extremes, possibly already a precursor of regional climate change, are another common determinant of increasing wildfire risk. The problem of fires burning in terrain contaminated by unexploded ordnance (UXO) and landmines stemming from previous conflicts, and wildfires started intentionally or as collateral damages during armed conflicts, or as consequences of political tensions, constitute additional threats to human security in the region.

Insights in the **Relationship of climate and fires in California** were given by Jon E. Keeley, U.S. Geological Survey, and University of California, Los Angeles. He first referred to an investigation in the Western US revealing that fires seasons are becoming prolonged. Databases of the U.S. Forest Service 1970-2009 (focusing on forests) and CalFire 1960-2009 (including also other lands, lower elevations areas, where more humans are living) were evaluated as well as meteorological records (increase of rainfall and temperatures), decrease of regular fire use and allowing natural fires to burn, resulting in increased wildfire threats. Population increase in Northern California brought increasing fire activity, and less fires in the lesser populated South. Large fires are occurring more frequently, possibly a consequence of increasing dead fine fuel availability.

In the following session **Climate Change and Forest Fires** José M. Moreno (University of Castilla-La Mancha, Toledo, Spain) elaborated on the **Likely impact of climate change on vegetation and fire regimes in the Mediterranean Basin** and concluded that climate change will expand the fire season and increase seasonal severity in the Mediterranean region, while Ricardo Trigo (University of Lisbon Campo Grande, Portugal) looked at the **Role of climate extremes (heat waves) driving large wildfires in southern Europe & Meteorological fire risk in the Mediterranean**. The contributions of meteorologists and fire scientists from Israel followed by analyzing the **Weather conditions during the Mount Carmel 2010 Forest Fire and other fires in Israel** (Dan Malkinson and Haim Kutiel, Haifa University, Israel).

In the sessions **Forest Fire Management** Noam Levin (The Hebrew University of Jerusalem, Israel) looked at **Wildfire regime in Israel in the 2000s: a national analysis using satellite images** and concluded that most fires had been burning in herbaceous vegetation, not in forests. The theme of **Post-fire restoration in the perspective of climate change** was highlighted by Ramon Vallejo (CEAM, Spain) who looked at approaches to assess post-fire restoration needs. The next speaker Shay Levy (Haifa University, Israel) analyzed **Forest Fire Management in Israel: Ecological and Economical Aspects** using a unified database that includes all existing data in the authorities that are involved in firefighting and fire-prevention. The data were collected from 12 firefighting unions, JNF-KKL (Forestry Department), and from airborne firefighting operations. The evaluation revealed, among other, that wildfires management policy and planning should be based on a holistic approach considering plant biomass as potential fuel, plant flammability, topography, weather conditions, consequent fire intensity and fire spread.

With the presentation on **Livestock grazing in managed pine forests: fire hazard reduction vs. forest regeneration and diversity** by Yagil Osem (Agricultural Research Organization, Israel) the benefits and the adverse effects of grazing were analyzed. His survey showed that there are three general trends in the country:

- Total exploitation of grazing area in the North and the South, and a lack of grazing in central Israel
- Permanent cattle grazing in the north and prevailing seasonal sheep grazing in the south
- A good control of seasonal grazing vs. limited control on permanent grazing lands

Target-oriented management should support maintenance of fuel break zones (fuel reduction) and recreation zones (infrastructure, human activities), and contribute to multifunctional landscape management with regards to biodiversity conservation, natural regeneration, landscape aesthetics, and human activities. In future “grazing services” may take over the role – “prescribed grazing” as formulated by GFMC.

The theme of soil erosion was addressed by the papers **Soil erosion assessment and mitigation following wildfires in Portugal: the state-of-affairs of the EROSFIRE decision-support tool for post-fire land management and impact assessment of future scenarios** (by Jan Jacob Keizer, Centre for Environmental and marine Studies (CESAM), University of Aveiro, Portugal), **Fire effects on soil properties and erosion dynamics: New perspectives** (by Lea Wittenberg, Haifa University, Israel), **Using synthetic polymers to prevent soil erosion after fire in Mediterranean forests** (by Meni Ben-Hur, Institute of Soils, Water and Environmental Sciences, Volcani Center, Israel).

Presentations on post-fire ecosystem development included **Resilience and natural post-fire regeneration of Mediterranean trees - implication for post-fire management** (Gidi Ne'eman, University of Haifa-Oranim, Israel) who recommended among other to shape future forests according to local needs, conserve landscape patchiness, and the use of fuelbreaks. Grazing, logging and pruning, as well as the use of prescribed fire as management tools.

The paper **The effect of fire on the fauna of the Mediterranean basin: an overview and synthesis** by Ido Izhaki (University of Haifa, Israel) was based on a review of the literature (50 papers) of the last 15 years with the aim to summarize the major knowledge of the short- and long-term effects of wildfires on vertebrates in shrub lands and forests in the Mediterranean basin, from the population to the community levels, and to identify practical aspects for conservation and management, based on the information reviewed. He concluded that the impact of climate change will govern future development.

In the session **Knowledge Gaps, Research and Networks** Jesús San-Miguel-Ayanz (EC Joint Research Centre, Institute for Environment and Sustainability, Italy) provided the EU perspective on forest fires in Europe where every year on average 65,000 fires are affecting 500,000 ha vegetated lands (thereof 85% in PT, ES, FR, IT and GR). He elaborated on the role of the EU in international collaboration by highlighting the contribution of European Commission Directorate Generals (DGs) in the field of forest fires, European Forest Fire Information System (EFFIS), the role of the Monitoring and Information Centre (MIC). The next presentation on the **Israeli perspective in light of the 2010 Mount Carmel fire** (by Avi Perevolotsky, Agricultural Research Organization, Israel) looked at the knowledge gaps, e.g. by asking if these are real or artificial; assumed that there is a tendency to “re-invent the wheel” and not to rely on information from other countries.

Regional perspectives: the role of formal and informal networks was the title of the presentation of Johann G. Goldammer (Global Fire Monitoring Center [GFMC], Max Planck Society for the Advancement of Science and United Nations University [UNU], Germany). He stressed that globally the need has been recognized by nations and international organizations to share knowledge, human and technical resources in fire management. Transboundary cooperation in fire management aims at taking advantage of and sharing the specific technical and scientific expertise developed in the various countries and regions globally, including concepts and methodologies of best practices and capacity building in fire management. In addition, international assistance is often needed in wildfire emergency situations during which a country may run out of resources and require international assistance. Informal networking within the UNISDR Regional Southeast Europe / Caucasus Wildland Fire Network (a regional network of the Global Wildland Fire Network) is receiving increasing support. Partners in cooperation in fire management in the region are financed by the Environment and Security Initiative (ENVSEC), a partnership of six international organizations – the Organization for Security and Co-operation in Europe (OSCE), Regional Environment Centre for Central and Eastern Europe (REC), United Nations Development Programme (UNDP), United Nations Economic Commission for Europe (UNECE), United Nations Environment Programme (UNEP), and the North Atlantic Treaty Organization (NATO). Recent experience in multinational response to fire emergencies in Israel and Russia in 2010 have revealed the lack of agreed international standards for ground and aerial firefighting missions. The beginning for a new standard will be addressed by the “International Fire Aviation Working Group” (IFAWG), which is operating under the auspices of the UNISDR Wildland Fire Advisory Group. The participation of Israel in the work of the GFMC was offered.

On the second day in the session **From Science to Policy and from Policy to Practice** David Brand (Chief Forester, Head of the Forest Department, KKL-JNF, Israel) welcomed the participants on behalf of Yael Shaltieli, Director General, KKL-JNF, Israel. Contributions in this session addressed the publicly and scientifically debated **Rehabilitation of Mount Carmel after the fire in December 2010** (Yeshayahu Bar-Or, Ministry of Environmental Protection, Israel). The discussion after his presentation among other addressed the problem of wildfires caused by the military. In this discussion GFMC repeated what was said in the introductory speech that this is a problem similar to other countries, and that the military should actively participate with increased awareness but also specialized units that may serve also outside military areas / exercises.

The **Wildland fire urban interface in Israel, a methodological approach to prevention and reduction of the social and economic impact** was presented by F. Rodríguez y Silva (University of

Cordoba, Spain) followed by the presentation of Hugh D. Safford (USDA Forest Service, California, USA) on **Making fuels management compatible with restoration objectives: case studies from the US Mediterranean-climate zone** who concluded with regards to the applications to Mt. Carmel that maquis and *Pinus halepensis* are adapted to Fire Regime IV of California and most oaks can tolerate frequent fire; and that Wildland fuel breaks can serve to “compartmentalize” fires, but only under moderate conditions and when they can be accessed safely; and fuel break networks can be integrated into trail and park systems, but will need constant maintenance.

In the session **Forest Fire Management** David Brand (Chief Forester, Head of the Forest Department, KKL-JNF, Israel) presented his views on **Prevention management of forest fire in Israel** in which he introduced the history of JNF-KKL, and the history of forest cover of Israel, fire hazard and risk reduction. He detailed about the role of fuel breaks around residential communities, their maintenance, the roles of grazing services, and the role of fuel breaks inside forests. Investments of two million dollars for fuel break establishment are planned. He called explicitly for testing the application of prescribed burning in maintaining fuel breaks. The presentation **Forests fires prevention programs in natural reserves and forests in the region of the Mediterranean** by Yehoshua Shkedy (Nature & Parks Authority, Israel) showed that Israel Nature & Parks Authority is closely working hand in hand with JNF-KKL and the Ministry of Agriculture. One of the problems in Israel is that the Maquis is closing up and that open habitats for species that need these open-land conditions are disappearing, along with an increasing wildfire hazard. „We have too many trees. When trees are closing up, we are losing species / habitats” he said and “grazing is essential”.

Shmuel Fridman (Ministry of Agriculture, Israel) in his paper **Grazing as a tool for fire prevention** looked back to the history of the Authority of Grazing, which was established in 1977 by Ministry of Agriculture, Israel Lands Administration and the Jewish National Fund. Professional grazing requires the mapping of grazing zones and vegetation formations, and matching the pastures to different types of animals. The paper **Governmental involvement and regulation in determining forest management policy** by Hagai Snir (Ministry of Agriculture & Rural Development, Israel) looked first back to history, notably the British Forest Ordinance of 1926-1960 which focused, among other, on supporting the growth of woodland and forest, protecting trees, tree nursery establishment, dune stabilization. The Governmental policy 1948-1960 supported forest reserves declaration, conducted massive afforestation, mainly by the JNF, and enforced the ordinance. The convent between the state and the JNF resulted in the closure of the governmental forest department, and JNF became responsible for managing state forests and forest reserves. In 2001 a new era began after the Supreme court brought the state back into the game, and the Minister of Agriculture returns to be the Forest Commissioner. The Vision is to complete an updated forest law together with JNF and the Ministry of Environmental Protection.

In the **discussion with local authorities from M. Carmel Druze villages** a representative of local authorities stressed that authorities would not recognize and understand the people living in the forest and that they should not consider people as a threat to the Mt Carmel Park. He asked how can a Biosphere Reserve be established without a community? After the 2010 fire he said he had hoped that KKL would “come to us and we would build a common authority”. He asked “Does fire know borders? No. We need to think regional”, and “I want my village to participate. We want tourism, we want life quality. It is possible to work with us We need a green culture. We need partnerships and need to look for formulas. Let us look what the biosphere will tell us to do.

The second speaker agreed. “The JNF and others still see us as enemy. Before establishment of the Park we had 10 Druze settlements, only two are left.” According to the State Ombudsman there should be an escape route. This could become a buffer zone, allow the residents of the villages to evacuate or to receive help. 1 km road, paved, needed, but there was lot of resistance. We need this for security, and we want to cooperate and need your help. It will become the most beautiful biosphere reserve of the world. Through education and dissemination, an authority should be created, and inevitable fires will become less severe.

The representative of the Nature & Parks Authority replied that indeed the authorities are talking among each other and not to the Druze communities. However, your communities are also not talking among you. You have the possibility to address government.

A representative of the community elaborated on the concept of a Biosphere Reserve. It is about preservation of nature and local people. Section 5 of the Biosphere Document refers to the role of education. "I want to give my son environmental education. I do not have the tools, but you have them."

In the session **Community Engagement in Forest Fire Management** Uriel Safriel (Hebrew University, Jerusalem, Israel) asked **The Biosphere Reserve - a paradigm shift in nature conservation?** The reserves need legal protection & community participation. It is better to go for bottom-up decisions with community participation, instead of top down like it happens in many nature reserves. Besides the esthetic and ethic value conservation paradigm and the paradigm "human survival, value of nature" the MAB Action Plan 2008 is looking after ecosystem services. Missing incentives include community involvement. **Research for people, but without people: What is missing in research on forest ecosystem services?** was the theme of the paper presented by Daniel Orenstein (Center for Urban and Regional Studies, Faculty of Architecture and Town Planning, Technion Haifa, Israel) in which he asked why expert policy recommendations for fire adaptation were not adopted and why there is a continuing conflict between preservation goals and development. He considers the Millennium Ecosystem Assessment as human-centered. He suggested that the inclusion of social ES assessment in the Carmel Forest might strengthen post-fire policy making and fill gaps in knowledge regarding how stakeholders perceive the forest and its management. **FireSmart: Forest and land Management options to prevent unwanted forest fires** were presented by Ana Sebastián López (GMV Aerospace & Defense, Spain) recommended better targeted and optimized awareness raising. **Protecting each other: The Forest and the Community** by Salman Aburukun (Nature & Parks Authority, Israel) said "What we need is for communities to become reacquainted with forests on a new and different level. We should get to know the forest with all of our senses and understanding the variety of services we enjoy thanks to it. This should be done by inculcating two principles: Trees and forests have a right to live, just like we do, and for the forest to protect us, we have to protect the forest. This is our moral obligation."

In the following general **Discussion** themes included benefits of the Biosphere Reserve for Druze and other communities, questions whether fenced goats without shepherds will work under the threats of jackals and stealing. How much money needed for fuelbreaks?

In the session **Technologies and Innovative Approaches in Forest Fire Management** Kostas D. Kalabokidis and Palaiologos Palaiologou (University of the Aegean, Greece) reported about the advancements of **Forest Fire Modeling aided by Web GIS in a Changing Climate**, followed by the paper **Assessing fire risk: post-fire analysis of pre-fire mapping - a recent case study from Mount Carmel** by Yohay Carmel (University of Haifa, Israel), **Evaluating drought stress changes in planted forests by means of remote sensing** by Michael Dorman (Ben-Gurion University of the Negev, Israel) who observed increased mortality of *Pinus halepensis* in the planted forests during the last decade. Stephen Achal (Itres Research Limited, Canada) provided insight in his work on **Very Large-Scale, High Spatial Resolution Airborne Thermal Mapping of Wildfires in Northern Canada using the TABI-1800** using the Thermal Airborne Broadband Imager, a new type of high performance airborne thermal imager delivering large-scale and traceable apparent radiant temperature maps.

On 26 January 2012 a field excursion to Mt Carmel allowed conference participants to get a close insight in the ecological conditions of the Biosphere Reserve, the history of wildfires pre-2010 and during the 2010 fire. At the end of the excursion a closing discussion focused on the problems of erosion, salvage logging, wood removal, the future of forests, landscapes and on fuel break. Foreign participants of the conference and excursion were challenged to provide a one-page statement on the utility and concepts of fuel breaks.