

**Forest Fire Threat in Qadisha Valley, Lebanon:**  
**Precautionary Action to Prevent Damage or Destruction of the UNESCO World Heritage Site**  
Report of an Initial Project, submitted to UNESCO by the Global Fire Monitoring Center (GPMC)  
29 December 2010



## 1. Executive Summary

Qadisha Valley in Lebanon, a UNESCO World Heritage Site since 1998, is embedded in a regional environment and landscape patterns that have been shaped by hundreds of years of land cultivation. With the recent changes of demographics, land use and under the influence of political instability in the country Qadisha Valley has experienced dramatic changes in settling and land cultivation. Intensive cultivation of olive groves, terraces and gardens has been abandoned.

A close look at vegetation composition in Qadisha Valley reveals that the traditional cultivation systems are overgrown by natural succession and an increasing build-up of live and dead vegetation that increases the wildfire hazard. At the same time the pressure on Qadisha Valley by construction of houses at the edge of the valley and the continuing and increasing tourists visiting the valley is bringing an increased risk of wildfire ignitions.

The occurrence of severe wildfires since 2007, including the most recent fires in December 2010, reveal the wildfire threat to Qadisha Valley. While so far Qadisha Valley fortunately had not been affected by a major fire disaster – although a fire in 2008 constituted a potential threat for a larger-scale fire – it is important to take all steps necessary to reduce the risk of wildfires that could possibly destroy the valuable natural and cultural assets, and even endanger local inhabitants, especially those living in monasteries and scattered houses, or visitors of the valley.

An action plan is proposed to address the most appropriate measures that could be implemented within a reasonable timeframe and finances. The suggested steps include:

- fire hazard (vegetation) and biodiversity mapping as a basis for a fire management plan
- technical measures to treat vegetation for wildfire hazard reduction
- a public information and education campaign
- fire management training and purchase of equipment
- construction of some infrastructure in the valley (water access points, cisterns)

The budget required for this action plan is tentatively 80,000 Euro. The implementation of the action plan should receive highest priority (preferably to be initiated in 2011).

## 2. Introduction

The mission, with an on-site assessment of Qadisha Valley in Lebanon, a UNESCO World Heritage site, was initiated in April 2010 by the proposal for the project “Forest Fire Threat in Qadisha Valley, Lebanon: Precautionary Action to Prevent Damage or Destruction of the UNESCO World Heritage Site”, submitted to UNESCO by the Global Fire Monitoring Center (GFMC) (Annex I).

The cultural and ecological assets of Qadisha Valley are described in depth in a number of publications and summarized in the UNESCO document “The Qadisha, a Biological, Cultural, Historical and Religious Heritage” (Annex II). This document clearly underscores the problem of land-use change and the threats to the valley by increasing external pressure. The increasing wildfire problem is summarized by two key statements:

“The progressive disappearance of the open spaces and of the traditional agricultural and pastoral practices could cause great losses in biodiversity and agro-biodiversity. The progressive suffocation and the invasion of bushes in the agricultural fields, fruit orchards and open spaces are one of the major causes of the degradation of the landscape.”

and

“....At the end of the road, the continued abandonment of agro-pastoral activities in the Valley would lead to a progressive closing of the milieu, causing a deep modification of the landscape, an alteration of the biological equilibrium and a loss in the biodiversity. This situation usually leads also to an increase in the risk of occurrence of forest fires because of the thick pack of litter and dead biomass accumulating in the woodland.”

While the report does not address further details on the need for building fire management capability, it indirectly calls for relevant action, i.e. when calling for (among other):

- *An equilibrium between the hortus, ager, silva and saltus.*
- *Traditional agriculture should be used as a tool for the maintenance of the forest and open spaces (mainly in the Valley).*
- *A participatory approach should be adopted in the decision making process for all issues related to the management and development of the site.*
- *Zones should be identified in the forest populations where trees should be allowed to grow old without any intervention and where agro-sylvo-pastoral activities should be allowed and managed.*
- *The actors and the users of the site should be better educated, sensitized and trained.*

Qadisha Valley is embedded in a set of landscapes in Lebanon for which the overall wildfire hazard<sup>1</sup> has been described in detail by “Lebanon's National Strategy for Forest Fire Management” of 2009, which details the fire problems of the country (the core of the unofficial translation of the Strategy has been edited and is provided in Annex III).

The recommendations of a Fire Management Action Plan for Qadisha Valley aims at implementing the core recommendations of the National Strategy for Forest Fire Management.

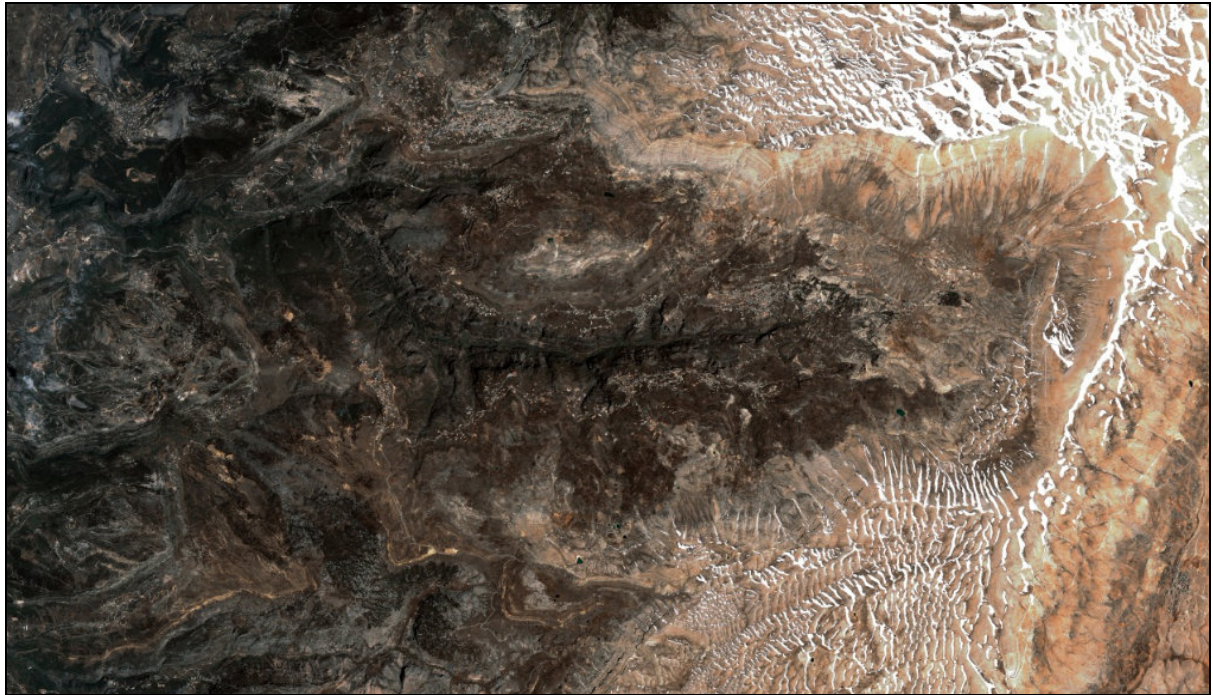
## 3. The Fire Assessment Mission (September 2010)

A short field assessment was conducted in September 2010. The institutions and persons consulted during the mission, field visits and topics discussed between 2 and 6 September 2010 included key national and local actors who needed to be consulted and / or to be involved in an action plan. A complete Mission schedule is provided in Annex V.

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<sup>1</sup> A special terminology for fire management is provided by an online multilingual fire management terminology: <http://www.fire.uni-freiburg.de/literature/glossary.htm>

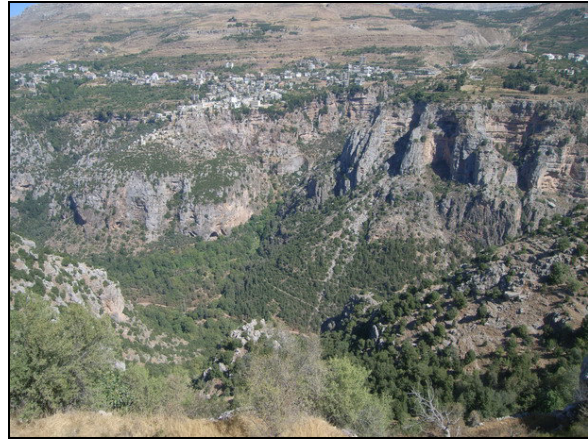
### Satellite images of Qadisha Valley



These two satellite images show the valley embedded in the surrounding mountainous landscape of northern Lebanon. Sources: Upper image: © JAXA; lower image: © Google Earth). Source of the top right photo on the cover page: *Intertravel Lebanon* (<http://www.intertravel-lb.net/index.php>).

The field assessment verified the key problems. In the following pages these problems are visualized by photos taken during the assessment mission (all photographs by GFMC):

### 3.1 Qadisha valley embedded in the surrounding landscape



The edge of Qadisha Valley is characterized by abandoned terraces and uncontrolled construction of houses – both representing an increasing fire hazard and ignition risk: The piling-up of unused vegetative matter on terraces where gardening, agriculture and grazing has been abandoned provides combustible materials (*fuels*) which can easily carry fire and allow spread to surrounding vegetation.

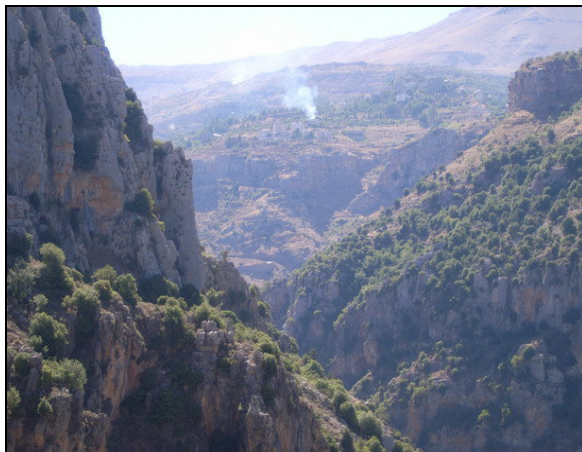


Traditional burning of candles on individual graves or cemeteries along the valley slopes are posing a source of ignition.

### 3.2 Ignition risks on slopes and inside the valley



Caves formerly occupied by hermits are nowadays occasionally used by local people and tourists who are using camp fires for warming and celebrating. The use of the valley by visitors and bird hunters is reflected by discarded cigarette stumps or shotgun cartridges.



Abandoned terraces along the valley edges are often burned – without any supervisory control or a burning permit system in place.



Traces of fires caused by downslope-falling embers or small fires along the road, possibly caused by disposed cigarettes, can be seen in some places.

### 3.3 Land-use change inside the valley affecting the wildfire risk



Remnants of active gardening culture can be seen only in a few places. There are still some fruit trees which are cultivated or harvested by landowners. In general, however, the trend of succession, forming thickets and almost impenetrable vegetation growth and high loads of combustible materials is observed.

### 3.4 Abandoned houses and terraces



Abandoned farmsteads are characterizing the changing landscape of Qadisha Valley: Former open, cultivated lands are overgrown by tree succession. Abandoned houses are collapsing and encroached by vegetation. The overall effect is the loss of habitats of plant and animal species that were adapted to the open terrace landscapes. Unused biomass is increasing the wildfire hazard considerably.

### 3.5 Access to the valley



Access to the valley is difficult. The topography and trees growing along the access road do not allow larger fire engines to enter the valley.



The fire trucks available in Bcharré (left) are not suitable for a fire response intervention in the valley, whereas tourists driving 4WD vehicles can be seen at picnic / barbecue places and restaurants in the valley.

### **3.6 Summary of field assessment of fire risk**

In preparation of and wrapping up the field mission to the valley discussions were held with representatives of agencies and NGOs in Beirut, as outlined in detail in Annex V:

- Armed Forces Headquarters, Operations Director, General Staff, Armed Forces (G3)
- Minister for Culture
- Ministry for Environment, Head, Department of Conservation of Biological Diversity
- Director General, Association for Forests, Development and Conservation (AFDC)<sup>2</sup>

and during the on-site assessment in and around Qadisha valley:

- Chief, Civil Defense, Bcharré
- Head, Centre des Forêts du Liban Nord
- President and Executive Director, Community for the Preservation of Qadisha Valley (COSAQ)
- President, Couvent Saydet Qannoubine
- Patriarch of Antioch and the Whole Levant

There is a consensus that the wildfire threat in the valley is increasing due to land-use change, tourism and development of structures / housing nearby along the valley edge.

There are limited to almost none dedicated activities in

- Public information and education on fire risks and prevention
- Technical fire prevention measures to reduce the wildfire risk
- Appropriate training of local fire and forest service personnel
- Equipment suitable for entering the valley and fighting a fire

There is a consensus that an action plan for fire management in Qadisha valley must be developed and receive high priority.

## **4. Proposal for a Fire Management Action Plan**

The National Strategy for Forest Fire Management outlines five key areas which the country needs to address for addressing the fire risk, i.e. (1) Research, information and analysis; (2) Risk modification, including fire vulnerability reduction and prevention of harmful fires; (3) Readiness, covering all provisions intended to improve interventions and safety in the event of fire; (4) Response, including all means of intervention for fire suppression; and (5) Recovery, including the rehabilitation and ecological restoration of healthy forest conditions, and the support to individuals and communities in the short- and medium term aftermath of the fire.

The proposed action plan is addressing areas 1 to 4 that are relevant for the prevention, preparedness and response to wildfires.

The proposed action plan takes also into consideration the suggestions made by the Executive Director of COSAQ.

### **4.1 Research, information and analysis**

There is no need for fundamental ecological and fire research for Qadisha valley. However, as a preparatory step for Action Item 2 (below) it is recommended to accept the offer of the Director General of the Association for Forests, Development and Conservation (AFDC) to work with UNESCO in developing a detailed “fire risk map”.

The challenge for developing such a map is to provide the basis for risk modification measures. Risk modification, as outlined below, will concentrate on reducing the wildfire hazard, i.e. the manipulation

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<sup>2</sup> <http://www.afdc.org.lb/home.php>

of combustible vegetation aimed at reducing the build-up and uncontrolled or almost non-controllable spread and severity of a wildfire.

The manipulation of vegetation to reduce “fuel loads”, however, cannot be done without carefully looking at the characteristic aspects and elements of habitats and biodiversity of fauna and flora requiring protection. It would be counterproductive to the biological conservation goals if important elements of vegetation would be removed for the sake of fire protection / fuel reduction. Additional aspects for fire preparedness and management planning should be included, e.g. the location of a number of water cisterns and Qadisha river access points for replenishment of water during firefighting operations (see section 4.3.3 below).

In addition, there is the challenge to realistically assess the future of land use and biodiversity management in the valley. While at first glance it may seem to be likely that the traditional land use and its influence of shaping the vegetation pattern and biodiversity of the valley will be history and in no case can be re-established, there are certainly options for alternative concepts and incentives to revive the traditional cultural activities, which would become an integral part of the future maintenance of the cultural and natural heritage of Qadisha Valley.<sup>3</sup>

## **4.2 Risk modification: Fire vulnerability reduction and prevention of harmful fires**

The most important measures to be taken include the modification of wildfire hazard and the prevention of ignition by local inhabitants and visitors to the valley.

### **4.2.1 Vegetation treatment to reduce wildfire hazard**

A key activity will be the reduction of wild growing vegetation, which has encroached the valley after the abandonment of *hortus*, *ager*, *silva* and *saltus*. The development of the proposed “risk map” would become a more complex fire and biodiversity planning and management tool, which would include:

- Mapping of biodiversity assets that need to be conserved directly by complete protection or indirectly by manipulating its habitat, i.e. protecting habitat structures / requirements for protected biodiversity
- Mapping of vegetation succession that can be removed in order to reduce combustible materials and thus the probability of an intense and severe wildfire, thus to reduce the fire threat to the assets of the valley and to people
- Proposing site in which natural succession should be allowed for restoring the potential natural vegetation – if applicable.
- Management plan for both conservation and fuel reduction
- Treatment of vegetation nearby houses and monasteries at risk to become affected by a wildfire

Since it will be impossible to treat the complete valley by fuel reduction measures the planning tool will include the “strategic location” of fuel breaks (e.g., cleared buffer zones or strips alongside the access road and across the valley).

### **4.2.2 Prevention of ignition risk: Public information and education for a fire-free valley**

As detailed in the attached Lebanon's National Strategy for Forest Fire Management (Annex III) all wildfires in Lebanon are caused by human activities. The amount of natural (lightning) fires is rather insignificant in the country. Thus, unlike other natural disasters, which are originating by weather or tectonics, the risk of ignition of wildfires can be prevented by targeted prevention measures. The most

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<sup>3</sup> An example from a UNESCO World Heritage site – a valley located in Germany – reveals that there are movements and initiatives of the young generation to restore organic farming and traditional use of currently abandoned sites. Annex IV provides information about two UNESCO World Heritage sites (Germany, Sri Lanka) in which prescribed fire has been used to maintain openness of former cultivated vineyard terraces; the Sri Lanka example shows the problems of illegal encroachment and wildfires, which are threatening the sustainability of the World Heritage site.

common causes of fires starts are summarized in the strategy and can be considered valid for Qadisha Valley:

- Farmers who use fire to eliminate crop stubble and push back the forest to make room for agricultural expansion. In spite of the obvious risks, farmers might set fire to agricultural residues even when large out-of-control fires are burning in the same area.
- Careless smokers and excursionists who throw lit cigarettes on the forest litter or along the roads and light cooking fires without taking the necessary precautions to extinguish them properly.
- Burning solid wastes (municipal wastes and those left by tourists and recreational users) and the disposal of garbage by burning being often carried out in conditions of high fire risk without taking the necessary precautions.
- Fixed installations such as high voltage power lines that are implemented above forest areas.
- Arsons that set fires for destruction, vengeance, conflicts, and changes in land-use classification...
- Fireworks (pyrotechnics)

At the outskirts, entrance and inside of Qadisha Valley there are no signs or messages that encourage people to prevent wildfires by taking precaution measures. Such targeted messages are important. Billboards should be developed to be placed around the valley, at the entrance and at the picnic sites. The messages and symbols used should be identical with those developed by AFDC and partners. For instance, the fire prevention mascot *Sanjoub*, the Lebanese squirrel, which was launched in 2009, should be used consequently throughout the country.

It is strongly suggested to completely ban the use of fire and smoking by valley visitors. Thus, messages / signs must be posted at the picnic sites.

For the local communities located around the valley there should be public meetings in which the fire threats would be discussed, concentrating mainly on the problems associated with burning of terraces and slopes surrounding the valley, fires ignited originating from houses constructed at the edge of the valley, smoking, candle burning in cemeteries and graves.

### **4.3 Preparedness and safety in the event of fire**

#### **4.3.1 Training: Capacity building**

Considerable efforts have been made in Lebanon in developing materials for training firefighters and other personnel, including volunteers, in the basics of vegetation fires and fire control. Training and information materials are available in Lebanese and English for the level of firefighters (e.g., the booklets that have been developed jointly by AFDC, Ministry for Environment, and the Directorate of Civil Defense Civil Defense (Ministry of Interior and Municipalities), supported by various donors such as the European Commission and Spanish authorities (Tragsa; Ministry for Foreign Relations and Cooperation; Authority of Aragón).

Furthermore the Lebanese University, Faculty of Agriculture and Veterinary Sciences, in January 2010 launched a forest fire management course in partnership with the AFDC and in collaboration with Tragsa and the University of Cordoba-Spain.<sup>4</sup>

These materials and the expertise of national trainers who have been trained by these projects should be utilized to train the following personnel in and around Qadisha Valley:

- Firefighters on the municipal Civil Defense Unit of Bcharré
- COSAQ personnel (ranger)
- Inhabitants of the valley and volunteers of communities surrounding the valley

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<sup>4</sup> <http://middleeasteducator.com/issue/december-january-2010/article/lebanese-university-launches-courses-in-forest-fire-management> - See also Textbook „Introduction to Forest Fire Management in Lebanon. Resource Guide to Instructors (G. Mitri, ed.), published by AFDC, Tragsa and partners, Lebanon 2010, English, 204 p.

Personnel of Civil Defense, COSAQ and volunteers need to be trained in all aspects of

- Fire prevention
- Basics of vegetation fire
- Fire suppression, and
- Personal safety

Civilian valley inhabitants, including inhabitants of monasteries, and those living uphill need to be trained in

- Fire prevention, and
- Basics of self defense, and
- Personal safety

The training courses can be implemented by the above-mentioned capacitated personnel of AFDC. GFMC may support local training if desired and appropriate.

#### **4.3.2 Purchase and training of use of equipment: Firefighting tools and personal safety**

The currently available firefighting vehicles and equipment operated by the Civil Defense Unit of Bcharré are not suitable for fighting wildfires in the valley. The vehicles are not constructed for off-road driving, and they are too large and heavy for operating on the small roads inside the valley. The suggestion to widen the roads in order to allow access for the large trucks is not suitable. Instead it is proposed to purchase a 4WD pickup vehicle with a small mobile firefighting unit, as they are now increasingly used in many parts of the world. The so-called "slip-on units can be removed from the pick-up car outside the fire season, and the vehicle can be employed for other transport use. The water tank may carry between 400 and 500 l of water. With a modern pump and a small-diameter hose this unit is suitable for operating in off-road conditions and allow access with the light hose to steep terrain.

The hand tools consist of traditional fire swatters and advanced, new designed multiple-purpose hand tools, including light backpack pumps with up to 20 l water. The yellow clothing are made of fire-resistant materials. The pants and shirts are light, so that firefighters can work with these clothing during extremely hot days (traditional fire brigade clothes are usually too heavy and not designed for working for many hours under heat stress in a wildfire situation).

These materials are elements of a recommended package of equipment for use in Quadisha Valley. Pictures of the equipment and a table with costs are provided in Attachment VI.

#### **4.3.3 Preparing access and infrastructure in the valley**

As can be taken from the attached list of equipment there should be purchased some tools for clearing vegetation, i.e. chainsaw(s) and brush cutter.

These tools shall be used by a group of local people to be employed as additional firefighters and laborers implementing fuel reduction inside the valley, including cooperation with owners of houses and the presidents of the monasteries, which are potentially at fire risk. These part-time employees would gain best local knowledge during their regular fuel reduction and valley maintenance work, will be the best to be prepared to assist in fighting a fire.

In addition, these people could be employed in constructing access points to Qadisha River in the valley bottom for refilling backpack pumps and the tank of the rapid-attack unit.

In conjunction with the mapping of the valley it should be investigated if cisterns could be constructed along middle slopes. These cisterns could be constructed using natural stone and harvest rainwater during the rainy season. Decisions about location, number and size should be done during the mapping study.

#### 4.4 Response: Fire suppression

The measures mentioned above are essential to prepare all necessary steps for the worst-case scenario – fighting and controlling a wildfire in the valley. The efficiency of firefighting will depend on the steps taken before – technical and people-oriented prevention measures, preparedness, training and equipment.

COSAQ and the Civil Defense Unit of Bcharré need to closely work together with the communities in the valley and on top of the valley.

#### 4.5 Action and investment plan for 2011

In Phase 3 of the project the following activities are proposed. No timeframe has been set since it is not yet clear how this phase can be financed.

Activity	Reference Section	Partners	Tentative Costs (€)
Fire hazard and biodiversity as a basis for a fire management plan	4.1	AFDC, COSAQ (with backstopping support by an international expert)	3,000
Vegetation treatment to reduce wildfire hazard (some equipment included under 4.3.2)	4.2.1	COSAQ personnel, laborers / volunteers (with backstopping support by an international expert)	10,000
Prevention of ignition risk: Public information and education campaign (design and construction of billboards, community meetings)	4.2.2	COSAQ (with backstopping support by an international expert)	3,000
Training: Capacity building	4.3.1	AFDC. Participants: Personnel of COSAQ, Civil Defense Unit of Bcharré, community members / laborers / volunteers (with backstopping support by an international expert)	3,000
Purchase and training of use of equipment: Firefighting tools and personal safety	4.3.2	UNESCO Regional Office, with COSAQ, Civil Defense Unit of Bcharré (with backstopping support by an international expert)	15,000
One 4WD pickup vehicle (small rapid-attack unit suitable for the narrow roads)	4.3.2	UNESCO Regional Office, with COSAQ, Civil Defense Unit of Bcharré (with backstopping support by an international expert)	30,000
Construction of some infrastructure in the valley (several water access points, cisterns)	4.3.2	COSAQ (with backstopping support by an international expert)	10,000
International backstopping	4.5	t.b.d. (total costs for international expert inputs for all action items)	6,000
<b>Total estimated costs</b>			<b>€ 80,000</b>

The budget is a rough assessment of costs for an initial action in 2011-2012. These proposed activities can be realized swiftly and efficiently if the budget will be made available. **It must be noted that a consequent follow up in reducing the fire hazard by fuel reduction will require vegetation clearing also in the following years.**

#### 4.6 A look at surrounding forests

During the mission two forest sites nearby the valley were inspected from outside, the Forest of the Cedars of God (Horsh Arz el-Rab) and Joubbeh-Bcharri forest (Hadeth el-Joubbeh community). While it was not possible to enter both forests due to lack of time and – in the case of Joubbeh-Bcharri forest – the threat of land mines, the following suggestions are given:

##### Forest of the Cedars of God (Horsh Arz el-Rab)

At first glance it looks that the forest is well fenced and protected against illegal entering and thus bringing in fire. The wall surrounding the forest stand and a fire break are certainly offering protection against a surface fire spreading towards the forest. However, an ignition inside the forest cannot be excluded completely. It is therefore suggested that at the next visit of an international fire management expert the Forest of the Cedars of God should be inspected in detail in order to ensure that all precautionary measures for fire protection will be taken.

##### Joubbeh-Bcharri forest

Together with the mayor and the vice mayor of Hadeth el-Joubbeh community the Joubbeh-Bcharri forest was visited on 4 September 2010. The motivation for this on-site inspection was the desire of the community leaders to explore options for managing the forest in future.

The community forest belongs to the few large forest tracts in Lebanon, which are not subjected to illegal cutting and otherwise occupation by constructions and degradation. The reason for this lies in the contamination of the forest by land mines. Mine fields had been laid by Syrian and Lebanese troops during the civil war (1975-1990). These mine fields have not yet been cleared, thus people are not entering the forest. Grazing by goats is common around the edge of the forest complex.



In principle Joubbeh-Bcharri forest is at high risk of wildfires spreading from surrounding pasture lands and abandoned fields. However, goat grazing reduces the highly combustible grass and shrub layer. This has possibly contributed to the protection of fires at the edge and inside the forest.

There is an intent of the mayor of Hadeth el-Joubbeh community to develop the forest for tourist activities. An general opening of the forest for visitors would require complete demining. After demining the forest and open access the forest could be threatened by illegal activities and other economic activities. Ironically, land mines and goats so far have protected the forest from degradation so far.

Thus, the following measures could be taken into account:

- Demining of selected forest roads: In these roads only (and to a limited extent on the road shoulders) would allow guided access, i.e. hiking in the forest complex

- Hiking tours should be allowed only by following the concept of “responsible tourism” and led by guides
- The boy scout camps, which are set up annually, should be entrusted in training young people as “Guardians of the Forest”, including fire prevention and initial control in case of an outbreak of a fire.
- Older boy scouts could serve as guides for hiking tours.
- Boy scouts and inhabitants of Hadeth el-Joubbeh community should work together for catering hikers, without setting up permanent structures.
- Land mines should be left on site short term. In the long run the Armed Forces should clear the mines, but access should remain limited.
- Grazing by goats should be supported to keep fuel loads down and reduce the risk of wildfires.

## **ANNEXES**

**Annex I:** The Qadisha, A Biological, Cultural, Historical and Religious Heritage (edited report by UNESCO)

**Annex II:** Lebanon's National Strategy for Forest Fire Management (extracts)

**Annex III:** Selected Press Coverage of the Wildfires in Lebanon, December 2010

**Annex IV:** Looking beyond Qadisha Valley: Fire problems in other UNESCO World Heritage Sites

**Annex V:** Schedule of the Fire Assessment Mission

## ANNEX I



UNESCO Office - Beirut

### THE QADISHA, A BIOLOGICAL, CULTURAL, HISTORICAL AND RELIGIOUS HERITAGE <sup>5</sup>

#### ABSTRACT

Listed as a World Heritage site since 1998, the Qadisha valley (or Kannoubine) and the Cedars of God Forest constitute a cultural landscape of an exceptional universal value. Surrounded by steep mountains, the Valley has been for a very long period of time a refuge and a place for meditation. It contains an exceptional number of Christian hermitic and coenobitic monasteries, some of which belong to the very early days of the Christian expansion. The traditional land exploitation in terraces, the calcareous caves and the important biological diversity (fauna and flora) it contains, have provided it with a cultural and natural added value.

The analysis of the interaction between the richness of the biodiversity and the landscape, cultural and historical heritage of the Qadisha and the Cedars of God Forest, has allowed for a better perception of its strengths and a better identification of the threats it is subject to. The study of the specific character of this site leads to a better understanding of the importance of the safeguard and the protection of a unique religious and cultural patrimony, in a privileged background with an exceptionally rich biodiversity and the heritage of the collective memory of a region and perhaps a whole country. The concern for the preservation of the valley is not limited to the local inhabitants and users, the tourists, the outdoor sports amateurs, the religious entities in the valley and those for whom it represents a site for worshipping. The preservation concerns also the future generations.

#### 1. A Remarkable Natural, Cultural and Spiritual Heritage

Situated at the downstream of the Mount Mekmel, the Qadisha is irrigated by the Qadisha River (35 km long) which springs under the Cedars cirque. The calcareous lithology dating back to the Jurassic period presents a karstic facies explaining the presence of a high number of caves, often situated very high on the cliffs. The Qadisha valley contains an important religious patrimony, both built and caved. It is there that the highest concentration of caved monasteries and hermitages (115 in total) dating back to the origins of Christianity is found. It offers a facies of steep cliffs where the first Maronites used to hide in grottos (29 grottos in the valley) of a very difficult access in the valley, sometimes at more than 1,000m of altitude. The lack of comfort in these grottos was an appropriate environment for the mortified life and the monastic contemplation. Over the years, the presence of the hermits has strongly contributed to the sacred character of this valley. During the Palaeolithic era, some of these grottos were used as sheds and sometimes as tombs. Since the beginning of the Christian era, the Holly Valley has served as a refuge for people looking for solitude. The Syrian Maronites moved there to hide from the religious persecutions since the seventh century. This movement was intensified in the tenth century after the destruction of the Saint Maroun Monastery. The Maronite monks have then established their new centre in Kannubin, in the heart of the Qadisha. Monasteries combining hermitic and coenobitic life started to extend all over the surrounding hills. However, the Holly Valley was not only the centre of the Maronite culture, as other Christian communities found their shelters in the cliffs: Jacobites (Syrian Orthodox), Melchites (Greek Orthodox), Nestorians, Armenians, and even Ethiopians.

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<sup>5</sup> Partial translation of the report „Etude de l'interdépendance entre diversité biologique, traditions et patrimoine culturels dans la Vallée de la Qadisha et élaboration de propositions d'action pour le futur“, conducted for the Regional UNESCO Bureau, Beirut, April 2005, by GAIA-heritage (sal), realized by Fady Asmar, Carla Khater, Stéphane Hobeika, under the supervision of Georges S. Zouain

Overlooking the valley, the Lebanese cedar forest (*Cedrus libani*) contains around 375 trees. According to the local beliefs, two of these trees are said to be more than 3,000 years old and 10 more than one thousand year old. One of the oldest written texts in the world, the Gilgamesh Epic, discovered in Central Mesopotamia, describes the Cedars of Lebanon as sacred trees. Those giant trees have witnessed the history of mankind. A multitude of legends and historical facts linked to the cedar contribute to the sacred character surrounding this tree, to the extent that until the end of the nineteenth the Maronite Church used to excommunicate those who dared to harm any one of those sacred trees. A local belief pretends that the Transfiguration of Jesus Christ occurred in this sacred forest. The church of the Transfiguration, built at the heart of the forest is visited by thousands of pilgrims every year in August, to celebrate this very important event in the Christianity. Local beliefs pretend that as God has planted those trees, He will look after them and protect them. Since the seventeenth century this sacred forest is visited by pilgrims and tourists coming from all over the world to pray and to admire its beauty and the charm of its monumental trees. Historical information confirms that the famous cedar forests of Lebanon had started to be threatened during the period of Justinian the first, in the sixth century ad. Around 1870, the Queen Victoria of England has ordered the building of a stone wall around the forest to protect it.

The Kannoubine valley is surrounded by traditional villages, distinguished by specific characters, charm and uniqueness. They show traces of very old human occupation, offer a traditional architecture of a great interest and contain some perfectly preserved water mills. The Qadisha Valley and the Cedars of God Forest are on the World Heritage list since 1998.

## **2. The Economical, Touristic and Heritage Challenges linked to the Valley**

As in most of the rural areas in the Mediterranean region, the valley was exploited since centuries or even millenniums. This exploitation has shaped the landscape. The space is organized around four main components: the *hortus* (gardens around the houses and the convents with an intensive cultivation of fruits and vegetables); the *ager* (cereals and legumes on terraces); the *silva* (the forest for the wood and the fuel-wood, frequently grazed) and the *saltus* (an intermediary woody space used for pastoralism, and for some temporary cultures). The land being on very steep slopes, the development of agriculture was only possible with the building of terraces which have increased both the surface to be planted and the water holding capacity of the soil. It is on these terraces that was developed the culture of the olive tree (for olives and for oil), the vines (for the grapes, the Arak, the table wine and the church wine), the mulberries (for the fruits and for the silkworms), different fruit trees, cereals, pulses and vegetables. Those cultures were very difficult to maintain and very demanding in manpower. The monks had to share their time between prayers, religious obligations and farming. The local peasants were spending their time on agriculture for survival.

The different economical and socio-political crisis that occurred in the region, have forced the local people to abandon their villages looking for better paid jobs. The abandonment of the good practices and maintenance of the space had very negative impacts on parts of the territory because of the soil degradation resulting from abandoned and non maintained terraces. However, the abandonment of the agricultural practices had also a positive impact, that of the biological raise, or the reinstallation of the natural forest vegetation on the abandoned terraces.

Nowadays, the different forms of exploitation have lost their importance in the Valley. The forest exploitation is no longer viable; agriculture and pastoralism do not constitute the primary source of income any more. Pastoralism is no longer perceived as an activity integrated in the rural space, but rather as harm and aggression on the forest and on the natural vegetation. Local inhabitants do not seem to understand yet the importance of ecotourism in the socio-economical development. The economical value of the market and non-market products (landscape, hosting, lodging...) is far from being understood as an important potential source of income. Despite the abandonment of agriculture, forestry and pastoralism, and despite the timidity of the newly developed activities, the Valley still benefits of an emotional value in the eyes of the local inhabitants and in those of all the Lebanese people in general. This affective dimension is certainly linked to the symbol value of the Valley, and to what it represents on the historical and patrimonial levels, in terms of the history of the region, the emotions it provokes and the intimate relation it has created with the inhabitants. There is a common will to protect the Valley, to benefit of its attributes while insuring the transmission of this heritage to future generations.

### 3. Natural and Cultural Diversity: Challenges and Perspectives

The natural territory of the Qadisha is fragile and submitted to several constraints. The constraints are mainly linked to the climate and its irregularities, to the soil and the narrowness of the lands, and mainly to the human activities. In order to face these constraints, the early inhabitants have developed complex technical solutions like building terraces on the slopes.

Witnesses of the human impact on the Valley, these terraces are now an integrated part of the landscape of the Qadisha. The preservation of the Valley can only go through the preservation of the different elements that compose the landscape. The lack of interest in agriculture and the abandonment of the terraces have not only affected the organization of the landscape but have also modified the biological dynamics by provoking the reappearance of the forest and later by the enrichment of the area with native animal and plant species. At the end of the road, the continued abandonment of agro-pastoral activities in the Valley would lead to a progressive closing of the milieu, causing a deep modification of the landscape, an alteration of the biological equilibrium and a loss in the biodiversity. This situation usually leads also to an increase in the risk of occurrence of forest fires because of the thick pack of litter and dead biomass accumulating in the woodland.

Despite their economical and ecological value, the landscapes in the Valley are increasingly degraded and threatened. There is no doubt that several animal species have migrated looking for more welcoming habitats and that several plant species have completely disappeared.

The Cedar (*Cedrus libani*) remains by far the best known, the most respected but also the most overexploited species, because of its beauty and the imputrescibility of its wood. The wood from the cedar forests was used for crafts, carpentry and structures. Trees were treated as branched candlesticks: the top of the tree was trimmed at an early age causing the vertical growth of the remaining horizontal branches, giving the tree the candlestick like shape, with several trunks. At maturity, some of these trunks were timbered and the others were left on the tree to insure the sustainability and the perennality of the forest. The Cedars of God Forest was not subject to such a treatment as it has always benefited of a legendary, religious and tourist value.

The richness of the flora in the region is certainly not limited to the cedar. The plant formations of the different vegetation stages between the Valley and the Cedars of God Forest are composed of several species. The evergreen cypress (*Cupressus sempervirens*), the brutia pine (*Pinus brutia*), the oaks (*Quercus calliprinos*, *Quercus infectoria*), the plane (*Platanus orientalis*), the green laurel (*Laurus nobilis*) and the wild apple and pear trees (*Malus trilobata*) and (*Pyrus syriaca*), are only a few species of the arborated stratum of the region. They are accompanied by different arbustive and herbaceous species, like the oregano (*Origanum syriacum*), the berberis (*Berberis libanotica*) and the sage (*Salvia trilobata*).

Although frequently accused of strongly contributing to the degradation of the natural vegetation in Lebanon, goats have always played an important role in the life and in the survival of the local inhabitants. Unlike sheep and cattle, the local goat is very dynamic and adapted to the landscape. Meat, milk and milk by-products have always provided a good source of proteins to the rural societies all over Lebanon. The fermented goat cheese is one of the countryside products that risks disappearing. Goat meat was the only red meat that was consumed, raw or cooked, until a very recent past.

The progressive disappearance of the open spaces and of the traditional agricultural and pastoral practices could cause great losses in biodiversity and agro-biodiversity. The progressive suffocation and the invasion of bushes in the agricultural fields, fruit orchards and open spaces are one of the major causes of the degradation of the landscape.

When it is abandoned, the man-built system is deteriorated and is no longer able to produce all of its amenities. Man having left and the space being abandoned, a whole page of history disappears, the charm and the mystery of the site are deteriorated. The space becomes wild and less welcoming; no one is left to maintain the landscape, cultivate the land and host visitors and tourists.

The concept of the Mediterranean garden combining the *hortus*, *ager*, *silva* and *saltus* allows for the conservation of the landscape and the preservation of the natural, landscape and cultural heritage. An

organized tourism, respecting the assets and the richness of the landscape would valorize the space by adding an element to the functional mosaic.

#### **4. Possible Scenarios**

The actual critical situation of the Valley is due to all of the stresses on the site and all the possible scenarios for the future of the Qadisha depend on the becoming of several factors conditioned by the complexity of the challenges linked to the area.

A negative scenario could be based on the appropriation of the site by external actors. Local concerned stakeholders have a diverging point of view regarding the utilization and the management of the area. If some of them are pleased with the installations and the ecological initiatives, others would see there a hindrance to their economical development which is mainly based on seasonal tourism, keeping in mind that most of the houses are transformed into secondary residences.

The local tourism would not have integrated yet all the dimension of ecotourism and sustainable development. The local inhabitants would not all have the capacity to host tourists in their premises. If some of them benefit of the support of certain ecotourism operators, the infrastructure they dispose of, is so primitive that it could not satisfy the requirements of the demanding visitors. With the exception of a few old people, barely able to look after themselves, almost no one lives in the Valley anymore. In order to be able to host people in the homes, a return to the origins has to be undertaken, with a re-edition of the traditional cooking tools and table ware and a revalorization of the traditional culinary and architectural traditions. All of this topped up with a certain comfort, a lot of hygiene and quality. A smile and a warm welcome are not always enough.

A high pressure on the land caused by buildings maladapted to the site, translating the need for urbanization and modernization, the uncontrolled mass tourism, the lack of authenticity and the almost not existing management of the area, will certainly lead to the loss of identity of the land, the runaway of the tourists and in the end the total devalorization of the site.

A positive scenario offers an ideal prospective vision. It aims at solving the different problems: the visits to the area are properly managed; the traditional rural activities are strongly implemented; forest exploitation and agro-forestry are maintained, taking into account the multiple functions of the forest; the conflicts of use are reduced with the existence of an educated category of visitors, aware of the importance of the site and respectful of the private property and by the presence of forest guards, guides and rangers; the local values are developed, without going into a cheap folklore. The development of a new form of tourism, the responsible tourism, allows for the creation of new jobs and for the valorization of the landscape. Some of the young people come back to live in the Valley, thus contributing to its blooming. The spirit of the Valley is respected. It is above anything else a « Haut Lieu » of prayers and pilgrimage. Any activity and development that does not take into consideration this spiritual dimension would lead to the destruction of the site. This scenario supposes a participatory management of the land with all the concerned stakeholders.

#### **5. Recommendations and Proposals for Action**

- An equilibrium between the *hortus*, *ager*, *silva* and *saltus* should be found, by integrating into this system some modern dimensions like ecotourism and local industries, and the implementation of social and environmental services. The sound and progressive reintroduction of human activities into the landscape of the Qadisha will allow for the redynamisation of the local economy while respecting the landscape values and favoring the proper extension of the *silva* component of this landscape.
- Traditional agriculture should be used as a tool for the maintenance of the forest and open spaces (mainly in the Valley). This will allow for the opening of the space, favor the enrichment of the biodiversity and be economically beneficial for a sustainable development policy.
- The different ecosystems should be managed at the landscape level, going beyond the limits of municipalities.
- A participatory approach should be adopted in the decision making process for all issues related to the management and development of the site.

- The management and the conservation of the sensitive species should be focused on: the habitats of the endemic species and the populations of rare and threatened species should be identified and preserved.
- The ecosystems of major interest should be preserved: cedar forests, riparian formations, particular ecotones, cliffs...
- Zones should be identified in the forest populations where trees should be allowed to grow old without any intervention and where agro-sylvo-pastoral activities should be allowed and managed.
- Strong regulations should be applied and enforced for issues like walking only on the assigned tracks, biotope protection, geological reserves...
- The landscaping aspect should be taken into consideration when undertaking and implementing structures, activities and buildings...
- Elements of the rural, historical, cultural and religious heritage should be preserved, promoted, and valorized.
- The protection and eventually the restoration of the soils and the threatened zones should be insured.
- Different uses should be conciliated by:
  - Favoring the meeting and the mediation between the different users of the site.
  - Improving the organization of the reception of the public and the management of the sensitive sites.
  - Analyzing and discussing the different proposals for the initiatives of reception of public.
  - Insuring the presence of field agents with specific missions of application of legislations and regulation of access to sensitive sites, to sites for meditation, education, follow-up and supervision.
  - Encouraging the substitution of sport activities with negative impact by activities respectful of the nature of the site.
- The actors and the users of the site should be better educated, sensitized and trained by:
- Reinforcing the education at school and youth levels on the importance of the Valley, the threats and the challenges.
  - Putting in place training sessions on the sustainable management of the Valley, for the different stakeholders: guides, land owners, politicians...
  - Involving the tourism and leisure professionals and the user groups in the conservation of the Valley and the conciliation of the uses through raising the awareness of the users on issues like the application of codes of conduct, quality charters, quality labels...

## 6. Conclusions

Tourism represents nowadays the major industry in the world. Visited for the diversity of its landscapes, the hospitality of its people and the cultural and historical richness it offers, Lebanon does not escape from this rule. With their great and rich features, the Qadisha Valley and the Cedars forest are an important local and international tourist destination. The over exploitation of the natural sites leads to an increasing pressure on the wild species and increases the stress on the natural ecosystems. This is where lies the issue of a sustainable tourism, respectful of nature and local populations and most importantly the issue of a slow tourism, where bicycling, snow showing monkey rides and trekking could replace the aggressive and intensive outdoor activities.

The fauna and flora characteristics of the Qadisha are fragile and require a real preservation effort. In this respect, the aggressions on the natural environment are many, and the biodiversity in the Valley is submitted to a perpetual degradation due to causes like increasing urban pressure disfiguring the landscape, anarchic tourism frequently disrespectful towards the site and pollution of the water resources. This leads the Valley towards a progressive loss of identity causing the strong need to have this identity rebuilt.

The religious heritage of the Valley was adapted to the natural landscape, mainly with the exploitation of the lands for agriculture (cultivated terraces...) and small industries (silk from silk worms...) and even with the domestication of the site, reputed to be hostile (troglodyte habitations, monasteries, churches...). The religious stakeholders of the Qadisha have, through the centuries, invested the

Valley. The preservation of the local biodiversity is therefore an important commitment for the perennality of the collective memory of the religious community and of the local inhabitants.

Is it not possible to integrate the conservation and the preservation of the natural heritage of the Valley into a more global landscape perception approach? Moving from the scale of the site to that of the landscape, covering the whole region in the management policy and in the creation of development options and tourist attractions in the surrounding villages, would this not represent a sustainable alternative for the management of the Valley itself?

The analysis of the interactions between the richness of the biodiversity and the landscape, cultural and historical heritage of the Qadisha has allowed for the identification of the strengths linked to the natural richness of the Valley and the threats it is subject to. Studying the specific character of the Qadisha would mean first to understand the importance of the safeguard and the preservation of the unique cultural and religious patrimony, in a privileged environment, with an exceptionally rich biodiversity and a collective memory going beyond the limits of the region to those of the whole country. The preservation of the Valley and the forest does not only concern the local inhabitants and users, the tourists, the visitors and the sports amateurs, the religious entities established in the Valley and those for whom the Valley represents a site for worship. It concerns all the future generations of the world.

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## **ANNEX II**

### **Lebanon's National Strategy for Forest Fire Management**

Extracts of the unofficial final version (April 2009), edited for the GFMC report "Forest Fire Threat in Qadisha Valley, Lebanon: Precautionary Action to Prevent Damage or Destruction of the UNESCO World Heritage Site"

#### **The current situation of forest fires in Lebanon**

Forests in Lebanon are a unique feature in the arid environment of the Eastern Mediterranean. Until June 2006, they covered approximately 13.5% of the overall area of Lebanon. Lebanese citizens, especially in rural communities, have traditionally benefited from forest resources in various ways: forest flora is exploited for beekeeping, while edible and medicinal plants, pine trees, firewood and charcoal are a valuable source of income.

Increasingly, Lebanon's forests, which include remnants of valuable broad-leaved trees, conifer forests and evergreen trees that cover the Lebanese mountains in patches, are exposed to degradation due to urbanization, pests and diseases, fires, wars, climate change, human neglect, improper management, outdated laws, and poor law enforcement. Like other Euro-Mediterranean countries, forest fires have been especially damaging Lebanon in recent years, representing one of the most important elements that destroy Lebanon's natural resources. Moreover, the absence of a national forest fire management strategy and the lack of human and technical resources contribute to the degradation of Lebanon's forests.

These factors have led to great imbalances in the forest ecosystems causing a devastating impact on the livelihoods of local communities. Recently, the fires in Lebanon have harvested large areas of green areas, noting that the percentage of forest cover has declined in a short period of time in Lebanon in recent years to 13% of its total area, after it had constituted around 35% in the years 1960-1965. This has given rise to concern at the national and international levels resulted from the risk of loss to forest cover. As such emergency steps were needed to be taken.

Shortly after the disastrous forest fires that broke out in late 2007, affecting more than 2000 hectares of land only in few days, the Lebanese Prime Minister Mr. Fouad Siniora formed and chaired a ministerial committee (Decision number 119/2007 on 6/11/2007) comprising the Minister of National Defense, the Minister of Interior and Municipalities, the Minister of Agriculture, and the Minister of the Environment to follow up forest fire prevention activities and to restore damaged forest areas. Also, a National Executive and Technical Forest Fire Prevention and Forest Restoration Committee was formed through the Decision number 118/2007 (on 6/11/2007). This committee was chaired by the Ministry of Environment and included representatives from the following ministries and institutions: the Ministry of Agriculture (MoA), the Ministry of National Defense (Lebanese Army), the Ministry of Interior and Municipalities (the General Directorate of the Civil Defense and Internal Security Forces), the Higher Relief Council (HRC), the Council for Development and Reconstruction (CDR), the Prime Minister office, in addition to the Association for Forests, Development and Conservation (AFDC). This committee worked on drafting recommendations to address forest fire management issues, especially after the fires of 2007 and worked on attracting the necessary intellectual, human and material resources. Consequently, four working groups emerged from this committee and each was assigned the tasks to discuss one of the following subjects: equipment to combat forest fires, common operations room, training and capacity-building and development of a national strategy for forest fire management.

The Council of Ministers approved through resolution Number 138 (on 27/10/2007) a Memorandum of Understanding (MoU) between the Ministry of Environment and the Association for Forests Development and Conservation (AFDC) to develop and implement an action plan on forest fire prevention, control and forest landscape restoration. This MoU represented a successful example of a positive collaboration between the public and private sectors, precisely between the central public administrations and the civil society.

The collaboration between MoE and AFDC lead through a National Campaign of Forest Fires to in kind and in cash contributions from more than 80 individuals in addition to several funded projects related to forest fire management. Moreover, the EU funded project "Towards Developing and

Implementing a National Strategy for Forest Fire Management in Lebanon" was developed and implemented. One of the main objectives of this project was to promote Lebanon's National strategy for forest fire management.

Furthermore, the Ministry of Interior and Municipalities launched in 2008 a fundraising initiative towards the private sector in Lebanon to purchase helicopters for air fire-fighting to be used by the Lebanese Army as well as providing four-wheel fire-fighting vehicles for rapid intervention in forest fire control. For this purpose, the NGO "*Feu Vert*" was created in order to manage all fundraising operations and take the necessary steps for the purchase of helicopters and equipment. Moreover, the Ministry of Interior and Municipalities put efforts to develop the capacity of civil defense fire brigade in early and effective forest fire control and cover the financial and technical needs of the Directorate of Civil Defense. In addition, the Ministry of Interior and Municipalities expressed its willingness to improve the capacity of Internal Security Forces in forensic investigation in determining the cause and origin of forest fires.

It is to be noted that the Ministry of Environment prepared in 2001 "an action plan for forest fire control", which was approved by the Council of Ministers (Resolution Number 4 dated on 23/5/2002). However, there was a current need to update this plan and therefore to develop a national strategy for an integrated forest fire management with the contribution of local, regional and international stakeholders and experts. As such, the working group responsible for designing and developing the national strategy presented to main involved ministries and institutions a first draft for discussion. In May 2008, MoE and AFDC organized a workshop in collaboration with the International Union for Conservation of Nature (IUCN) to discuss ideas about an action plan for forest fire management in Lebanon. In addition, another national workshop was conducted in October 2008 to discuss a first draft of the National Strategy.

Lebanon's National strategy for forest fire management in its final version is a result of extensive work taken at the national level with the contribution of several local institutions as well as regional and international organizations, in an attempt that this strategy will achieve its foreseen results in improving the management of forest fires in the country.

### **Main strategic activities for implementation in the short term**

#### Legal requirements:

- Apply law enforcement and involve the required components in terms of incentives and punishments for improved forest fire management.
- Follow up of involved legal institutions to investigations which are started by regional police units in forest fire incidents in order to reach positive results.
- Treat regulation obstacle which is related to intervention in private lands in terms of reforestation and forest landscape restoration.

#### Administrative requirements:

- Create early intervention units at the Civil Defense for forest fire control comprising not more than 50 persons.
- Enable the common operations room for forest fire control which has been equipped at the Directorate of the Civil Defense and secure needed personnel.
- Follow up the intense communications with the municipalities which comprise affected lands by forest fires and pursue them to put as priority the maintenance of their forests as well as the prevention and control of forest fires. In addition, encourage municipalities establishing their own nurseries or nurseries owned by union of municipalities and propose the assignment of public institutions and local committees by the General Directorate of the Ministry of Interior and Municipalities to assess the capabilities and needs of municipalities in this regard and work towards allocating needed funds.
- Endure evaluating resources and needs of public administrations involved in forest fire management and continue working on securing needed equipment and maintaining existing ones, in addition to providing necessary training and capacity building through attracting additional funds.
- Enable and activate the role of the advisory committee which is indicated in the regulation law

of the Civil Defense and precisely, article 10 of the decree 1967/50 which proposes establishing this committee chaired by the Minister of Interior and Municipalities in order to continue the work that has previously been conducted by the National Executive and Technical Committee on forest fire prevention in Lebanon throughout its 6-month mandate which ended on 6-5-2008.

### **Problem Statement**

The problem of forest fires in Lebanon is complex and should not be addressed on a sectoral level. It concerns all the aspects related to forest management, prevention, suppression, and post fire management. At the administration level, it is a problem having several authorities involved in this subject from different institutions and a problem of forest policy and legislation, as much as it is a problem of equipment and capacity building.

Despite the increased efforts, fire issues increasingly threaten forest ecosystems and economic development in Lebanon. Reports accuse increases in fire frequency and severity; thus, affecting tree growth and survival as well as yield and quality of wood and non-wood forest products, wildlife habitat and the recreational, scenic, environmental and cultural value of forests. Serious fires can also cause human injuries, death, and losses in properties.

A shift is needed towards more holistic, inter-sectoral and participatory approaches to forest fire management in policy, implementation, rehabilitation and monitoring. This requires strengthening the capacity of the concerned authorities in order to address the different issues related to forest fires.

Lebanon lacks the necessary policy measures and management capacities to address a number of forest protection measures related to fire management including monitoring, prediction (early warning), preparedness, prevention, suppression and restoration. The role of local communities in the different steps related to fire management is far from being understood in its real dimension.

Experience has shown over a number of years that the reporting systems in Lebanon are weak and do not reflect the reality of the problems. This has serious repercussions on the development policy and implementation, also on the identification of the needs to be addressed.

Although a basic forest strategy was developed a few years ago, it was never implemented and responsibilities were not defined.

Several initiatives, projects and activities were elaborated in the last decades, among which we site the assistance provided by the French Government to the Ministry of Agriculture. This project has allowed the training of engineers from the Ministry of Agriculture in France, through several study tours, training and courses, on the different questions related to forest fire management and forest management. Assisted by the trained Lebanese engineers, French trainers provided a full training program to forest guards from the Ministry of Agriculture. The project has also assisted in the provision of equipment, cars, small and large trucks for immediate interventions as well as the identification of the most appropriate sites for look-out towers and water reservoirs. The implementation of the look-out towers and water reservoirs is still missing. More recently, and after the disastrous fires of 2007, emergency projects dealing with forest fire management have been funded at the national level within the framework of the National Executive and Technical Committee. Such projects included the Lebanese Recovery Fund Project "Integrated Forest Fires Management - forest fires prevention, forest fires fighting (control) and damaged forests assessment and rehabilitation", which is managed by FAO and implemented by MoE and AFDC in addition to the EU National scale funded project "Towards Developing and Implementing a National Strategy for Forest Fire Management in Lebanon", which is implemented by the Ministry of Environment in partnership with AFDC.

### **Fire Situation in Lebanon**

Fire is the main cause of damaging forests, other wooded lands along with other lands in the countries of the Mediterranean Basin in general and in Lebanon in particular. It causes enormous economic and ecological damage as well as loss of human life. A forest fire map was produced by AFDC in 2005 and

updated in 2007 showing that 28% of the total surface area of Lebanon is severely threatened by fires.

The forest fire situation in Lebanon is significantly determined by predominating climatic conditions with prolonged summers (extending from June to October and sometimes even longer), virtually no rain and average daytime temperatures well in excess of 30°C, reducing the moisture content of forest litter to below 5%. Under these conditions, a small addition of heat (lightning, a spark, a match, a cigarette butt) can still be enough to start a violent conflagration. The steep slopes and the summer and eastern dry autumn winds characterized by high speed and strong desiccating power aggravate the situation.

Among the factors that threaten the forests in Lebanon, fire constitutes the most dangerous one and causes severe ecological and economic losses and, sometimes, human injuries and death. Within some hours, fire destroys what has naturally grown over years and centuries. An increase of wildfire frequency is witnessed reaching a catastrophic dimension and serious action to reduce the negative impacts of fire should be taken. This was particularly true in October 2007, when more than 200 fires were declared in less than 24 hours, destroying thousands of hectares of forests and other wooded lands.

It must be noted however, that the fire may not destroy the forest completely. Fires might have some positive roles if they occur at a very low frequency and intensity.

After fire, some forest species have the ability to regenerate. Therefore, the forest is not lost, but it is temporarily un-stocked. Natural regeneration, assisted regeneration or reforestation will enable the land to restore its role in the land use and land cover of the country.

### **Land-Use and Climate Change**

A strongly human-influenced landscape was created by the severe human pressure and resulting activities like burning, cutting and grazing on non-arable lands and clearing, terracing, cultivating, and later abandonment of arable portions. It is not possible to understand the current vegetation patterns in Lebanon without taking into account past and current anthropogenic activities and land uses. Human intervention has been so strong that it is still making a significant impact on current and future vegetation patterns.

The changes in fire occurrence during the last decades closely reflect the recent socio-economic changes underway in several countries. Changes in traditional land-use and lifestyles, depopulation of rural areas, increases in agricultural mechanization, decreases in grazing pressure and wood gathering and increases in the urbanization of rural areas are leading to the recovery of vegetation and an increase in accumulated fuel. Land-use changes produced during the present century are parallel to the changes in the fire regime, from being few in number and affecting small areas, to becoming very numerous and affecting large extensions every year. This trend is not observed in countries/regions where traditional land uses remain the major socio-economic system.

Although the main reason for fire increase in the last decades is probably changes in land use, climatic factors should be considered as a contributing factor. Fires tend to be concentrated in summer when temperatures are high and air humidity and fuel moisture are low. The climate changes that are predicted to occur in the near future as a result of releasing greenhouse gases are likely to induce increased fire risk.

### **Forest vegetation as fuel**

Lebanese forests and other wooded lands are characterized by plant species adapted to certain natural fire regime. Nevertheless, the complex inter-relationship among humans, fire and forests has modified natural forest fire dynamics, making it rather difficult to understand and/or characterize natural forest fire regimes nowadays. This explains why Mediterranean fire dynamics is the subject of countless studies and reports.

Fire acts with different frequencies and intensities depending upon the vegetation and topography

involved. Climatic regimes determine the occurrence of fire. Thus, vegetation composition, biomass and structure depend on climate and fire frequency and intensity, while fire frequency and intensity depend in turn on vegetation biomass, structure, topography and climatic regimes.

For many Mediterranean species it is difficult to determine whether fire or any other natural or anthropogenic disturbance acted as the major selective force for their environmental adaptation. In the case of xeric pines, a "dual life strategy" may respond to both fire and intense drought periods. A number of reproductive features are described as adaptation to fire and drought, from which "serotiny" (the retention of mature seeds in a canopy-stored seed bank with synchronized cone opening and seed release with fire and extreme dry weather) must be highlighted. Certain species also tend to have a particularly high content of resin or essential oils, making them extremely flammable.

Other species, particularly the evergreen sclerophyll species have developed a morphological resistance to fire. Likewise, the presence of a large number of dormant buds ensures the production of shoots and sprouts if the aerial part of the plant is reduced by fire.

However, these adaptive traits do not provide permanent protection. The climate change exacerbation of the intensity and frequency of human-induced fires forest vegetation may cause sharp changes towards more xeric vegetation types with unpredictable ecological and socio-economic consequences. Since the Neolithic times, there are registered cases of forest vegetation replacement by the rapid expansion of fire-prone tree and shrub vegetation (i.e. with the dehiscence of rockroses (*Cistus*), or other species that produce seeds with a thick isolating tegument or rhizomes or running roots), and significant reductions or extinctions of more temperate tree species.

To this processes must be added human-induced changes caused by attempts to restore the tree cover in areas where excessive fire or other uses such as overgrazing and fuelwood extraction have caused a high level of degradation.

Reforestation is usually carried out using pioneer species, predominantly stone pines (*Pinus pinea*) established in monospecies stands. This in itself increases the risk of fire due to the continuity of fuels in closely spaced plantations as well as the concentration of fine, highly inflammable fuels.

There is still another important factor that increases the danger of fires. The socio-economic development and the changes that occurred on the livelihood systems have led to a generalized decrease in grazing and in the collection of wood and forest scrub for fuelwood and fodder. As a consequence, there has been a build-up of highly flammable forest litter. This problem is much more serious in the regions where the rural population has abandoned the traditional lifestyles (managing large numbers of ruminants and gathering great quantities of fuelwood and other products from the forests for domestic use) than it is in the regions where grazing and other forms of forest related activities are still an integral part of the system.

Another cause of increases in forest fuels is the shift of population from the rural areas to the cities. As a result, large stretches of marginal farmland, especially in mountain areas, have been left uncultivated and have been colonized by bush and even natural pine groves.

The population drift does not imply the total elimination of activities in the forest area. Some of the remaining rural population use fire to eliminate stubble and renew pastures; the increase in tourism is a recent form of forest related activities that is increasing the risk of fires. However, the large accumulation of fuels often allows fires set for agricultural and tourism purposes to spread out of control and develop unprecedented intensities and severities which increase the difficulty of putting them out and creates a disturbance in the ecosystems.

## **Causes of Fires**

Lack of data on forest fires and their causes are a major obstacle in understanding the nature of forest fires. Information is needed to describe the magnitude and urgency of the problem to decision makers and make them prioritize the necessary measures. Information is also essential to draw the most appropriate strategies and policies.

Statistics on the causes of forest fire are far from being complete, but it is evident that people set the majority of fires. Natural agents such as lightning do indeed cause forest fires. However, the climatic conditions in Lebanon are not favorable for such fires, as thunder storms occur in winter when the vegetation is no longer susceptible to fire. The most common causes of fire are the following:

- Farmers who use fire to eliminate crop stubble and push back the forest to make room for agricultural expansion. In spite of the obvious risks, farmers might set fire to agricultural residues even when large out-of-control fires are burning in the same area.
- Careless smokers and excursionists who throw lit cigarettes on the forest litter or along the roads and light cooking fires without taking the necessary precautions to extinguish them properly.
- Burning solid wastes (municipal wastes and those left by tourists and recreational users) and the disposal of garbage by burning being often carried out in conditions of high fire risk without taking the necessary precautions.
- Fixed installations such as high voltage power lines that are implemented above forest areas.
- Arsons that set fires for destruction, vengeance, conflicts, and changes in land-use classification...
- Fireworks (pyrotechnics)

### **Needs and Limitations**

From the analysis of forest fires, the following needs and limitations can be drawn:

- Scattered responsibilities among different administrations and lack of a coordination mechanism among all concerned stakeholders by forest fires.
- A common database on forest fires is still missing. Data, when it exists, is scattered, non-homogenous and difficult to process.
- Collaboration with neighboring countries and international assistance on forest fire issues is very limited.
- Research on forest fires is weak.
- The analysis of the actual direct and indirect effects of forest fires is at a very preliminary level, failing to identify and estimate the real burden posed on the economy and society from forest fires.
- An integrated approach is needed both in forest planning and management of forest fires.
- Forests are not viewed as a common good having vital links with the local economies. Communities do not feel part of forest management.
- Public awareness on the values of forest other than direct timber production is not adequately promoted.
- There is a lack of a clear management approach on forest fires issues. Forest fires are treated as a natural disaster only and analyzed (depending on the case) as either an effect of the development and management policies, an inherent part of the Mediterranean ecosystems, or a voluntary action aiming at destroying the natural heritage, and in some cases as a management tool for forests.
- Sectoral policies (agricultural policy, tourism development, urban development, etc.), contribute to a non-sustainable process, which in turn increases the distortions between communities and the forests.
- Presence of non-integrated forest policy, despite its importance for the forests.
- Fighting forest fires is in most cases seen as a reaction to a natural catastrophe, independently from the actual root causes and forest management policies and practice.
- Absence of expertise to determine the causes of fire and weak law enforcement to punish arsonists.
- Lack of awareness at all levels (about fires, its causes and ways of prevention...).
- The employment status of the fire brigade (Civil Defense) and other stakeholders concerned with fire suppression.
- Lack of human resources, administrative cadre, equipment and tools in the concerned ministries.

The major needs in terms of forest fires management and control are the following:

- Institutional building
- Vocational training
- Early warning systems and preparedness plans
- Evaluation of the vulnerability of stands
- Critical seasons (olive/pine related activities...)

The needs could be answered through:

- Capacity building programmes involving all concerned actors
- Community participation (training and implementation)
- Early warning system (providing links with EU system)
- Policy and forest law review
- Networking on issues like prevention and post-fire
- Offering needed equipment and tools for involved administrations (forest guard stations of the Ministry of Agriculture, Civil Defense centers, Lebanese Air Force, local authorities)

## **Collaboration**

International agencies and unions have developed policies and strategies to promote the protection of the Mediterranean countries from forest fires. Their role is in most cases theoretical. Treaties and agreements for cooperation exist, but only a few measures are taken on the ground. Most agreements concerning forest fires are part of broader forestry policies, strategies for civil protection and environmental declarations. The issue of trans-boundary cooperation and collaboration remains a crucial aspect to be emphasized.

An effective Mediterranean forest fire initiative does not exist in any international organization, besides some meetings and research projects are still without any application. The Mediterranean has its own specific characteristics that define the way forest fires should be controlled and cannot simply be a sub-unit of a larger international policy. However, the activities of Silva Mediterranea with its role as a regional network within the Global Wildland Fire Network is a promising arrangement that may be instrumental for intra- and inter-regional cooperation in forest fire management.

## **Community involvement**

Local populations have a low level of awareness concerning their attitude to forest fire protection. They often burn forests by mistake, using fire as a tool in the wrong time and at the wrong place. People also burn forests on purpose in order to replace them with other land uses that may bring short-term profit. This indicates that people are not aware of the long-term value of forests and the services they provide. They cannot connect the forest with their own quality of life. While the link between forest fires, poverty and land-uses should be properly addressed, community participation is crucial at all levels of forest fire management.

Some community-based organizations and active NGOs are playing a very important role in fire prevention and suppression in Lebanon. Such organizations should be encouraged and supported by the Government and international organizations, bi-lateral and multi-lateral partners.

## **Section 2: The strategy**

### **Aim of the strategy and its main components**

Aim of the strategy: Reducing the risk of intense and frequent forest fires whilst allowing for fire regimes that are socially, economically and ecologically sustainable.

There is widespread acceptance among fire management agencies that decisions about fire management are best made within a risk-management framework, known as the 5Rs:

(1) Research, information and analysis; (2) Risk modification, including fire vulnerability reduction and

prevention of harmful fires; (3) Readiness, covering all provisions intended to improve interventions and safety in the event of fire; (4) Response, including all means of intervention for fire suppression; and (5) Recovery, including the rehabilitation and ecological restoration of healthy forest conditions, and the support to individuals and communities in the short- and medium term aftermath of the fire.

### **First component: Research, Information and Analysis**

The natural forest fire regimes in the region are poorly known due to the ancient alteration of the natural vegetation by people. Moreover, fire regimes are nowadays ruled by complex and often badly known root-causes driven by socio-economic conflicts and destructive human behaviors. A number of regional networks, mainly linking Mediterranean countries with the European Union, were established in the last years to exchange and improve know-how for understanding the root-causes of fires, the dynamics of different fire regimes, and the ecology of fire of the different Mediterranean forest ecosystems and related uses. It is necessary to reinforce the existing organizations and institutions/programmes working on fire related issues in Lebanon, supporting them to set-up specific forest fires curricula and research work, join existing networks researching on fire ecology issues in the region and develop exchanges with "nodes of expertise" on fire ecology issues.

National detection and monitoring networks based on fixed and mobile stations are established in several countries. In some cases, these operations are being automated with the use of infrared sensors and remote television monitors, sometimes powered by photovoltaic cells. The high cost of aerial monitoring places serious constraints on its wide use. In any case, hi-tech systems cannot replace ground-level technicians with a good working knowledge of the terrain. The experienced person is still and will continue to be a basic cog in the detection wheel.

Monitoring from look-out towers is a very widespread technique that is used in several countries. This activity is usually supplemented by ground patrols made up of foresters with a good knowledge of the area. In some cases, visual assessment could be complemented by automated infrared systems. Interestingly, fires are often first reported by local inhabitants.

Danger-rating systems are another essential element of fire control. This requires close cooperation with the national meteorological services, and the development of fire behavior models and indices. Relevant and adequate meteorological data should be made available in order to develop daily danger indices based on local weather forecasts, calculated over several years.

Improving knowledge on fire related issues requires effective monitoring systems (indicators to be measured, methodologies and databases) for the collection and analysis of relevant data (qualitative and quantitative) over time. By doing so, it will be important to bridge innovative fire management knowledge with traditional management practices. A good monitoring system will also allow evaluating the implementation and effectiveness of the National Fire Strategy.

#### Strategic Objective:

To support and promote the improvement, know-how sharing, monitoring and dissemination of knowledge on fire ecology, fire management and post-fire vegetation dynamics among all relevant actors (science/research, policy makers, land managers, grassroots? groups), bridging science and traditional knowledge.

Activities should be undertaken in close collaboration among all concerned stakeholders:

- Reinforce the existing organizations and institutions/programmes working on fire related issues (in capacity building, human and financial resources) and support them to join existing networks researching on fire issues in the region and develop exchanges with "nodes of expertise" on fire issues.
- Set-up specific forest curricula in universities/research institutions where forest fire experts should be prepared and undertake research work.
- Develop effective monitoring systems (indicators to be measured, methodologies, databases) and set up systems for the collection of relevant data (qualitative and quantitative).
- Develop daily danger indices based on weather conditions, vegetation types and prevailing

- activities; developing a comprehensive danger-rating system.
- Develop fire behavior models and/or combustibility models to allow fire-fighting brigades to better predict the fires and better manage them.
- Develop an annual comprehensive data base on forest fires.
- Monitor fires after suppression to avoid re-ignition.
- Archive and report data and information use to simulate forest dynamics as well as trends to monitor and detect fires.
- Develop objectively verifiable indicators which can evaluate the success or failure of the National Forest Fire strategy and the adoption of fire risk reduction means in all concerned sectoral policies.

## **Second component: Risk Modification (Fire Vulnerability Reduction and Prevention of Harmful Fires)**

Land owners, users and managers have a major role in fire risk reduction. Participatory spatial planning processes, in large territorial units where large-scale disturbances such as harmful fires occur, are being adopted by some Mediterranean countries where fires have caused enormous damages in the last years. Participatory spatial planning has the objective to get the active involvement of all concerned stakeholders in the identification/mapping of:

- High fire risk areas
- Resilient land use types and landscape patterns with the spatial distribution of uses and infrastructures which result more efficient to reduce the risk of fire

Although participatory planning processes help raise awareness of local actors about fire risk reduction options, trade off mechanisms (i.e. economic compensations and incentives) are needed to get the buy-in of individuals and communities and empower them to adopt resilient uses and management practices. The implementation of trade off mechanisms requires the revision of all sectoral policies concerned by fire risk reduction and the establishment of flexible legal frameworks supporting the adoption of resilient land uses and management practices.

Prevention activities can be divided into two broad areas: those aimed at mitigating the flammability of the vegetation, and those directed at the primary cause of fire, which in most of the cases is due to negligence or arson. Knowledge of the causes of forest fire is a precondition for the implementation of suitable solutions.

Mitigating the flammability of the vegetation implies the adoption of adequate forestry and land management practices which help reduce dry biomass and fuel continuity in the landscape. It requires modeling and testing innovative options adapted to the ecological and socio-economic context of the Lebanese rural areas and to the climate change predictions for the region. Fuel management involves such highly diverse techniques as grubbing and pruning, tree thinning, brushwood crushing, prescribed burning, controlled grazing and species selection.

Protective techniques need to be integrated into overall silvicultural practices, which have generally concentrated on regeneration and production. Selection of specific techniques must be determined by the prevailing physical, economic and social conditions. For example, in areas where there are forest-grazing conflicts, controlled grazing should be encouraged rather than prohibited. If properly timed and controlled, grazing enables fine fuel accumulation to be reduced and involves pastoralists in forest management.

The major problems in applying efficient preventive silviculture are the extent of the area to be treated and the cost of the labor required.

Prescribed or controlled burning is still not used in Lebanon, despite the advantages of this low cost land management technique. However, it must be noted that this technique is highly dependent on the climatic conditions and requires very well trained personnel. Different intervention methods must therefore be combined and adapted to specific situations.

Almost all Mediterranean countries have adopted measures to increase public awareness of forest

fires, and the focus is nearly always on accidentally caused fires. The target is the adult public - residents or tourists - located in areas of risk. School children are also the target of specific programmes.

The situation regarding the rural population, however, requires a different approach. In fact, campaigns developed for urban populations may even be counterproductive with a rural public. Generally, rural dwellers have a good basic knowledge of the positive influence of forests on the microclimate and of their effect in reducing erosion, and of the potentially negative effects of fire. The rural population needs to be involved in forest economics. People need to be clearly informed about the damage wildfire causes to the long-term potential of their farming and livestock operations. It is also necessary to give precise information on who is, in fact, affected by fires, with a concentration on the effect on both public and private lands.

Provisions for the prevention of accidental fires associated with installations (railways, rubbish dumps, power lines, etc.) do not exist in Lebanon. The prevention is generally poorly considered in the list of available policy and administrative measures.

Preventive efforts must be supported by legislation clearly establishing the setting of incendiary fire as a crime and penalizing offenders in proportion to the damage caused. However, this component should never be the main element of prevention efforts. In some parts of the world, it has been observed, that the heavier the punishments provided by the law, the more difficult it is to prove arson and the more the courts hesitate to condemn arsonists.

Among the legal provisions that could be implemented, three merit special consideration:

- Punishments brought on the parties at fault in the case of fire. Legal instruments developed to punish the guilty parties responsible for setting a fire, either deliberately or not.
- Regulations restricting the right to light fires. Prohibiting the use of fire (including smoking) in forests and near their boundaries during the period regarded as high risk, including on privately owned land.
- Regulations obliging the clearing of the undergrowth. Some countries have adopted provisions in their forestry laws aiming at obliging forest owners to clear the undergrowth around the houses, along roads and/or railways. Undergrowth clearance can be interpreted as much as a measure of prevention (aimed at preventing ignition) as a measure of pre-suppression (aimed at making roads safe).

Minimizing the risk of fire and preventing harmful fires has four main elements:

1. Spatial planning processes to ensure that natural and built assets are identified in relation to fire risk and to agree on landscapes with more resilient types of land uses and spatial distribution of uses and infrastructures within territorial units.
2. The adoption of management practices within the landscape to help minimizing the risk of damage to life, the natural environment and built assets.
3. The establishment of policies and economic instruments to support land owners, users and managers in the adoption of risk reduction management practices and land uses.
4. Reducing the frequency of ignitions that result from arson and carelessness.

#### Strategic Objective:

To develop effective measures intending to reduce fire vulnerability, to increase ecological and social resilience to fire, and to prevent the occurrence of harmful fires and unsustainable fire regimes.

Activities should be undertaken in close collaboration among all concerned stakeholders

- Develop and implement a Fire Danger Rating System and risk mapping at national and municipality level.
- Identify opportunities and needs to allow land owners/users adopt the identified fire resilient land uses.
- Develop and explore opportunities (i.e. innovative management systems, economic

incentives, etc) to help adopt fire resilient land uses and landscape pattern. Modify risk through a number of means (i.e. traditional farming practices with some controlled and enforced livestock grazing in forests; encouragement of sustainable fuel wood collection; Incentives for farmers/herders not to burn crop residue and pastures during "fire danger times"; encouragement of Non-Wood Forest Products which can play a role at reducing risk; encouragement of "green fuel breaks" across the landscape; incentives for farmers to have ploughed fuel breaks around the perimeter of fields).

- Promote the role of agricultural cooperatives in fire risk modifications where resources can be pooled by local farmers.
- Develop preventive silviculture and fuel management aiming at reducing the highly flammable biomass and management of the forests to increase their resistance to fires (or reduce their susceptibility to fires); this includes but is not limited to grubbing and pruning, tree thinning, brushwood crushing, prescribed burning, controlled grazing and species selection.
- Develop an inventory (mapping) of dangerous infrastructures (i.e. power lines) within the territory.
- Analyze the probability of intervention (depending on causes and social groups) to modify habits (behavior) and change dangerous uses.
- Include a course on civil defense in scholar and academic curricula
- Conduct private sector fund raising in order to finance awareness campaign.
- Raise awareness at all levels of population; awareness varies with population types (urban and rural; schools; universities, decision makers...). Involve aware individuals from the same target groups (i.e. farmers, shepherds) to whom awareness raising and surveillance campaigns are addressed, in the awareness, education and surveillance actions.
- Consider provisions for prevention of fires associated with installations (clearing under high voltage lines, and equipping the lines with visibility balls; rubbish dumps; road sides; picnic and camping sites...).
- Review legislations, including revision of current legislation, drawing new laws, empowerment of law enforcement authorities: forest law, land zoning and classification law and land tenure law).
- Consider higher involvement of municipalities in all levels of forest management, including incentives and income generating activities.
- Involve of religious authorities and political parties.
- Equip and activate the Forest stations owned by the Ministry of Agriculture and distributed all over Lebanon.

### **Third component: Readiness or Pre-suppression**

The establishment of fire-fighting infrastructures for the early detection and fighting of fires is carried out in a very similar way throughout the Mediterranean basin. It is based on the creation of tracks, observation towers, firebreaks and water reserves. This work is often designed within the framework of traditional management projects. The adequate distribution, sufficient numbers and good maintenance of these infrastructures is an important issue. New GIS systems help better plan and distribute fire-fighting infrastructures in the territory. These infrastructures should take into account the recent technical developments such as the advent of large water carriers or air-tanker helicopters. The creation of additional tracks is however controversial, as these tracks may open the way for arsons, fire setters, campers and picnickers; they can also open the way for new settlements and urban crawl. If they are to be opened, they should be controlled and subject to a very specific regulation.

The weather forecast is used to mobilize means of suppression in advance. A considerable effort to establish weather stations that record temperature, humidity and wind speed and direction should be made.

Raising awareness and know-how of land users helps in rapidly detecting and informing about fires at the very early stages. This helps in conducting rapid response to a fire occurrence. Moreover, the maintenance of rural people as well as uses in high fire risk areas and the incorporation of preventive measures in their management practices (i.e. reducing fuel through grazing in high fire risk areas) facilitate early interventions and reduce the probability of harmful fires.

Being prepared for a fire before it occurs also requires the establishment of a clear mechanism for

clarifying and clearly defining the roles and authority of each agency in decision making and communications of fire incidents and the role of decentralized units. This requires a clarification of the current coordination between the various stakeholder agencies and a clear definition of effective organizational structure and coordination systems.

It is important to set up a mechanism to educate and target the various land users groups of how to respond to a fire. An existing option which has been implemented in many other countries and regions throughout the world with success is the establishment of "Community Fire Units" (CFUs) with well trained members of the village/town/community prepared with necessary equipment with the role to act as the first to suppress the fire, whilst waiting for further back up depending upon the size of the fire. They can also play an important role in preventative actions within their communities.

All people involved in fire fighting activities should be well trained and equipped. Annual training activities should be organized for the different social groups; training activities involving at the same time different stakeholders who may act in the same fire-fighting activities and may need coordination among them. Thus, training for the right use of equipment is required.

#### Strategic Objective:

To undertake all possible provisions by individuals, communities and fire and land management agencies to be prepared before a fire event occurs, and improve interventions and safety in monitoring the probability of fire and detecting the event of fire.

Activities should be undertaken in close collaboration among all concerned stakeholders:

- Develop and implement a technical capacity building program towards the Civil Defense.
- Benefit from weather forecast and weather monitoring system for improving readiness.
- Conduct a proper distribution at the landscape level of fire-fighting infrastructures and conduct an inventory of current fire fighting resources which are available and desired future resources (aerial and ground infrastructure) such as fire lookout towers, water reservoirs, forest tracks and road network in general, forest strips with low tree density and low shrub cover, fire break areas of first and second level, forest tracks with fire break lines along them, protection perimeters in urbanized areas and fire fighting units.
- Consider the conciliation of interests regarding fire-fighting infrastructures, which may also benefit the local population, and may reduce the maintenance costs (i.e. Green fire breaks for grazing activities and water reservoirs in order to increase the water availability in all the forest areas).
- Maintain forest roads and tracks allowing the access of the fire suppression teams to all the forests (setting criteria; identification of needs).
- Clearing under high voltage lines and using red balloons on the electric wires to alert helicopters.
- The promotion of cooperative surveillance programs (incorporating community and Forestry and Natural Resources Department) including neighborhood watch programs and patrols in high risk areas during severe fire weather conditions.
- Setting up a mechanism to educate and target the various land users groups about how to respond to a fire. An option exists which has been implemented in many other countries and regions throughout the world with success is the establishment of "Community Fire Units" (CFUs) with well trained members of the village/town/community prepared with necessary equipment with the role to act as the first to suppress the fire, whilst waiting for further back up depending upon the size of the fire. They can also play an important role in preventative actions and within their communities.
- Development of a protocol for establishing "community fire units?", firstly trialing community fire units/volunteers at a smaller scale to see if they can be effective within a Lebanese setting.
- Activate the role of municipalities located within forest sensitive areas to increase readiness.

#### **Fourth component: Response**

In ideal conditions, the fire should be suppressed within the first 20 minutes after it starts. If not, it becomes a wild land fire, which is very difficult to control.

Having trained personnel available in sufficient numbers is a basic condition for successful suppression work. The organizational scheme providing the best level of protection is one consisting of a general, permanent fire service which is reinforced with additional resources and personnel during critical periods. The dimensions of the basic service will be determined by the overall risk of fire. The correct functioning of such a system requires a suitable legal framework in which jurisdictions and responsibilities (who has the authority to mobilize forces, for example) are clearly delimited.

The efforts of land-based suppression forces are reinforced in many Mediterranean countries by fleets of aircraft (mostly amphibious) and helicopters. The use of helicopters is assuming increasing importance, particularly in the transport of fire crews to difficult locations.

Helicopters equipped with water belly-tanks are the most adapted for the conditions in Lebanon. Their built in submersible water pump and their smooth mobility give them the capacity to fill their tanks from any existing water reservoir, truck equipped with a reservoir, forest based water reservoirs or even private swimming pools. As their engines do not need to be warmed up before the flight, they have the capacity to fly immediately after the alert is given; aircrafts require some warming up time before they are able to fly, which retards their intervention capacity.

Airborne suppression activities must not be viewed as a substitute for land-based efforts, particularly in view of the high costs involved. If land-based forces are not sufficient, the introduction of additional airborne forces will not improve overall efficiency and may even retard future development as resources which could have been better invested in the formation of land-based brigades are diverted. Apart from their direct costs, airborne forces require an additional infrastructure of personnel and facilities.

It should be noted that fire brigades are usually trained to combat fires in urban areas and in cities, but cannot necessarily fight forest fires. If fire brigades should combat forest fires, they should be trained and their capacities must be built accordingly.

Legal frameworks should be implemented at the country levels in order to improve the coordination among the different actors concerned by forest fires. The example of Cyprus is worth mentioning as the forestry service is in charge of all forest fires and all fires that could affect the forests, while the mandate of the fire brigade is to protect people and properties in urbanized areas.

#### Strategic Objective:

Suppress the fires within the first 20 minutes after they start and limit the extension of fires through the development of methods and techniques coupled with appropriate material and very well trained personnel.

Activities should be undertaken in close collaboration among all concerned stakeholders

- Empower and build the capacities of the Civil Defense to fight forest fires.
- Train other stakeholders on fire suppression to assist the Civil Defense or to interfere at the early stages of the fire, thus avoiding the expansion of the fires and organizing common training activities.
- Develop the capabilities of air fire fighting by helicopters.
- Develop an appropriate legal framework and empower the law enforcement agencies to better punish those in charge of the voluntary or non-voluntary (accidental) fires.
- Develop and implement an appropriate legal framework for the establishment of a common forest-fire operations room or that would insure the coordination of fire suppression activities and implement the most appropriate coordination mechanism among all concerned stakeholders.
- Provide fire fighting personnel, including NGOs and CBOs with the most adapted and most appropriate equipment, based on the level of intervention of each stakeholder.
- Monitor fires after suppression to prevent restarting.
- Improve the role of municipalities in fire suppression.

### **Fifth component: Recovery, Post-fire Management and Rehabilitation**

The development of a strategy to help local communities recover from the social and economic damages after fire is necessary. The revision and improvement of current policies should well determine the needs of individuals and communities which may range from temporary emergency housing to financial support mechanisms. An example of support is from the European Union which has established the EU "Solidarity Fund" which gives support directly after major disasters. Consultations with various stakeholders for this process are extremely needed.

#### Strategic Objective:

Provide support for individuals and communities in the immediate aftermath of the fire as well as in the medium and longer term efforts of community and economic renewal, and restore healthy ecological conditions of burned forest land to facilitate the natural recovery of vegetation and increase forest resilience against future fires.

Activities should be undertaken in close collaboration among all concerned stakeholders:

- Analyze the post-fire emergency needs of individuals and communities and establish a "Solidarity Fund" which gives them adequate support.
- Map fire affected areas and assess the impact of fire on different vegetation types
- Prohibit grazing in burned forests (forest law prohibits grazing for the 10 years following a destructive forest fire) and prohibit land use change of a burned forest for the 10 years following a fire.
- Implement activities aiming at the reduction of soil erosion when the winter starts, as erosion is one of the most severe fire consequences.
- Develop post-fire active restoration/rehabilitation protocols and activities (forest landscape restoration), facilitate natural forest regeneration and undertake reforestation activities in areas where regeneration is not possible.
- Support ecological restoration actions undertaken by the Department of forests and natural resource to recover resilient vegetation types for reducing fire risk and assist the natural regeneration by protecting the burned ones.
- Develop post-fire snags and woody debris management guidelines for the Lebanese forest ecosystems and forest areas, and modify the existing legislation that prohibits the removal of burned trees accordingly.
- Develop a national reporting system, based on statistics as well as the common post-fire ID cards and expand a national data base on forest fires, their occurrence, and the ecosystems where they emerge and the exact climatic conditions at the time of emergence. This would substantively contribute to better manage the forest fires in the future. The common Post-fire ID card (Prime Minister Decision No. 256 dated 1 March 2008) is to be adopted as a basis for producing the national statistics on fire, knowing that some statistics are available in some ministries and organizations.
- Involving the local communities in the different activities related to post-fire management in addition to identifying socio-economic opportunities to link forest restoration and local development (i.e. local tree nurseries for the production and marketing of aromatic/medicinal native plant species).

## A common approach for forest fire management

Different countries have different ways of organizing their fight against forest fires. There is no critical description of the weaknesses and advantages of the systems applied. The philosophy of forest fire prevention is based on the creation of tracks, firebreaks and water reserves. This work is often designed within the framework of traditional management projects. The maintenance of these networks is an important issue. The main trend in forest fire management can be a mixed system with distributed roles and responsibilities with involving the Ministries of Agriculture, Interior and municipalities, Environment, in addition to other ministries and NGOs.

The advantages of the mixed fire protection system are:

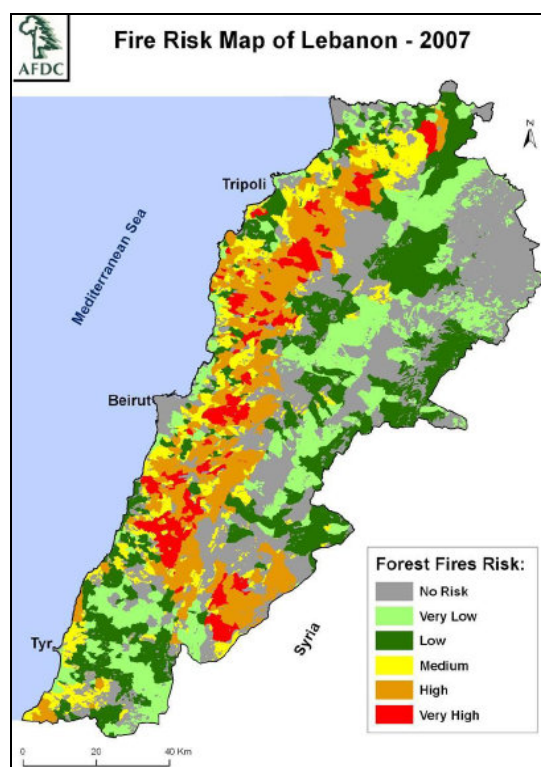
- Improvement of the effectiveness of detection and rapid response,
- Well trained personnel in fire suppression (not in all cases), and
- Ability to use more personnel, expensive tools and high technology facilities.

The main obstacles of the mixed forest fire management system are:

- Coordination between the agencies is an absolute prerequisite for the effectiveness of the system and this is not easily the case due to the differences in mentality, training and background.
- Different players usually represent different policies and a common forest fire policy is not applied - or existing.
- Forest fire management is a complex issue that needs feedback among all stages and cannot be separated into pieces.

In any case, suppression mechanisms should act complementary to the specific prevention and management measures within the framework of a solid policy for forest fire protection. What counts the most is the policy under which the players operate in addition to their coordination.

Note: Annexes I (Implementation framework of the strategy) and II (List of Participants of the Workshops) of the original report are not included in this version. Annex III (Fire Risk Map of Lebanon – 2007) and the cover of the English translation are included below.



Fire Risk Map of Lebanon (Annex III of the report; left) and the cover of the unofficial English translation (right).

## Annex III

### Selected Press Coverage of the Wildfires in Lebanon, December 2010

#### Residents flee Lebanon forest fire

Monday, 6 December 2010 12:14AM

<http://www.presstv.ir/detail/154093.html>

Lebanese villagers in northern Beirut have been forced to flee their homes due to a forest fire, while firefighters are trying to bring huge flames under control. Authorities said on Sunday that numerous forest fires are threatening the village of Fatri, 45 kilometers north of Beirut. At least 150,000 square meters of woodland have been devastated. The civil defense services said that 42 separate blazes were reported over the past week, four of them large.



A fire burns at a forest in Jamhour area, Mount Lebanon, December 5, 2010.

Another large blaze is also raging on in Wadi Shahrur, close to the capital. Lebanese army helicopters are trying to douse the flames from the air, while firefighters are battling the blaze on the ground in different parts fuelled by tinderbox conditions. Municipal council leader Imad Daou said rough terrain is hampering the firefighting efforts while high winds have been fanning the flames. "Olive groves and pines have been lost," he told AFP, adding that the huge flames are also threatening to engulf the homes and frightened residents have fled their homes. Lebanese President Michel Sleiman also travelled to the village of Fatri to inspect the firefighting efforts. "We need three times more capacity to face these fires," Interior Minister Ziad Baroud told reporters. The blaze has claimed no lives, but six civil defense personnel have been injured.

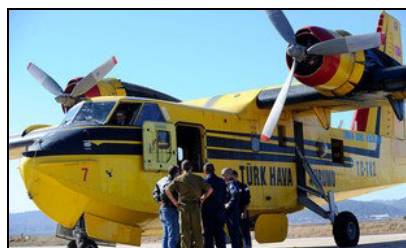
FTP/AGB/MGH

#### Turkish planes depart Israel to fight Lebanese fires

6 December 2010

<http://www.jpost.com/MiddleEast/Article.aspx?id=198249>

Over 120 fires burn through Lebanon's Cedar forests over the weekend; Hariri asks Amman and Ankara for assistance in extinguishing the blazes.



After helping to fight the Carmel fire, Turkish water-dropping airplanes made their way North - to Lebanon. At the same time that Israel was fighting the deadliest fire it had ever seen, Lebanon's cedar trees, which it features on its flag, were burning uncontrolled. According to the Lebanese paper *The Daily Star*, over 120 fires erupted over the weekend, with over 57 breaking out on Sunday. The largest fires were concentrated in the Wadi Shahrour and Baabda regions of the country where over 150,000 square meters have been charred. Speaking to the *Daily Star*, Lebanese Interior Minister Ziyad Baroud said that although the fires are 90 percent controlled, he expressed concern that strong winds could rekindle the flames. Though Lebanese Prime Minister Sa'ad Hariri was out of the country most of the weekend, he requested fire-fighting aircraft from Amman and Ankara to augment the water-dropping helicopters Beirut was using to fight the blazes. Two Turkish planes, some of the first to arrive at the Carmel fire, made their way some 50 kilometers north of Beirut to battle a previously uncontrolled blaze in Fitri. Hariri on Monday called a meeting of Lebanese government ministers to discuss the forest fires ravaging his country.

**Lebanese Army, Civil Defense contain most forest fires raging across country. Hariri calls for urgent meeting of ministers, officials to discuss issue at Grand Serail**

[http://www.dailystar.com.lb/article.asp?edition\\_id=1&categ\\_id=2&article\\_id=122239#axzz19A7Brzhu](http://www.dailystar.com.lb/article.asp?edition_id=1&categ_id=2&article_id=122239#axzz19A7Brzhu)

By Mirella Hodeib, Daily Star staff

Monday, 6 December 2010



BEIRUT: Lebanese Army and Civil Defense teams succeeded in dousing the majority of forest fires that erupted across Lebanon over the weekend, Interior Minister Ziyad Baroud said Sunday.

Forest fires raged across the country, forcing hundreds of residents to flee their homes as flames drew near homes and prompting the Lebanese government to seek the assistance of Turkey and Jordan.

According to Baroud, 120 fires erupted over the weekend, 57 of which started Sunday. The major fires hit the villages of Fitri in the Jbeil region and Wadi Shahrour in Baabda. Families teamed up with the Lebanese Army and Civil Defense personnel in Wadi Shahrour and Fitri to contain flames that threatened homes and properties.

"The fire in Wadi Shahrour was totally extinguished, while teams succeeded in containing almost 90 percent of the fire in Fitri," the interior minister told *The Daily Star*, but expressed his concerns that overnight westerly winds would revive flames.

Baroud said four Lebanese Army helicopters and the country's newly bought three Sikorsky planes contributed to efforts to put out the flames. "But we need more helicopters, at least 10, so that our response is more efficient," he said.

President Michel Sleiman travelled to the village of Fitri to monitor efforts to control the blaze, which affected 150,000 square meters of woodland. Sleiman said political bickering in the country delayed all developmental projects. "Fires have reached the homes of innocent people who have nothing to do with politics," he said, adding that Lebanon was in dire need of crisis management strategies.

Prime Minister Saad Hariri called for an urgent meeting of ministers and concerned authorities to

discuss the issue of forest fires at the Grand Serail Monday, his office said in a statement. While still on a state-visit to Muscat Sunday, Hariri contacted Jordanian King Abdullah II and Turkish Foreign Minister Ahmet Davutoglu to send helicopters to help extinguishing fires in Lebanon. The prime minister, according to his office, also kept in contact with the interior minister to check on the progress of fire fighting operations, and informed him about the contacts he made to ask for external assistance in this regard

Baroud, meanwhile, said Spain has also offered to take part in extinguishing efforts. "Although were able to contain most of the fires, outside help is still needed in case new fires erupt."

Lebanon's southern neighbor Israel succeeded Sunday in containing fires that erupted in the Carmel hills above the Mediterranean port of Haifa. Aircraft were brought in from several countries, including Greece, Britain, Cyprus, Turkey, Russia and France to help contain the deadly blazes which claimed the lives of at least 42 people.

The eastern-Mediterranean region has witnessed unseasonably high temperatures over the past two months, threatening crops and heralding serious water shortages. Thermometers scored a high of 28 degrees Celsius in Lebanon over the weekend, a temperature rarely if ever witnessed in the country during the month of December.

Lebanon's meteorological department predicted the hot weather to ease as of Monday morning with showers and a significant drop in temperatures expected.

Baroud said lack of rain has created tinder box conditions, which facilitates the proliferation of fires. "Global warming and extremely dried out soil are the main factors behind the weekend fires," he said. Asked whether the scenario of arson was being examined, the interior minister said: "I really cannot tell but I have my doubts." He said 120 fires erupting over a period of two days only "raises serious questions."

### **Rain Finally Arrives, Dousing Dozens of Forest Fires**

<http://www.naharnet.com/domino/tn/NewsDesk.nsf/getstory?openform&5B38FA780D60879BC22577F1001C2FB1>

Beirut, 06 Dec 10, 07:16



Lebanon on Monday finally received the much-awaited rain that helped douse dozens of forest fires, including a 7-day blaze on the outskirts of the Jbeil town of Fatri. "The sky saved the earth," said the Voice of Lebanon radio station. "Heavenly rains did what mankind failed to do," it added. Interior Minister Ziad Baroud on Sunday announced that around 120 forest fires were raging across the country, including four major blazes. Well into the night Sunday, firefighters, backed by Lebanese army helicopters, battled to contain a seven-day blaze on the outskirts of the Jbeil town of Fatri. But they failed. Thanks to heavy rains which started pouring on Lebanon in the early morning hours, helping put out the fires. Civil Defense chief Darwish Hobeika said 75 percent of the fires were "deliberate." Prime Minister Saad Hariri called from Oman for a Cabinet meeting to be held on Monday to discuss the fires.

## ANNEX IV

### Looking beyond Qadisha Valley: Fire problems in other UNESCO World Heritage Sites

The World Heritage List includes 911 properties forming part of the cultural and natural heritage which the World Heritage Committee considers as having outstanding universal value. These include 704 cultural, 180 natural and 27 mixed properties in 151 States Parties. As of June 2010, 187 States Parties have ratified the World Heritage Convention.

Besides Qadisha Valley there are only a few World Heritage sites that are threatened by land-use change and in which fire management may play a role for maintaining these cultural and natural heritage sites. Two examples reveal the relevance of fire as a disturbance factor, both in a negative and a positive sense.

#### Germany: Upper Middle Rhine Valley <sup>6</sup>

The 65km-stretch of the Middle Rhine Valley, with its castles, historic towns and vineyards, graphically illustrates the long history of human involvement with a dramatic and varied natural landscape. It is intimately associated with history and legend and for centuries has exercised a powerful influence on writers, artists and composers.

Criteria:

- Criterion (ii): As one of the most important transport routes in Europe, the Middle Rhine Valley has for two millennia facilitated the exchange of culture between the Mediterranean region and the north.
- Criterion (iv): The Middle Rhine Valley is an outstanding organic cultural landscape, the present-day character of which is determined both by its geomorphological and geological setting and by the human interventions, such as settlements, transport infrastructure, and land-use, that it has undergone over two thousand years.
- Criterion (v): The Middle Rhine Valley is an outstanding example of an evolving traditional way of life and means of communication in a narrow river valley. The terracing of its steep slopes in particular has shaped the landscape in many ways for more than two millennia. However, this form of land-use is under threat from the socio-economic pressures of the present day.

#### Fire-related problems identified



The slopes of the Middle Rhine Valley had been cultivated by viticulture for centuries. The right photograph shows the typical small-scale terraced vineyards on steep slope sites. In the late 20<sup>th</sup> Century, however, the vineyards were widely abandoned because use of mechanized harvest and maintenance methods on these extreme slopes were restricted an almost impossible. Subsequently the terraces disappeared visually as a consequence of fallow and rapid brush and tree succession.

<sup>6</sup> Launched 26 June 2002: <http://whc.unesco.org/en/list/1066>



Soon after inclusion of the valley in the World Heritage List it became apparent that the impression of the terraced landscape of the Upper Middle Rhine Valley would disappear. A research project looked into alternative methods for keeping the slopes and terraces open. This included the use of prescribed fire, grazing and mechanical treatment of invading vegetation. Prescribed burning experiments were conducted by GFMC.

However, even if there were some successful examples of removing bush encroachment by methods substituting traditional viticulture, this approach does not seem to be sustainable.

Recent developments, however, are encouraging: In 2009 media reports revealed a reviving interest of the young generation to reactivate viticulture in the valley.<sup>7</sup>



Viticulturist initiative "Summiteers" – to reconquer the mountains and reactivate steep-slope viticulture.

This example may encourage COSAQ to investigate if incentives could be considered to reactivate land use in the valley.

### **Sri Lanka: Central Highlands with Knuckles Conservation Forest <sup>8</sup>**

The Central Highlands of Sri Lanka is a serial property comprising three component parts: Peak Wilderness Protected Area, Horton Plains National Park and Knuckles Conservation Forest. Its forests are globally important and provide habitat for an exceptional number of endemic species of flora and fauna. The property includes the largest and least disturbed remaining areas of the submontane and

<sup>7</sup> [http://www.yoopress.com/de/weinnews/weinwelt/weinbaugebiete/773.Gipfelstuermer\\_rettet\\_Weinberge\\_-\\_Winzerinitiative\\_Mittelrhein.html](http://www.yoopress.com/de/weinnews/weinwelt/weinbaugebiete/773.Gipfelstuermer_rettet_Weinberge_-_Winzerinitiative_Mittelrhein.html)

<sup>8</sup> Launched 30 July 2010: <http://whc.unesco.org/en/list/1203>

montane rain forests of Sri Lanka, which are a global conservation priority on many accounts. They include areas of Sri Lankan montane rain forests considered as a super-hotspot within the Western Ghats and Sri Lanka biodiversity hotspot. More than half of Sri Lanka's endemic vertebrates, half of the country's endemic flowering plants and more than 34% of its endemic trees, shrubs, and herbs are restricted to these diverse montane rain forests and adjoining grassland areas.

Criteria:

- Criteria (ix): The property includes the largest and least disturbed remaining areas of the submontane and montane rain forests of Sri Lanka, which are a global conservation priority on many accounts. The component parts stretch across the Ceylonese rainforest and the Ceylonese monsoon forest. In the montane forests represented by the three serial properties, the faunal elements provide strong evidence of geological and biological processes in the evolution and development of taxa. The endemic purple-faced langur of Sri Lanka (*Semnopithecus vetulus*) has evolved into several morphologically different forms recognizable today. The Sri Lankan leopard, the only representative in the island of the genus *Panthera*, which diverged from other felids about 1.8 million years ago, is a unique subspecies (*Panthera pardus kotiya*).
- Criteria (x): The montane forests in the three serial components contain the only habitats of many threatened plant and animal species and are therefore of prime importance for their in-situ conservation. The property features exceptionally high numbers of threatened species, extraordinary levels of endemism, and high levels of species richness in a number of taxonomic groups. Of the 408 species of vertebrates 83% of indigenous fresh water fishes and 81% of the amphibians in Peak Wilderness Protected Area are endemic, 91% of the amphibians and 89% of the reptiles in Horton Plains are endemic, and 64% of the amphibians and 51% of the reptiles in the Knuckles Conservation Forest are endemic.

#### Fire-related problems identified



Despite of its inclusion in the World Heritage List in July 2010 the Central Highlands of Sri Lanka with the Knuckles Conservation Forest and surrounding forests have been affected by wildfires repeatedly, e.g. in 2008 and 2009 and after the recognition as UNESCO World Heritage asset in October 2010.<sup>9</sup> While parts of the World Heritage site are a premier site for conservation of native, unique and pristine montane tropical forest habitats, other parts are encroached by flammable exotic species, others are illegally utilized by slash-and-burn activities. Increasing illegal construction of houses reminds to the development and threats in and around Qadisha Valley. It seems that dedicated fire management / fire protection measures are not in place in this World Heritage site.

<sup>9</sup> e.g., [http://www.fire.uni-freiburg.de/media/2010/10/news\\_20101023\\_lk.htm](http://www.fire.uni-freiburg.de/media/2010/10/news_20101023_lk.htm), <http://www.slcricket.com/mother-lanka/16644-forest-fire-knuckles-forest-range-sri-lanka.html>, <http://ourlanka.com/srilankanews/bushfires-destroy-4000-acres-in-sri-lanka-hill-country.htm>

## ANNEX V

### Visual impressions of participants meeting during the UNESCO/GFMC mission



Field meeting with Mr. Eng. Riad S. Keirouz Executive Director, Community for the Preservation of Qadisha Valley (COSAQ), his COSAQ ranger and the chief of local police station.



Left: Mr. George Chedrami, Mayor Hadeth el-Joubbeh community (right), with local shepherd, at survey of Joubbeh-Bcharri forest. Right: Mère Clemence Helou, President, Couvent Saydet Qannoubine, with Ms. Samar Karam Archeologist, Directorate General of Antiquities, National Museum, and Riad Keirouz.



Left: Mère Clemence Helou surrounded by Johann G. Goldammer (GFMC), Riad Keirouz, Mr. Joe Kreidi (UNESCO, Beirut, and Mr. Ghazi Qassar Head, Centre des Forets du Liban Nord. Right: Audience and briefing with His Beatitude and Eminence Patriarch Mar Nasrallah Boutros Sfeir Patriarch of Antioch and the Whole Levant, and Mgr Samir Mazloun, President COSAQ.