

### 13. LAND MANAGEMENT

At the core of land management lies urban planning. While urban planning regulations are progressively covering more of Lebanon<sup>2</sup> are still not zoned. Urban masterplans can shape urban development in and around cities, as well as touristic sites and natural heritage sites. This chapter assesses current progress in developing zoning regulations. It then presents a review of various legal instruments for the protection and conservation of natural heritage sites and concludes with an insight into the state of reforestation in Lebanon.

#### 13.1 Urban Planning

Urban planning has a profound effect on the regulation of major real estate markets in the country. Unfortunately, integrating the conservation of natural sites into urban masterplans is still uncommon.

##### 13.1.1 Key players in urban planning

Urban planning involves several stakeholders. While the Directorate General for Urban Planning (DGUP) is responsible for developing urban planning regulations, the Higher Council for Urban Planning, the CDR and local municipalities play also an important role in formulating and enforcing masterplans. Since 1999, the MoE has been assuming a growing role in the urban planning process, and is regularly consulted by the DGUP on many issues. Table 13.1 summarizes the role and key responsibilities of the most important players in urban planning.

**Table 13.1**  
**Key Players in Urban Planning**

<i>Key Player</i>	<i>Role and Responsibilities</i>
Directorate General for Urban Planning (DGUP)	The DGUP falls under the authority of the Ministry of Public Works and Transport. Its mandate is to develop regulations and orchestrate urban planning. It defines urban master plans and issues building permits for municipalities that do not have a municipal council or an engineering department (this includes most of the municipalities in Lebanon except Beirut, Tripoli, Federation of Municipalities of Jbail, Kesrouan and Metn).
Higher Council for Urban Planning (HCUP)	The HCUP is presided by the DGUP and consists of the Director Generals of select ministries (Interior and Municipalities, Housing, Transports, Public works, Justice and Environment), representatives from several institutions (CDR), and urban planning specialists. It makes recommendations on urban planning projects and regulations, and large-scale development projects.
Council for Development and Reconstruction (CDR)	The CDR is a public institution established in 1977. It is directly linked to the Council of Ministers. The CDR is responsible for the planning and programming of reconstruction/rehabilitation projects in all sectors and across Lebanon. It is also mandated to develop a masterplan for urban planning. Almost 85% of all funds earmarked for reconstruction transit through the CDR. It could replace all public institution to implement projects as necessary.

<i>Key Player</i>	<i>Role and Responsibilities</i>
Municipalities	<p>Municipalities and municipal federations have many responsibilities (all that concern physical development in their territorial limits). They implement urban projects, follow up on cleanliness and public health issues, water works, public transport and tax collection. They may also request from the DGUP the definition of urban masterplans</p> <p>the municipalities have the necessary resources. Municipalities are also responsible for receiving applications for construction permits and issue permits.</p>

Source: Aveline, 2000

### 13.1.2 Extent of Zoning in Lebanon

In 2000, urban master plans covered only 10.3 percent (1,077 km<sup>2</sup> total surface area (CERMOC/Bakhos, 2001). This proportion however includes 40 percent of the buildings recorded in the national census on buildings and establishments conducted by CAS in 1996-8, in addition to 62 percent of the households and 68 percent of the establishments. This implies that from a land use point of view, the most complex areas (i.e., coastal zone, urban poles and their suburbs) are already zoned. Many other urban masterplans are under preparation. Over the coming few years, the total surface area affected by urban master plans will presumably double.

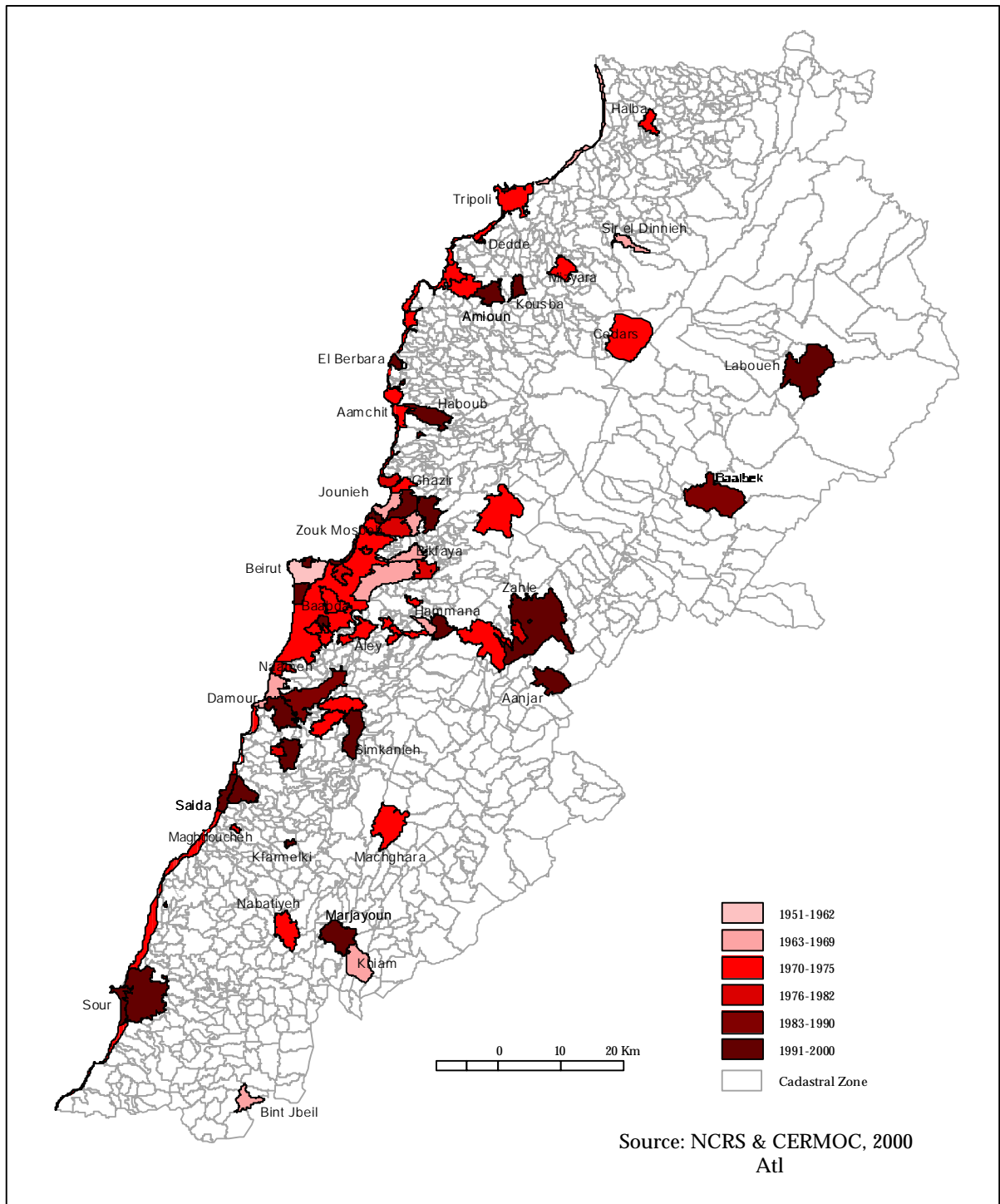
The National Centre for Remote Sensing (NCRS) and CERMOC have compiled all existing zoning regulations and produced a digital map showing all the zones that have been decreed (see Map 13.1). These zones are grouped into five time categories, extending from 1951 to 2000. The map also reveals that the majority of urban masterplans are concentrated around two axes:

1. *The coastal zone*: this axis includes two important beachfront regulations in the North (3362/72) and the South (5460/73) as well as major coastal cities including Tripoli, Batorun, Jbail, Jounieh, Saida and Tyre.
2. *The Damascus road*: this axis extends from Beirut, across Mount Lebanon and into the Bekaa valley. It covers at least 10 popular semi-urban poles, including Baabda, Aley, Bhamdoun, Sofar, Souk el Gharb, Hammana and Zahle, offering recreational outlets both during summer and winter.

With the exception of a stalemate period during the war, the DGUP has been proactively developing urban planning regulations in unplanned zones or modifying existing regulations in planned zones, as appropriate. Out of 83 urban masterplans, 37 were released after 1990. Existing zoning regulations are frequently amended when there is a need to change the lot coverage, the floor area ratio or the maximum allowable height (see Section 4.3.2 on building standards in unplanned zones). Occasionally, the geographic extension of the planned zone is changed. For example, a series of decrees (1474/71, 14314/72, 9285/74, 3053/80, etc.) modify the urban masterplan for Beirut and its suburbs (14313/70).

In retrospect, several zoning regulations have accelerated urbanization and resulted in haphazard urban agglomerations.<sup>1</sup> For example, during the late 1960s and early 1970s, the DGUP amended urban planning regulations in several winter and summer destination sites (e.g., Broumana, Beit Mery, Bikfaya and Rayfoun-Aajaltoun) by increasing lot coverage. These regions subsequently experienced mounting urban pressures.

**Map 13.1**  
**Current State of Zoning (Planned Areas)**



<sup>1</sup> Based on analysis performed by CERMOC and Bakhos W, 2001

## 13.2 Nature Conservation

Today there are 33 areas or sites legally protected in Lebanon (see Figure 13.1). A particular site may appear in more than one category. For example, Palm Islands and Tyre Coast are both Ramsar Sites and legally protected Nature Reserves. The cedars of Tannourine were declared

hundreds of cultural and natural heritage sites, world heritage sites as well as areas protected thanks to private initiatives.

### 13.2.1 Nature reserves

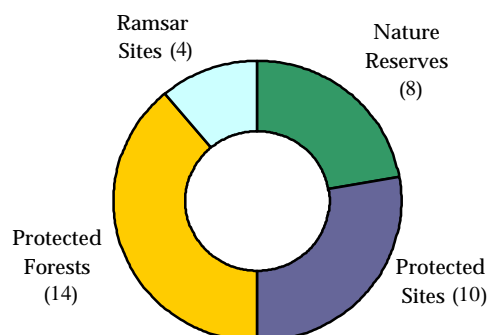
Between 1992 and 1999, a total of seven nature reserves were established by law, covering about 207 km<sup>2</sup>, or 2 percent of the Lebanese territory, in addition to the MoE proclaimed reserve of Karm Chbat (see Table 13.2). This achievement resulted from the concerted efforts of dedicated individuals, local NGOs, local governments, and the MoE. Appendix P provides a brief and baseline status assessment of each reserve. This appendix also describes the dominant natural features and the level of management attained in each reserve.

**Table 13.2**  
**The Eight Nature Reserves of Lebanon:**  
**Legal Basis, Approximate Area and Elevation Zone<sup>2</sup>**

<i>Nature Reserve</i>	<i>Law</i>	<i>Date</i>	<i>Approximate Area</i>	<i>Elevation Zone (meters)</i>
1. Horsh Ehden Nature Reserve	121	9/3/1992	17 km <sup>2</sup>	1,200-1,900
2. Palm Island Nature Reserve	121	9/3/1992	5 km <sup>2</sup> marine basin	Sea level
3. Shouf Cedars Nature Reserve	532	24/7/1996	160 km <sup>2</sup>	900-2,000
4. Tyre Coastal Nature Reserve	708	5/11/1998	4 km <sup>2</sup>	Sea level
5. Bentaël Nature Reserve	11	20/2/1999	2 km <sup>2</sup>	250-800
6. Yammouni Nature Reserve	10	20/2/1999	17.5 km <sup>2</sup>	1,400-2,000
7. Tannourine Cedars Nature Reserve	9	20/2/1999	1.5 km <sup>2</sup>	1,300-1,800
8. Karm Chbat (MoE Decision 14/1)	NA	6/10/1995	NA	NA

NA: Not Available

**Figure 13.1**  
**Number of Areas or Sites Legally Protected in Lebanon**



<sup>2</sup> Surface areas and elevation zones were calculated by Green Line Association, using GIS

### Legislative deficiency

Whilst the legal framework for the establishment of these reserves was the founding block for conservation management, the laws fall short of providing an effective management outlook based on the promotion of sustainable human development and viable economic activities. Specifically, Articles 2, 3, 4 and 5 of these laws prohibit the exploitation of all wood and non-wood forest products, as well as grazing.

Enforcement of these strict conservation measures has generated mixed results. Whereas in the Al Shouf Cedars and Horsh Ehden Nature Reserves, enforcement has led to a notable increase in the natural regeneration of several plant species (including cedars), it has also partially alienated local communities. Many villagers used to harvest

carrying capacity. Such forest systems supported viable economic activities that were interrupted when the reserves were proclaimed. Also, the management team and municipality of the Al Shouf Cedars Nature Reserve have filed several lawsuits against shepherds who have trespassed the reserve boundary.

While such stiff regulation was necessary to protect the reserves at a time when re-integrate income generating activities (such as harvesting plants, controlled grazing, and bee farming) to generate much needed income. This income will support park

Table 13.3 for an overview of MoE donations).

#### **Box 13. 1 Review of Draft Protected Areas Framework Law**

Current legislation for the establishment of protected areas is deficient because it does not:

- Provide any mechanism for installing conservation management on private lands;
- Define adequate management guidelines within protected areas and buffer zones; and
- Afford socio-economic integration of the reserves.

In views of these shortcomings, the MoE has prepared a draft framework law for the establishment and management of nature reserves in the country. The parliament is currently reviewing the draft law, and its approval is imminent. This framework law stipulates that:

- Nature reserves are established to protect important ecosystems or landscapes;
- Nature reserves may be established on public as well as private lands;
- conse
- In the event that large portions of the proposed reserve is private ownership, then the MoE must acquire express approval from the landlords of three fourths of the total private land (the MoE and the landlords may then engage in a 25-year contract);
- 
- le conservation and economic activities of strict conservation.

Other provisions under the framework law include the appointment of follow-up committees, the preparation of 5-year management plans, and the delegation of the management functions to either the public or private sector, appointed by the Minister of Environment.

Source: Based on draft Protected Areas Framework Law, MoE, 2000

**Table 13. 3**  
**(in million LBP)**

Reserve	Year					Total
	1996	1997	1998	1999	2000	
Chouf Cedars	51	60	55	55	80	301
Horsh Ehden	20	40	45	45	65	215
Palm Islands	20	40	45	45	65	215
	-	-	-	25	65	90
Tyre Coast	-	-	-	25	65	90
Tannourine Cedars	-	-	-	25	80	105
Yammouneh	-	-	-	-	-	-
<b>TOTAL</b>	<b>91</b>	<b>140</b>	<b>145</b>	<b>220</b>	<b>420</b>	<b>1,016</b>

Note: Bental, Yammouneh and Tannourine nature reserves were proclaimed in 1999, Tyre coast in 1998

Source: MoE, 2001

#### Biological diversity in nature reserves

The NCSR has conducted a *preliminary* assessment of biological diversity in four of the seven nature reserves. More accurate inventories would require extended flora and

reduced vegetation cover or short growing season. The results so far confirm the biological importance of the reserves and present an overview of potential biological indicators. Biological indicators are plant or animal species that only live if and where specific environmental conditions prevail. Table 13.4 presents the preliminary documented biological diversity of Horsh Ehden, Al Shouf Cedars, Palm Islands and Tyre Coastal Nature Reserves.

**Table 13. 4**  
**Documented Biological Diversity in Four Protected Areas in Lebanon**

Nature Reserve	Plants	Mammals	Invertebrates	Birds	Total
1. Horsh Ehden	532	25	23	146	<b>726</b>
2. Al Shouf Cedars	438	32	23	166	<b>659</b>
3. Palm Islands	73	7	8	150	<b>238</b>
4. Tyre Coast	270	13	18	205	<b>506</b>

Source: MoE/NCSR, 1999

**Box 13. 2**  
**Synopsis of GEF/UNDP In-situ Biodiversity Conservation Project**

With grant funding from the Global Environmental Facility (GEF) the nature reserves of Horsh Ehden, Al-Shouf Cedars and Palm Islands were in 1996 selected for the implementation of a five-year pilot project (US\$ 2.5 Million). This project is implemented by the MoE with the technical assistance from the World Conservation Union (IUCN). It is executed by a number of local and national NGOs, which is the first time that the GoL entrusts local communities and NGOs with the management of public lands, albeit under the supervision of the MoE. Five years into the project, many achievements attest to its success:

- Management teams have been recruited, equipped and trained in a variety of disciplines;
- Management plans have been drafted for every reserve;
- Flora and fauna monitoring programs have been initiated;
- Biodiversity inventories have been compiled;
- Educational material has been produced and disseminated (including videos, leaflets, posters, training kit, and slides); and
- Facilities for visitors have been partially completed.

However, a number of outstanding issues may compromise the future management of nature reserves in Lebanon. For example, to this date, the boundaries of the two inland reserves (Al Shouf Cedars and Horsh Ehden) have not been fully delineated and the capacity of local management teams and NGOs to raise sufficient funds to cover running costs (including the operation and maintenance of visitor facilities) remains uncertain. Recognizing the need to support the day-to-day operations of management teams, the MoE has provided blanket funds to nature reserves. The sum of these contributions has increased steadily from US\$60,000 in 1996 (only three beneficiaries) to US\$280,000 in the year 2000 (six beneficiaries). Local management teams and NGOs have concurrently raised additional funds. However, only Al Shouf Cedar Society has been aggressively organizing income-generating activities, raising over US\$150,000 yearly between 1998 and 2000. Other management difficulties include the absence of forest guards (MoA) to patrol and assist park rangers, delays in finalizing the construction of visitor facilities, and the presence of suspected mined fields.

The GEF project will end in 2001 so will the salaries of rangers and park managers, unless an adequate funding strategy is developed and implemented. There has recently been a concerted effort to develop a strategy that meets the financial requirements for the long-term management of the nature reserves (Sandwith, 2000 & Darwish, 2000). Options for fund raising and for revenue generation were elaborated and guidance provided on the implementation of these options (Sandwith, 2000):

- Options for fund raising include corporate donors, individual donors, school fund raising, membership subscriptions, donor functions, competitions, sporting events, collection boxes, and trust funds.
- Options for revenue generation include the sale of select range of products, charging of entrance fees, conducting guided tours, imposing user fees for particular activities, concessions, levies and royalties.

Nevertheless, the assumption that nature reserves can reach financial autonomy remains a dangerous one. It is therefore essential that the GoL continues to provide annual funds to support the management of the three reserves as well as other reserves in Lebanon.

### 13.2.2 Protected forests

The dwindling of forest areas has prompted the GoL to enact more stringent forest legislation. The Forest Code (Law 85 of 12/9/1991), amended by Parliament in 1996 (Law 558 of 24/7/96), stipulates that all cedar, fir, cypress, Lebanon are protected *de facto*. Moreover, at least 15 forests were declared protected explicitly by ministerial decisions (MoA) under the amended Forest Code, as listed in Table 13.5. Unfortunately the Ministry of Agriculture is understaffed and currently unable to effectively monitor recreational and economic activities or natural catastrophes within the reserves (see Box 13.2).

**Table 13.5**  
**Forests Protected by Ministerial Decision under the Forest Code (558/1996)**

Decision	Date	Location	Description				
			Cedar	Fir	Juniper	Cypress	Other
499/1	14/10/96	Tannourine/Hadath el Jebbeh, Jajj (Jajj) and Arz el Rab (Bsharre)	X				
587/1	30/12/96	Swayse (Hermel)	X	X	X	X	
588/1	30/12/96	Aamouah (Akkar)	X	X	X	X	Pine
589/1	30/12/96	Karm Chbat (Akkar)	X	X	X		
591/1	30/12/96	Bazbina (Akkar)	X	X	X	X	
592/1	30/12/96	Knat (Knat)	X	X	X		Oak
10/1	17/1/97	Qaryet el Sfina (Akkar)	X				Oak
11/1	17/1/97	Merbine (Wadi Jhannam)	X	X	X		
8/1	17/1/97	Ain el Houkaylat/kornet el kif (Dinniyeh)	X	X	X		Oak
9/1	17/1/97	Jurd el Njas/jabal el Arbain (Dinniyeh)	X	X	X	X	
174/1	25/3/97	Chbaa (Hbaline)	X	X	X	X	Pine
3/1	8/12/97	Bkassine (Jezzine)					Pine

### 13.2.3 Protected Sites

In 1998, the Ministry of Environment declared five rivers (Dog, Beirut, El Aassi, Aarkah, and Awali), one valley (Damour), two mountain tops (Makmel and Qornet el Sawda), and the Shouf region as protected sites (Ministerial decisions 97/1, 130/1, 189/1, 188/1, 187/1, 131/1, 129/1, and 122/1). According to these decisions, the MoE will develop, in coordination with the DGUP, permitting standards for the construction and operation of any facility around these sites and within a 500-meter buffer zone. Enforcement remains a problem as the MoE requires the assistance of the *Mohafez* to enforce environmental legislation and there appears to be some contradiction between the decisions and other legal instruments (see Box 13.3 for an example). Meanwhile, the MoA has declared other natural sites protected by ministerial decision including Hbaline, Caza of Byblos (152/1, 1992) and Kfarzebid (71/1, 1992).



### **Box 13. 3**

#### **Legal Conflict over Site Protection in Nahr el Kalb**

In the spring of 2001, a large billboard was erected on top of the historic promontory overlooking the river mouth of Nahr el Kalb, with a permit issued by the Municipality. The MoE has argued that the billboard should be removed because it violates its Decision 1/97 (July 2, 1998), which protects the valley of Nahr el-  
 river median. The landlord has maintained that the billboard complies with (Council of Ministers) Decree 8861 (July 25, 1996) on the regulation and licensing of billboards. The Decree prohibits erecting billboards within 100 meters of historic and touristic sites and monuments. The  
 areas classified as  
 to issue permits for billboards within its jurisdiction, and such permits must comply with the permit conditions established by the MoE and the DGUP under Decision 1/97, no such permit conditions have been put in place yet. The case has served as an eye opener for the MoE, which has started preparing conditions for permitting by municipalities inside natural sites, consistent with the mandate of the MoE.

Source: Based on articles that appeared in the Al Nahar Newspaper, May 12 & July 21, 2001

#### *13.2.4 Ramsar wetland sites*

The Convention on Wetlands, signed in Ramsar, Iran, in 1971, is an intergovernmental treaty, which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. There are presently 125 Contracting Parties to the Convention, with 1,078 wetland sites (totalling 82 million hectares), four of which are loc  
 (2000), Tyre Coastal Nature Reserve (2000) and Palm Islands (2001). Having acceded on the Ramsar List of Wetlands of International Importance, these four sites stand a bigger chance of benefiting from international funding for conservation management. With the exception of Ras el  
 international funding including GEF/UNDP (Palm Islands) and the FFEM (Ammiq Estate and Tyre Coastal Nature Reserve).

Recognizing the need to explore the financial repercussions of conservation management, the MoE has secured auxiliary funds from the Ramsar Small Grant Fund to develop a viable socio-economic framework for the Management of Aammiq and Tyre wetlands.

#### *13.2.5 Private initiatives*

The Ammiq swamp is a permanent freshwater marsh measuring roughly 240 ha during the rainy season. It lies on one of the most important bird migratory routes between Europe and Africa. The marshes were originally much larger, covering several 1000 ha, but were gradually reduced to its present size following the construction of drainage canals and 12 artesian wells. Most of the area is inundated in the winter, but in summer only 2 small areas of open water remain. The marshes fall within a 2400 ha private estate. The fields around the marshes are edged with reeds and bramble bushes. The Ammiq marshes and surroundings sustain at least 67 species of fungi, 131 plants, 23 mammals and 17 invertebrates. In addition, more than 240 birds are observed around the site (NCSR, 2000). In June 2001, a grant was concluded between the GoL and the FFEM to design and implement an integrated management program at the site.

La Reserve de Afqa is a 3 million-km<sup>2</sup> estate rented for a period of 17 years. It is located in Jbeil, near the famous Afqa waterfall. The site hosts a large number of plant species and trees, including the cypress and the juniper, and offers breathtaking views overlooking the Nahr Ibrahim valley. A drive across a recent road stretch takes you above the tree line and across the mountain peak, before descending to the East in the Bekaa plain (see Box 6.3 for more information on ecotourism in ).

### 13.2.6 World Heritage Sites

Lebanon is a signatory of the Paris Convention (1972) that calls for the protection Heritage List, five are in Lebanon. These are Tyre, Baalbek, Byblos, Anjar and the Qadisha Valley (see Table 13.6). To be inscribed on the World Heritage List, candidate criteria applicable to the five sites in Lebanon are multiple. Several initiatives are underway to add the valley of Nahr Ibrahim to the list.

**Table 13. 6**  
**List of World Heritage Sites in Lebanon**

Site	Date	Criteria	Description
Baalbek	1984	C - i, iv	Originally a Phoenician city, it retained its religious function in Roman times when the sanctuary of Heliopolitan Jupiter drew thousands of pilgrims. With its colossal structures, Baalbek is one of the most impressive examples of Imperial Roman architecture at its apogee.
Anjar	1984	C - iii, iv	The ruins of Anjar, a city founded by Caliph Walid I at the beginning of the 8 <sup>th</sup> century, has a very methodical layout, reminiscent of the palace-cities of ancient times. It is a unique testimony to Omayyad city-planning
Tyre	1984	C iii, iv	According to legend, the purple dye was invented in Tyre. It was a great Phoenician city that ruled the seas and founded prosperous colonies such as Cadiz and Carthage. Its historical role declined at the end of the Crusades. It conserves important archaeological remains, mainly from Roman times.
Byblos	1984	C iii, iv, vi	Byblos is the site of the multi-layered ruins of one of the most ancient cities of Lebanon, closely tied to the legends and history of the Mediterranean region for many thousands of years. Byblos is directly associated with the history of the diffusion of the Phoenician alphabet.
Wadi Qadisha	1998	C iii, iv N ii, iii, iv	The Qadisha valley is one of the most important early Christian monastic settlements in the world, and its monasteries, many of great age, are positioned dramatically in a rugged landscape. Nearby are the relic cedar forests highly prized for the construction of great religious buildings in Antiquity.

Legend : C for Cultural heritage criteria and N for Natural heritage criteria. See Appendix Q for full details

Source: <http://www.unesco.org/whc/sites>

The Qadisha valley offers not only some of the most breathtaking sceneries in Lebanon, it also harbours several old convents and monasteries. It has the potential to become a popular destination site for pilgrims and spiritual tourism.

### 13.3 Reforestation and Combating Desertification

: land reclamation (i.e., terracing and agricultural roads), irrigation (i.e., hill lakes and distribution networks), and reforestation. These activities were implemented by the Green Plan, a separate authority under the Ministry of Agriculture. During the period 1960-1975, large-scale reforestation projects were initiated with the establishment of mixed stands, including conifers, and the creation of forest nurseries (Talhouk et al., 2001). For example, in the Chouf Mountains, reforestation was undertaken to cedar forests (e.g., Maaser el Chouf, Barouk, and Ain el Zhalta). Unfortunately, planned thinning and plot management were interrupted by the war. Today, the trees are densely aligned and stunted.

#### 13.3.1 Community-level participation

A review of scattered reforestation activities over the past 10-year, as reported by the media, indicates that several NGOs, working with government agencies and with the support of local and international donors, undertook many reforestation campaigns throughout Lebanon (Talhouk et al., 2001). While these efforts are significant socially, their impact on total forest cover is negligible. Although there is no reliable information on the scale and impact of these campaigns, the survival rate for transplanted trees is believed to oscillate between 10 and 40 percent, at best. By all international standards, such low survival rates are a harsh reminder that something is going wrong.

While urban planting faces many difficulties also (see Section 12.3 on the role of municipalities), reforestation campaigns in open lands is even more difficult:

- ❑ Transplanting is labour intensive (i.e., steep terrain, shallow bedrock);
- ❑ In the absence of fencing, young trees are vulnerable to grazing;
- ❑ Young trees may require watering the first two to three years (this is difficult if the site is not immediately accessible from the road or close to springs);
- ❑ Not all lands are fit for reforestation and landowners may not approve; and
- ❑ Little efforts are diverted to securing support from the local communities.

In the light of these shortcomings, several reforestation efforts are currently tackling the issue differently. For example, in Bsharre, homeland to the relic Cedars of 18-year reforestation project. The committee secured seed money from *Iles de France* and currently manages a plant nursery, which can produce up to 25,000 saplings per year. The municipality donated 226 hectares for establishing a new cedar forest, using saplings from the nursery. After planting, follow-up and maintenance is secured by a tree adoption program. Project sponsors and supporters pay up to US\$100 for every tree planted; this contribution guarantees 18 years of maintenance (watering, weeding, protection). In addition, the trees are name tagged after their sponsor who also receives a certificate.

#### 13.3.2 Government program

Whereas national reforestation campaigns were previously the responsibility of the MoA, the yearly government allocation of LBP5 billion (about US\$3.3 million) was in 2001 transferred to the MoE, renewed annually for a period of five years. This budget allocation is significant in comparison with MoEs own budget (US\$1.7 million in 2000).

Recognizing the importance and complexity of reforestation, the MoE has developed an annual project implementation plan for the five years to come. In the short term (years 1 to 5), the MoE will target 18,000 hectares of disused lands and hopes to set in place a framework for subsequent efforts, to ultimately achieve a forest cover of 200,000 -40 years. To implement the short term objective, the MoE will carefully orchestrate each work phase including the identification of target areas, production of forest saplings, preparation of the targeted sites, transplanting, after care and protection from grazing and fires. Preliminary estimates indicate that the average cost for one tree (including production, planting and two years after care) is LBP 1,625. This is equivalent to LBP 1,300,000 per hectare (assuming 800 trees per hectare). An additional LBP 100,000 would be required to monitor and protect the targeted site from grazing and fires. The sites may be selected if:

1. The land is disused, non-arable and prone to desertification (see Section 13.3.3);
2. The existing forest is degraded and the canopy closure does not exceed 10 percent;
3. The land is abandoned and located around existing forests; and/or
4. The land has an extraordinary ecological, touristic or scenic value.

Reforestation campaigns will be implemented through a bidding process. The MoE will strive to put in place a partnership framework with all stakeholders including the MoA, MoIM, Lebanese Army, municipalities and NGOs to achieve the best possible results.

### 13.3.3 Combating desertification

With grant funding from the German Agency for Technical Cooperation (GTZ) and co-financing from the MoA and ACSAD, Lebanon is implementing a project for *Combating Desertification in Lebanon (CoDel)*. CoDel will assist the GoL in developing a National Action Programme (NAP) to combat desertification pursuant to its commitment to implement the United Nations Convention to Combat Desertification (the GoL ratified the UNCCD on 21/12/1994). CoDel effectively started in June 2000 and project partners include ACSAD, the MoA and the National Centre for Remote Sensing (NCRS). The project will (1) build institutional capacities, (2) identify desertification prone areas<sup>3</sup> using GIS and remote sensing, (3) raise awareness on the issue among decision makers, the general public and communities of affected areas, (4) implement pilot interventions in affected areas, and (5) draft a NAP for combating desertification.

To date, CoDel has elaborated a map of priority areas for combating desertification in Lebanon based on the synthesis of several indices (vegetation, soil, land use, climate, and socio-economics). It has initiated several practical measures to combat desertification or rehabilitate degraded lands. For example, rangeland rehabilitation is being piloted in Aarsal (North Bekaa) using legume seedlings; a vast reforestation campaign is being implemented in Kfar Houne (Jezzine); and in Sultan Yaacoub (West Bekaa), CoDel is assisting the Litani River Authority in improving groundwater recharge through soil and water conservation measures. In addition, CoDel is providing technical training to several staff of the MoA and the NCRS, as well as supporting several on-going awareness campaigns in local schools. The project website is [www.codel-lb.org](http://www.codel-lb.org).

---

<sup>3</sup> Desertification prone areas (DPA) are not necessarily degraded areas, yet. DPAs are areas which are likely to degrade and ultimately lose their capacity to support human life if a combination of pressures should coincide (e.g., grazing, fires).