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Ministry of Environment

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FIFTH **NATIONAL REPORT** OF LEBANON

TO THE **CONVENTION** ON BIOLOGICAL **DIVERSITY**

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ELARD

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List of Acronyms

ADELNORD	Appui au Développement Local dans le Nord du Liban
ABS	Access and Benefit Sharing
AFDC	Association for Forest Development and Conservation (National NGO)
AFED	Arab Forum for Environment and Development
AIDS	Acquired Immune Deficiency Syndrome
ALI	Association of Lebanese Industrialists
APJM	Association for the Protection of Jabal Moussa
AQI	Air Quality Index
AUB	American University of Beirut
BAU	Beirut Arab University
BCS	Biodiversity Country Study
BDL	Banque Du Liban
CAS	Central Administration of Statistics
CBBIA	Capacity Building for Biodiversity and Impact Assessment
CBD	Convention on Biological Diversity
CBNRM	Community Based Natural Resources Management
CDR	Council for Development and Reconstruction
CGLU/BTVL	Cités et Gouvernements Locaux Unis au Liban/ Bureau Technique des Villes Libanaises
CHM	Clearing House Mechanism
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on the Conservation of Migratory Species of Wild Animals
CNRS	Centre National de la Recherche Scientifique
CoM	Council of Ministers
COP	Conference of the Parties
CSO	Civil Society Organization
DGA	General Directorate of Antiquities
DGUP	Directorate General of Urban Planning
EFIMED	Mediterranean Regional Office of the European Forest Institute
EIA	Environmental Impact Assessment
ELARD	Earth Link and Advanced Resources Development (Consultancy firm)
ERML	Environmental Resources Monitoring in Lebanon

ESCWA	Economic and Social Commission for Western Asia
EU	European Union
FAO	Food and Agriculture Organization
FNR	Fifth National Report
FSAA	Faculté des Sciences Agronomiques et Alimentaires
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Green House Gases
GIS	Geographic Information Systems
GMOs	Genetically Modified Organisms
GoG	Government of Greece
GoL	Government of Lebanon
HCH	Higher Council for Hunting
IAIA	International Association for Impact Assessment
IAS	Invasive Alien Species
IBA	Important Bird Area
IBSAR	Initiative for Biodiversity Studies in the Arid Regions
ICARDA	International Center for Agricultural Research in the Dry Areas
ICZM	Integrated Coastal Zone Management
ILO	International Labour Organization
INCAM	Integrated Environmental and Coastal ecosystem Management
IOE	Institute of the Environment
IPM	Integrated Pest Management
IPTEC	IPT Energy Centre
IRD	Research Institute for Development
ISF	Internal Security Forces
ISSG	Invasive Species Specialist Group
ISWM	Integrated Solid Waste Management
IT	Information Technology
IUCN	International Union for Conservation of Nature
IWRM	Integrated Water Resource Management
LARI	Lebanese Agricultural Research Institute
LEDA	Local Economic Development Agencies
LEF	Lebanese Environment Forum
LEPAP	Lebanon Environmental Pollution Abatement Project
LIVCD	Lebanon Industry Value Chain Development

LPA	Lebanese Petroleum Administration
LRA	Litani River Authority
LRI	Lebanon Reforestation Initiative
LSGC	Laboratory for Seed Germination and Conservation
LU	Lebanese University
LULC	Land Use/Land Cover
MAB	Man and the Biosphere Programme
MAP	Medicinal and Aromatic Plants
MD	Millennium Declaration
MDG	Millennium Development Goal
MDGR	Millennium Development Goals Report
MEHE	Ministry of Education and Higher Education
MEU	Middle East University
MLF	Multilateral Fund of the Montreal Protocol
MoA	Ministry of Agriculture
MoC	Ministry of Culture
MoE	Ministry of Environment
MoET	Ministry of Economy and Trade
MoEW	Ministry of Energy and Water
MoF	Ministry of Finance
MoI	Ministry of Industry
MoIM	Ministry of Interior and Municipalities
MoInf	Ministry of Information
MoJ	Ministry of Justice
MoPWT	Ministry of Public Works and Transport
MoSA	Ministry of Social Affairs
MoT	Ministry of Tourism
MoU	Memorandum of Understanding
MPAs	Marine Protected Areas
MSB	Migratory Soaring Birds
MSW	Municipal Solid Waste
NAS	National Academies of Science
NBSAP	National Biodiversity Strategy and Action Plan
NC	National Communication
NCE	National Council for the Environment
NCMS	National Center for Marine Sciences

NFP	National Forest Programme
NGO	Non-Governmental Organization
NPMPLT	National Physical Master Plan for the Lebanese Territory – *Also known as SDATL : Schéma Directeur d'Aménagement Du Territoire Libanais*
NPTP	National Poverty Targeting Program
NR	National Report
NSDS	National Social Development Strategy
OREME	Observatory of the Sciences of the Universe
OWL	Other Wooded Land
PAs	Protected Areas
PINR	Palm Island Nature Reserve
PMR	Plant Micro-Reserves
QHSE	Quality Health Safety Environment
RAC/SPA	Regional Activity Center for Specially Protected Areas
RBGE	Royal Botanic Garden Edinburgh
ROWA	Regional Office for West Asia
SBR	Shouf Biosphere Reserve
SEA	Strategic Environmental Assessment
SEPASAL	Survey of Economic Plants for Arid and Semi-Arid Lands
SISPAM	Stable Institutional Structure for Protected Areas Management
SMART	Specific, Measurable, Attainable, Relevant and Time-Bound
SOER	State and Trends of the Lebanese Environment
SPAMI	Specially Protected Area of Mediterranean Importance
SPNL	Society for Protection of Nature in Lebanon (National NGO)
SRLWR	Safeguarding and Restoring Lebanon's Woodland Resources
SSC	Species Survival Commission
SWM	Solid Waste Management
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNHCR	United Nations High Commissioner for Refugees
UNU-INWEH	United Nations University-Institute for Water, Environment and Health
UOB	University of Balamand
US	United States
USAID	United States Agency for International Development

USEK	Université Saint-Esprit Kaslik
USFS	United States Forest Service
USJ	Université Saint Joseph
VP	Vice President
WUI	Wildland-Urban Interface

Part I: An Update on Biodiversity Status, Trends, and Threats and Implications for Human Well-Being

Overview

Natural Geographic Framework

Lebanon is a country located in the Middle East at the east end of the Mediterranean (33°00'N latitude and 35°50'E longitude) and bordered in the North and East by Syria and in the South by Palestine. It is divided into eight administrative regions called Mouhafazas: Beirut, Mount Lebanon, North Lebanon, South Lebanon, Bekaa, Akkar, Baalbak-Hermel and Nabatieh. Lebanon covers an area of 10,452 km^2 with an average width of 48 km and a length of 225 km (Figure 1).

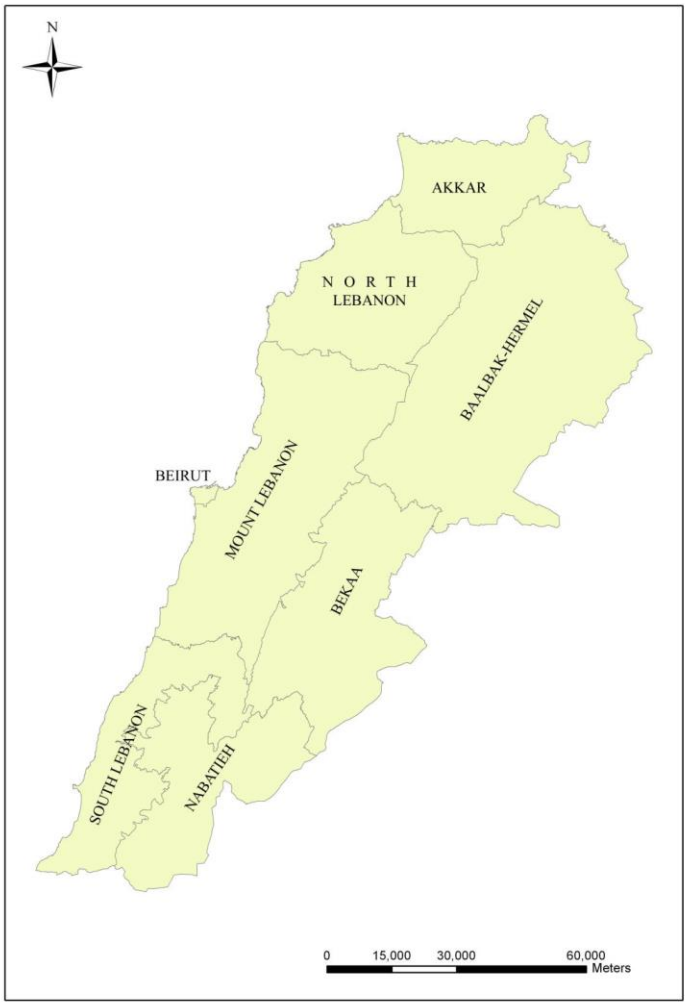


Figure 1 **Administrative Map of Lebanon**

Source: Sattout E. J. &Abboud. M. (2006)

Country Demography

The resident Lebanese population was estimated at around 3.76 million in 2007, with an additional 260,000 Palestinians (approximately, 2009) living in camps and other migrant workers (Yaacoub and Badre, 2012). Due to the recent Syrian war, Lebanon's population has increased in an unprecedented manner. At the end of August 2014, the Syrian refugee population registered with the United Nations High Commissioner for Refugees (UNHCR) was estimated to exceed 1.1 million in Lebanon, with almost 34,000 awaiting registration and around 53,000 Palestinian refugees coming from Syria. This does not include substantial numbers of Syrians in Lebanon who are not registered and that are consequently not counted. These were estimated at around 250,000. The number of refugees is equivalent to more than 25% of the total population of Lebanon (UNHCR, 2014a). The overall average household size in Lebanon has declined from 5.4 individuals per household in 1970, and 4.8 individuals in 1997, to 4.3 individuals in 2004 (The National Survey of Household Living Conditions, 2004-2005).The most remarkable phenomenon to highlight is that the increase of Lebanon's population is due to the influx of refugees since the national population is declining. Lebanon's demographics between the sexes, the age profiles and the age pyramid are presented in Table 1 below.

Table 1 Distribution of Population According to Age, Sex, Male-to-Female Ratio and Age Groups

Age Group	Males	Females	Total	Male-to-Female Ratio Average[1]
0-4	4.2	3.7	8.0	113.7
5-9	4.7	4.3	9.0	111.1
10-14	5.3	5.0	10.3	107.0
15-19	5.1	4.8	9.9	107.0
20-24	5.1	4.9	9.9	104.4
25-29	3.8	4.1	7.9	92.3
30-34	3.6	3.8	7.3	94.9
35-39	3.1	3.7	6.8	85.1
40-44	3.0	3.7	6.7	80.0
45-49	204	2.7	5.2	89.3
50-54	2.2	2.2	4.4	99.0
55-59	1.7	1.9	3.7	91.2
60-64	1.6	1.8	3.4	90.3
65-69	1.5	1.5	3.0	101.8
70-74	1.2	1.1	2.2	107.5
75-79	0.7	0.7	1.3	98.6
80-84	0.4	0.4	0.7	100.9
85 and above	0.1	0.1	0.2	85.1
Whole Population	49.8	50.2	100.0	99.0

Source: The National Survey of Household Living Conditions (2004-2005)

The Status of Biodiversity

According to the United Nations Convention on Biological Diversity (CBD), biological diversity, generally shortened to 'biodiversity', is "the variety of life on earth" and it includes diversity of ecosystems, species and genes and the ecological processes that support them.

Lebanon has a very rich and unique biodiversity mainly due to its geographic location at the far eastern end of the Mediterranean Sea, its mountainous topography and the great diversity in its climatic conditions. Lebanon is part of the Mediterranean region that is considered to be a true "hotspot" and ranks third in plant diversity and endemism after the Tropical Andes and Sundaland (Figure 2).

[1]The male-to-female ratio varies usually at birth between 103% and 107% in a census. The reason behind the 113.7% figure within the age group (0-4) is the margin of error resulting from sampling, taking into consideration the size of the basic sample on the one hand, and the relatively small sample size regarding this age group, on the other.

Figure 2 Lebanon in the Mediterranean Hotspot

Source: www.cepf.net

There are 9,116 known species in Lebanon, fauna (4,486 species) and flora (4,630 species) (BCS-MOA/UNEP/GEF, 1996) distributed over five geomorphological regions:

1. **The Coastal Zone**: includes the shoreline and continental shelf, the coastal plains and the foothills of Mount Lebanon up to elevations of 250 meters. It extends over 250 km;
2. **The Mount Lebanon Range**: includes middle and high elevation zones above 250 meters. It rises from Akkar in the North and extends south to the hills of Jabal Amel. Mount Lebanon peaks at 3,088 meters at Kornetes- Saouda in the north. It extends over 160 km long and 25-40 km wide;
3. **The Beqaa Plain**: a land depression separating the Mount Lebanon and Anti- Lebanon ranges. It comprises an 8-12 km wide fertile corridor and is about 120 km from north to south. The Beqaa Plain is drained by the Aassi River from the north and by the Litani River from the south;
4. **The Anti-Lebanon Range**: extends across the Lebanese-Syrian borders and peaks at 2,600 meters (TallatMoussa). The southern sections of the Anti-Lebanon range include Jabal el Cheikh (Mount Hermon), which intercepts rainwater and redistributes water into at least three main watersheds across Lebanon, Syria and Palestine; and
5. **South Lebanon**: an elevated plateau that extends a short distance inland from the western shores of South Lebanon to the Mount Hermon foothills in the East. This region is intersected by many seasonal streams flowing from west to east and discharging into the Mediterranean Sea.

One of the most remarkable features about Lebanon is the presence of such biodiversity in a very limited area of land. Lebanon covers 0.007% of the world's land surface area and hosts about 0.8% of the world's recorded and catalogued species. Table 2 presents the recoded number of species in Lebanon for each major taxon.

This high diversity over small surfaces is clear in terms of species-area ratio, Lebanon's vegetation has a very high species-area ratio of 0.25 species/km^2 compared to other countries that supposedly have larger green lands and occupy areas that are outstandingly wider than Lebanon (e.g. Brazil's species-area ratio is 0.0044 per km^2 and South Africa's species-area ratio is 0.0081 per km^2). The fauna species-area ratio in Lebanon is considered high a well and reaches 0.028 species/km^2 compared to neighbouring countries (e.g. Syria with 0.019 species/km^2) (SOER, 2010).

Table 2 Species Richness in Lebanon

Taxon	Number of Described Species in Lebanon	Reference for Species Number
Freshwater	610	BCS, 1996
Reptiles	54	Hraoui*et al.*, 2002
Birds	395	Ramadan-Jaradi*et al.*, 2008
Marine Fish	367	BCS, 1996
Mammals	59	Ramadan-Jaradi*et al.*, 2008
Terrestrial Plants	3,790	BCS, 1996
Invertebrates	3,835	BCS, 1996
Amphibians	6	Hraoui*et al.*,2001

Terrestrial biodiversity

Reports indicate that 81% of the floral species are terrestrial; out of which 8.5% are endemic (221 species), 1.3% are rare (34 species) and 2.7% are threatened (69 species) (SOER, 2010). Endemism in Lebanon is significant, owing to its geomorphologic diversity and the isolation effect of its diverse topography. Lebanon has a high percentage (12%) of endemic plant species. Analyses show that most of the endemic species are located on the high summits of the two mountain ranges, specifically at Mount Makmel, Mount Sannine, Qammoua, Ehden and Mount Hermon. The isolation that characterizes these summits renders the alpine uplands a reservoir for endemic species. Consequently, more than one hundred species specific to Mount Hermon and the Anti-Lebanon Range have been counted (Medail and Quezel, 1997). A Survey of Economic Plants for Arid and Semi-Arid Lands found 224 species (10.8%) plants of economic importance distributed in Lebanon (SEPASAL, 1999). Analyses (BCS, 1996) show that 46% of faunal species are terrestrial and that 7 mammal species are already extinct, 31% of the existing mammals are rare, 20% vulnerable and 7.5% are close to extinction species.

In terms of avifauna, Lebanon has recorded 394 species, out of which two (Lesser Crested Ternand Blue-Cheeked Bee-Eater[2]) are extirpated from Lebanon, 6.3% are threatened and 32% are rare.

[2] Appendix V provides a complete list of scientific and common names of species used in the report

According to the IUCN 2007 Red List, the threatened bird species of Lebanon include 2 endangered, 8 vulnerable and 15 near threatened species (Ramadan-Jaradi *et al.,* 2008).

Lebanon encompasses important components of the Mediterranean vegetation (Madrone, St. John's Bread, Atlas Pistache, Bishop Pine, Black Oak and Grecian Laurel) which are relicts from the ancient forests that dominated the Mediterranean Basin two million years ago and represent the past and present climax of the country. Notable keystone and flag plant species in the country is the famous Lebanon Cedar (*Cedrus libani*) that has been exploited since the rise of civilization in the Fertile Crescent. Thus, Lebanon is known for its forests which occupy 13% of the territory while Other Wooded Land (OWL) cover 10% (FAO, 2010). About 65% of the total canopy coverage is considered dense (LULC, 1998) with the highest concentrations found in North Lebanon (30%) and Mount Lebanon (37%), followed by South Lebanon (9%) and Nabatieh (6%) (MoA, 2003). Oak forests occupy the largest forests' surface areas (52.42%) while Cypress (0.15%) Cedar (0.83%) and Fir (1.76%) occupy the lowest cover areas. The relic Cedar and Fir forests host several endemic, threatened and economic plant species. Mixed forests represent 17.98% whilst the Pine forests 14.91% and the Juniper 8.74%[3](MoE, 2012-a).

Marine and coastal biodiversity

Lebanese waters represent less than 1% of the world's ocean surface. However, almost 6% of all global marine species are found in those waters (SOER, 2010). This phenomenon can be explained by various historical, ecological and paleo-geographical factors. The Lebanese coastal and marine flora is considered to be Mediterranean with some subtropical features, whilst the majority of marine species and ecosystems are typically Mediterranean. Within Lebanese territorial waters (up to 12 nautical miles) of 4,702 km^2 and a continental shelf of 1,169 km^2, the average annual capture (excluding aquaculture) of marine fish and molluscs/ crustaceans is 3,646 and 200 metric tons respectively (FAO& MoA, 2000).

Freshwater biodiversity

A wide variety of organisms inhabit Lebanon's freshwater ecosystems, including invertebrates, molluscs, fish and others. The faunal species in freshwater represent 16% of the total fauna biodiversity of the country and the floral species represent just 6% of the flora species. Five percent of the country's freshwater fauna are threatened and 1.3% endemic (MoA, 1996). The only endemic freshwater fish to Lebanon, Levantine Minnow, was considered extinct in the country (MoA, 1996) but later it has been observed at least in Yammouneh Lake, Litani River and Qaraoun Lake (El Zein, 2001). Many have been exterminated from particular river systems due to overfishing. There are extensive pressures on Lebanon's inland aquatic ecosystems: water pumping, rivers channelling and pollution of various origin. Their impact on the ichtyo fauna (Carp Family, Pupfish Family and True Loaches) is high mortality during the drought season and abandon of preferred spawning areas (El Zein, 2002).

[3]Percentages are calculated based on data from the Ministry of Agriculture (2003) and FAO(2005)

Protected Areas

Defining protected areas (PA) is an important step towards the acknowledgement of the ecological and cultural national heritage. Lebanon has been designating nature sites and landscapes as PAs since the 1930's, responsibility for such designation originally fell under the jurisdiction of Ministry of National Economy.

Since the establishment of the MoE in 1993, PAs establishment has been reattributed to the MoE. A specific category is under the mandate of MoA.

The current PAs in Lebanon are divided into three categories:

1. Nature Reserves established by laws since 1992 (refer to Table 3 below);
2. Nature sites under the protection of the Ministry of Environment established by MoE decisions or decrees based on MoE proposals on the base of the law of protection of natural sites (08/07/1939) (refer to Table 4 below);
3. Protected forests established by MoA decisions (before 1996 based on the Law of Protection of Forest Wealth and Forests (Law 85 dated 1991); and after 1996, protected directly by the Law of Protection of Forests (Law 558, dated 24/07/1996) and through MoA ministerial decisions issued based on this Law).

In addition, there are many candidate natural areas that are in need of national protection; these sites are listed in Appendix VI.

Today, "Nature Reserves" is the most well-established, managed, and studied form of PAs in the country. For the purpose of protecting natural habitats and endemic and endangered species, Lebanon has created fifteen nature reserves (Table 3 and Figure 3).

Nature reserves are created through legislative texts defining their limits, objectives, prohibited and allowed activities within the reserves and within a 500-meter buffer zone, penalties, and management committees to be in charge of the reserves. To date only 6 out of the 15 reserves have management plans (Table 3).

Nature reserves occupy around 2.7% of the country's area (Table 3) and incorporate rich biodiversity with about 370 different kinds of birds and 2,000 types of plants and wild flowers, many of which are endemic to Lebanon. The nature reserves also host 30 species of mammals, including the wolf, hyena, wildcat, porcupine and squirrel.

Nature reserves have an important role in the protection and sustainable management of natural resources, especially biodiversity. They constitute as well a crucial component in local and rural development, through the influx of visitors who contribute via ecotourism, in augmenting the income of local communities living within the area of natural reserves. The reserves' committees always work on enhancing the benefits of local communities without compromising the reserve's status by involving locals in their activities. For example, visiting and trekking guides are trained locals in all reserves, visits to the Palm Islands are solely scheduled via local fishermen and boat owners, and Al-Shouf Cedar Reserve implemented a rural development project whereby visitors are introduced to local crafts and can purchase local products labelled as products of the reserve.

Furthermore, nature reserves in Lebanon have a major awareness and educational role. Inventories of floral and faunal species are available for each reserve, research projects are ongoing as part of the reserves' activities, knowledge is transferred through the reserves' websites, pamphlets,

brochures, books, television interviews, magazines, newspapers, and educational activities. One of many examples are the activities of the Association for the Protection of Jabal Moussa (APJM); the APJM published a book for children entitled 'Tabsoun Tabsoun' and books for adults namely; 'Guide des Flores', 'Guide des Arbres' and 'Biodiversity Album'. APJM conducts several animation events organized in various private and public schools and has more than one hundred and fifty published articles about Jabal Moussa Biosphere. Another example of a nature reserve that strongly works on promoting awareness and education is Al-Shouf Biosphere Reserve. Students are introduced to the rich biodiversity of the reserve and are taught to read animal prints and trails. An annual awareness activity entitled 'Rally for Nature' is conducted by Al-Shouf Reserve with the objectives of familiarizing the students and building up their knowledge on the importance of forests and biodiversity; reconnecting the young generations with nature; and exploring the trails of the reserve.

In order to better enhance the management of PAs, the MoE has prepared a new categorization system for PAs defining criteria for the establishment of each category in addition to their management objectives and modality. In 2002, the MoE created a first draft of the PAs Law; which was further amended in 2006 and then in 2012. The amendment included the following four categories with unique management objectives:

1- **Nature Reserve** which is defined as a terrestrial or marine zone in which ecosystems, habitats and species of specific importance must be protected because they are either endemic, or rare or endangered. The conservation of those species and ecosystems may require maintenance or rehabilitation activities if needed, in a way that suits with the protection objectives, and that are described in a management plan; in order to ensure the conservation of those habitats and the species that they harbour.

2- **Natural Park** which is defined as a vast rural territory, partially inhabited, with exceptional natural and cultural heritage, recognized nationally and deserving protection on the long term. A Natural Park can include one or more PAs or areas that might eventually become protected;

3- **Natural Site and Monument** which corresponds to an area containing one or more natural features of exceptional importance which deserve protection because of their rarity , representativeness or beauty; and

4- **Hima** which is defined as a Community Based Natural Resources Management (CBNRM) System that promotes Sustainable Livelihood, Resources Conservation, and Environmental Protection for the human wellbeing (UNU-INWEH). A Hima is under the supervision of the municipality, the union of municipalities or the Qaimaqam[4].

The draft Protected Areas Framework Law was submitted to the Parliament through the decree No. 8045 dated 25/4/2012 and was discussed by the Parliamentary Committees which approved its latest amendments and is currently pending final endorsement. The Draft application decree consequently developed sets the legal framework for the various categories of PAs including objectives, classification, management and financing mechanisms – making it possible for the bodies managing future natural parks to apply for loans and to work with the private sector.

[4] Lebanon is divided into Governorates, each sub-divided into administrative units called Cazas. The Qaimaqam is the person appointed by the Government as the head of the Caza and works in collaboration with the Governor.

Table 3 Nature Reserves in Lebanon

Nature Reserve	Legal Instrument	Date of Creation	Approximate Surface Area *(ha)*	Elevation Zone *(meters)*	International Designations	Management Plan
Horsh Ehden	Law 121	March 09, 1992	1,740	1,200 - 1,900	Important Bird Area	**Yes**
Palm Islands	Law 121	March 09, 1992	417.73	Sea Level	Ramsar Site, Specially Protected Area, Specially Protected Area of Mediterranean Importance (SPAMI), Important Bird Area	**Yes**
Karm Chbat	Decision 14/1	October 06, 1995	520	1,400 - 1,900	*None*	No
Al Shouf Cedars	Law 532	July 24, 1996	15,647	900 - 2,000	Biosphere Reserve, Important Bird Area	**Yes**
Tyre Coast	Law 708	November 05, 1998	3,889.25 (Land: 176.32, Sand: 6.12, Water: 3,706.81)	Sea Level	Ramsar Site, Specially Protected Area of Mediterranean Importance (SPAMI)	**Yes**
Bentael	Law 11	February 20, 1999	75.31	250 - 800	Important Bird Area	**Yes**
Yammouni	Law 10	February 20, 1999	2,100	1,400 - 2,000	*None*	No
Tannourine Cedar Forest	Law 9	February 20, 1999	195.48	1,300 - 1,800	Important Bird Area	**Yes**
Wadi Al Houjeir	Law 121	July 23, 2010	3,595	250 - 400	*None*	No
Mashaa Chnaniir	Law 122	July 29, 2010	27	500 - 530	*None*	No
Kafra	Law 198	November 18, 2011	40	~650	*None*	No
Ramya	Law 199	November 18, 2011	20	~650	*None*	No
Debl	Law 200	November 18, 2011	25	~600	*None*	No
Beit Leef	Law 201	November 18, 2011	20	~550	*None*	No
Jaj Cedars	Law 257	April 15, 2014	20	~1,650	*None*	No

Sources: MoE, 2015

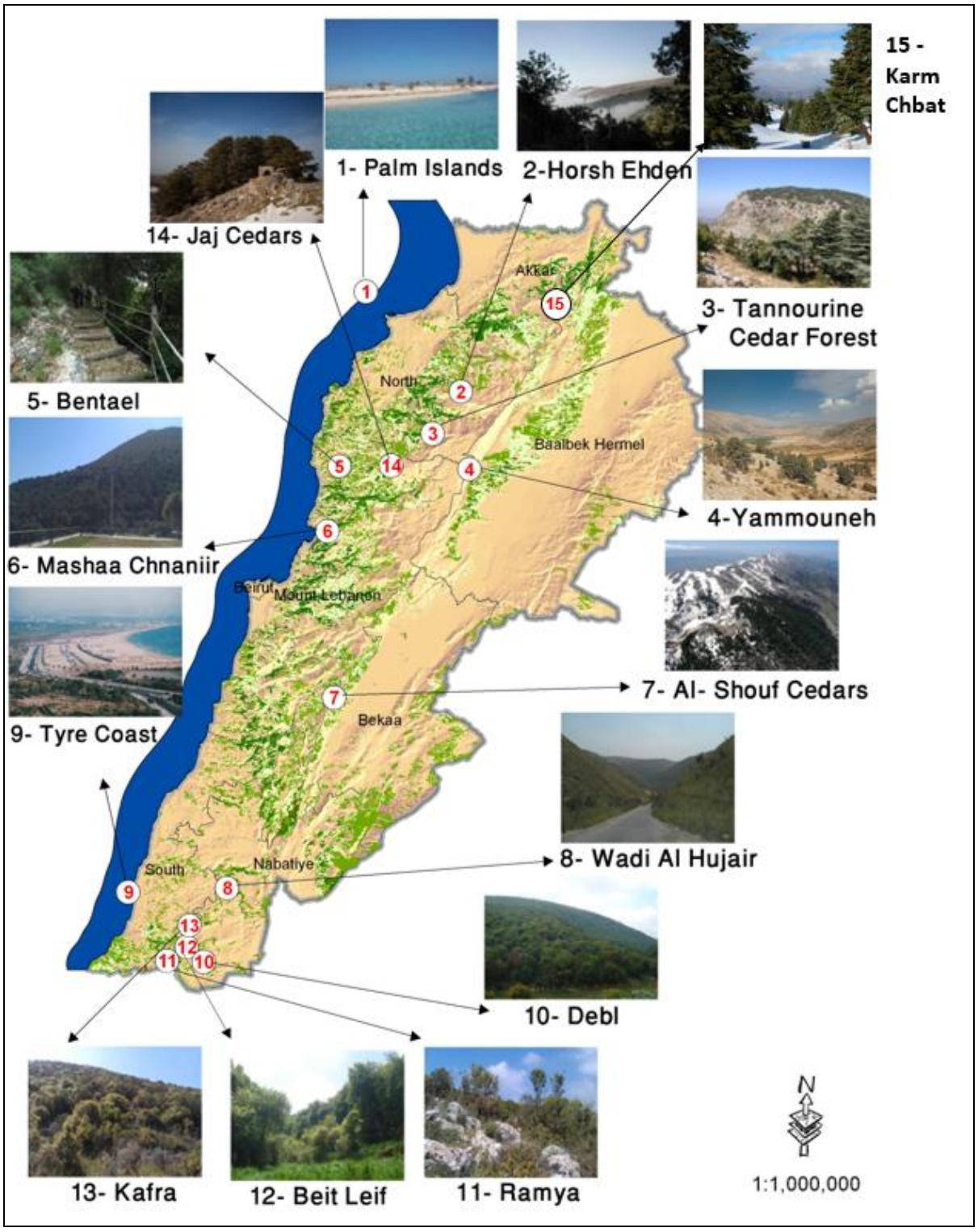


Figure 3 Nature Reserves in Lebanon

Table 4 Natural Sites under the Protection of MoE

#	Decision/Decree number	Date	Description	Location
1	Decision 15/1	1995	Prevent any action or making any changes in the vicinity of Faqra Natural Bridge in the district of Kesrouan	Kesrouan
2	Decision 151	1997	Kadisha Valley	Bcharre
3	Decision 34	1997	Ibrahim River to sea outfall	Jbail
4	Decision 22	1998	Al Jawz River to sea outfall	Batroun
5	Decision 29	1998	Al Damour River to sea outfall	Shouf
6	Decision 97	1998	Al Kalb River to sea outfall	Kesrouan
7	Decision 130	1998	Beirut River to sea outfall	Beirut and Mount Lebanon
8	Decision 131	1998	Al Awali River to sea outfall	Saida
9	Decision 132	1998	Forests between Ain El Hour- Daraya- Debiyé- Bérjin; Sheikh Osman Forest; Deir al Mokhalis surrounding; Ain w Zein Hospital surrounding; Dalboun forest; Al Mal valley; Kafra wells; Ainbal valley sites	Shouf
10	Decision 187	1998	Al Makmel Mountain	North Lebanon
11	Decision 188	1998	Arka River to sea outfall	Akkar
12	Decision 189	1998	Al Assi River to sea outfall	Hermel

#	Decision/Decree number	Date	Description	Location
13	Decision 19	2002	Al Kammoua Area	Akkar
14	Decision 21	2002	Al Qaraqeer Valley	Zgharta
15	Decision 22	2002	Dalhoun Forest	Shouf
16	Decision 8	2004	Baatara Sinkhole	Tannourine
17	Decree 7494	2012	JabalMoussa	Kesrouan
18	Decree 11949	2014	Kassarat Grotto	Metn

Source: MoE, 2015

At the international level, some sites are recognized by international entities and conventions; i.e. World Heritage sites by UNESCO, Ramsar sites under the Ramsar Convention, and important Birds Areas (IBAs) under BirdLife International, Specially Protected Areas of Mediterranean Importance (SPAMI) under the Specially Protected Areas (SPA) and Biodiversity Protocol.

UNESCO-MAB has identified three sites as Biosphere Reserves:

- The Shouf Biosphere Reserve (2005), which includes Al-Shouf Cedar Nature Reserve and Ammiq Wetland as well as 22 surrounding villages;
- The Jabal Moussa Biosphere Reserve (2008); and
- The Jabal Al Rihane Biosphere Reserve (2007).

The Valley of Qannoubine and the Arz El Rab Cedar Forests are listed as cultural landscapes by UNESCO World Heritage.

Four Ramsar sites of wetlands of international importance are recognized in Lebanon:

- Ammiq Wetland: Ramsar Site No. 978 (16/4/1999)
- Raas Al-Chaqaa: Ramsar Site No. 979 (16/4/1999)
- Tyre Coast Nature Reserve: Ramsar Site No. 980 (16/4/1999), and
- Palm Islands Nature Reserve: Ramsar Site No. 1079 (3/8/2001)

Moreover, fifteen sites are listed as Important Bird Areas (IBA) by Birdlife International, listed below and illustrated in Figure 4 hereunder:

1- Horsh Ehden Nature Reserve
2- Palm Islands Nature Reserve
3- Aamiq Wetland
4- A-Shouf Cedar Nature Reserve
5- HimaAnjar / KfarZabad
6- Lake Qaraoun
7- Riim / Sannine Mountain
8- Bentael Nature Reserve
9- Tannourine Cedars Nature Reserve
10- Hima Ebel es-Saqi
11- Semi Deserts of Ras Baalbek
12- Beirut River Valley
13- Upper Mountains of Akkar-Donnieh
14- Jabal Moussa Mountain
15- Ramlieh Valley

Two sites are listed as "Specially Protected Areas of Mediterranean Importance" (SPAMI) by the SPA and Biodiversity Protocol:

- Tyre Coast Nature Reserve
- Palm Islands Nature Reserve

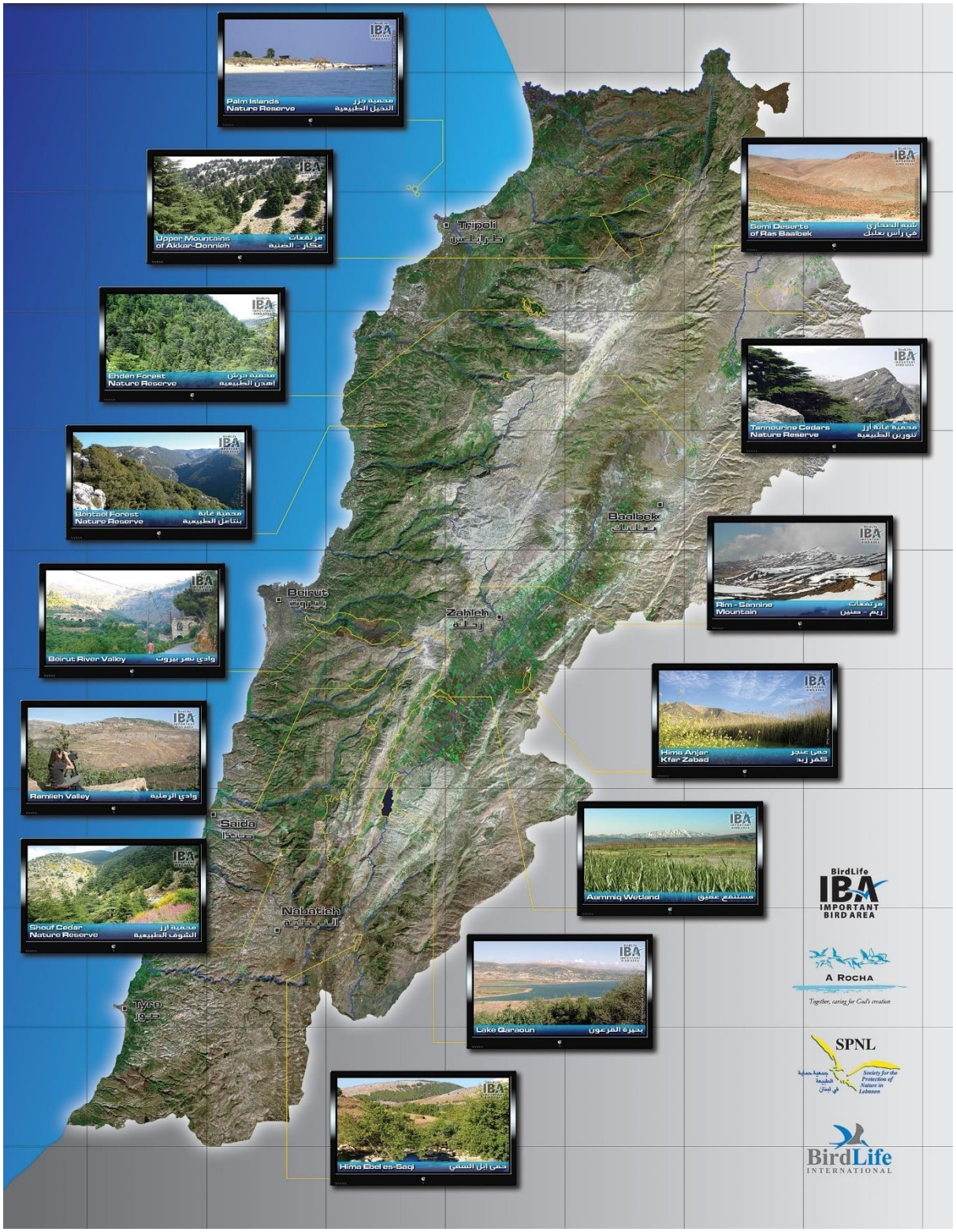


Figure 4 Important Bird Areas in Lebanon

Source: State of Lebanon's Birds and IBAs (2014)

Major Changes in the Status and Trends of Biodiversity in Lebanon

Biodiversity in Lebanon has known major transformations and changes, both positive and negative, throughout the years. Those transformations are presented in Figure 5 below and listed from left to right showing the older to more recent.

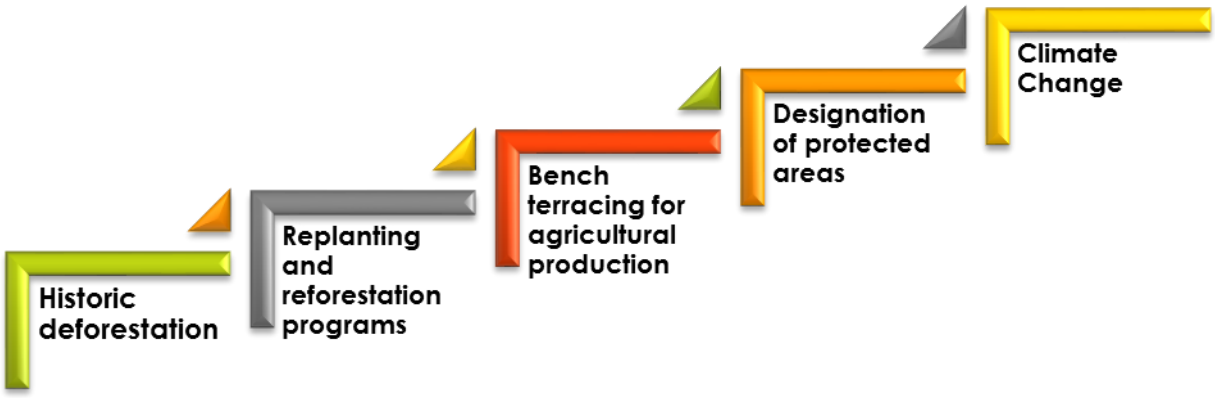


Figure 5 Transformation and Change in Lebanon's Ecosystems through Time

Source: SOER, 2010

The main changes in biodiversity management that have taken place at a national level since the 4th National Report, presented to the CBD in July 2009, and contribute to the conservation of Lebanon's biodiversity are listed below. The report's Parts II and III also present changes, achievements, and ongoing projects.

1. The increase in number of nature reserves from nine (9) to fifteen (15) – refer to Table 3 and Figure 3;
2. The preparation of a draft framework law governing PAs along with its draft application decree. The draft law introduces a new classification of PAs: 1) Nature Reserve, 2) Natural Park, 3) Natural Site and Monument, and 4) Hima *(refer to section The Status of Biodiversity)*;
3. The development of the first Natural Park Charter ("Charte Du Haut-Metn")(published in September 19, 2013) introducing the concept of Natural Parks to Lebanon and paving the way for the development of two other park charters;
4. The development of strategies and projects that contribute to the conservation of biodiversity *(detailed in section Main Strategies, Programs and Projects below)*; and
5. The ratification and implementation of:
    - The Environmental Impact Assessment (EIA) Decree (Decree 8633/2012);
    - The Strategic Environmental Assessment (SEA) Decree (Decree 8213/2012), which is the first SEA enacted decree in the Middle East and North Africa Region. To date three SEAs have been conducted and published in Lebanon allowing the integration of environmental consideration into important national sectors: 1) SEA for Petroleum

Activities in Lebanese Waters, 2) SEA for the New Water Sector Strategy for Lebanon, and 3) SEA for the Renewable Energy Sector. SEAs are currently being prepared in tandem with regional development plans; and

- The Environmental Compliance for Establishments Decree regulating all activities from classified establishments that may cause harmful pollution and environmental degradation (Decree 8471/2012).

Main Strategies, Programs and Projects

Achievements of the Higher Council for Hunting

The new hunting Law No. 580/2004 organized hunting in Lebanon, and has established the Higher Council for Hunting (HCH) under the tutelage of the Minister of Environment, and delegated to the MoE the responsibility of organizing hunting in Lebanon. The hunting law states the following:

- Hunting is allowed only during specific season in order to avoid breeding seasons;
- Specific game birds should be defined to be only allowed for hunting during the hunting season and rare and threatened bird and animal species should be protected;
- The hunter should obtain a hunting permit issued by the Minister of Environment after passing the hunting test and after issuing an insurance policy covering damages to any third party arising from hunting activities;
- Defines areas where hunting is strictly forbidden: cities, villages, parks, public gardens, nature reserves, historical and cultural sites, within 500 m from residential and religious places; in addition to private and public lands based on a request submitted to MoE by the land owners and/or Municipalities to ban hunting inside their lands;
- Forbids the public display of hunted preys;
- Defines allowed and forbidden hunting tools; and
- Defines the parties responsible for monitoring and controlling hunting violations and issuing related fines namely the internal security forces, MoA forest rangers, and Nature Reserves rangers.

Based on the hunting law, the Minister of Environment has issued in 2012 the following organizational decisions of the hunting law after consultation with the HCH; namely:

- Procedures for private and public land owners to submit a request to include their lands to the list of areas where hunting is not allowed (MoE Decision 236/1 of 2012);
- Procedures for selecting and defining the hunting clubs to be accredited by the MoE to run the hunting test (MoE Decision 71/1 of 2012);
- Procedures and conditions for conducting the hunting test (MoE Decision 212/1 of 2012);
- Procedures for obtaining the hunting licenses (MoE Decision 245/1 of 2012); and
- Procedures to grant the Nature Reserves rangers an authorization to control hunting violations in the surroundings of the nature reserves and issue fines to the violators (MoE Decision 199/1 of 2012).

In addition to the following Decisions issued by the Minister of Finance based on the proposal of the Minister of Environment and the Higher Council for hunting:

- Defining the design and details of the hunting stamp (MoF Decision 900/1 of 2012); and
- Defining the hunting license fee (MoF Decision 901/1 of 2012);

Moreover, the HCH has defined the following:

- The hunting season from 15 September until the end of January; and
- The birds and animals species allowed to be hunted during the hunting season. The list is subject to change every season.

On the other hand, a decree relating to the hunting insurance was issued on 24 May 2014 (Decree No. 11987/2014) based on the proposals of both the Ministers of Environment and Economy and Trade.

Supporting the management of Important Marine Habitats and Species in Lebanon

This project was executed by the MoE and IUCN with the aim of supporting the development of a network of Marine Protected Areas (MPAs) in Lebanon and an associated monitoring program to evaluate their effectiveness. Within its context, the Lebanon MPAs strategy was developed in 2012. The strategy aims at establishing a network of MPAs in Lebanon, founded and managed within an integrated marine management framework that enhances the health of Lebanon's sea and marine environment with the objectives of:

- Creating a more systematic approach to MPAs planning and establishment;
- Enhancing collaboration for the management and monitoring of MPAs;
- Increasing awareness, understanding and participation of the local community in the MPAs network; and
- Linking Lebanon's network of MPAs to Mediterranean networks.

The Strategy proposed the following 18 MPA sites:

Proposed MPA coastal and marine sites:

Naqoura
Sidon rocks
Raoucheh cliffs and caves
Beirut port outer platform
Byblos
Madfoun rocky area
Batroun Phoenician wall
Ras Al-Chaqaa cliffs
Enfeh peninsula

Proposed MPA estuary sites:

Litani estuary
Awalli estuary
Damour estuary
Nahr Ibrahim estuary
Arida estuary

Proposed MPA deep water sites:

Beirut Escarpment
Saint Georges Canyon
Jounieh Canyon
Sour Canyon

So far, ecological characterization through biodiversity field surveys were done in six of the proposed MPAs mentioned above (Enfeh, Ras Al-Chaqaa, and Raoucheh in 2012, Naqoura, Sidon rocks and Tyre rocks in 2013), through the MedMPAnet regional project executed by RAC/SPA at the regional level. The missions were done in coordination with the Lebanese Ministry of Environment and the results of the surveys were published in a report issued in 2015 "Ecological Characterization of Sites of Interest for Conservation in Lebanon".

Mainstreaming Conservation of Migratory Soaring Birds (MSB)

The MSB project aims to ensure the preservation of globally threatened bird species into key productive sectors along the Rift Valley/ Red Sea Flyway. The project spanned over a period of 5 years from June 01, 2008 until December 31, 2014. The overall project goal is to ensure that globally threatened and significant populations of soaring birds that migrate along the Rift Valley/Red Sea flyway are effectively maintained. The project is further presented under Part II of this Report.

Market Policy and Legislative Development for Mainstreaming the Sustainable Management of Marine and Coastal Ecosystems in Lebanon

This is an ongoing project; which started in November 01, 2013 and expected to end on October 31, 2016), funded by GEF and implemented by UNEP and MoE, which aims at conserving and protecting marine and coastal biodiversity through policy and legal reforms, enhanced stakeholder participation and mainstreaming biodiversity priorities into national plans and programs. The project is further presented under Part II of this Report.

Mainstreaming Biodiversity Management into Medicinal and Aromatic Plants (MAP) Production Processes in Lebanon

The "Mainstreaming Biodiversity Management into MAP Production Processes in Lebanon project" is a UNDP/GEF project, executed by LARI (2009-2012), and that was designed to address the security of Lebanon's high levels of MAPs diversity by developing MAPs as a resource-base for local livelihood and national development. The project is further presented under Part II of this Report.

Restoring forest habitats

Forests in Lebanon have long been subject to intense human intervention and exploitation and suffered mostly due to urbanization, agriculture, overharvesting, and to damages deriving from overgrazing and fires. As a result, during the last fifty years, substantial part of these forests was lost. The optimistic estimates refer to a loss equivalent to 35% of the forest cover or 7% of the country land area (Europe Aid, 2014).

Recently, the forest sector gained increased importance and attention and is more and more considered as a national asset and reforestation initiatives are being implemented; the main four being:

1- Safeguarding and Restoring Lebanon's Woodland Resources (SRLWR)

The project was executed by MoE, implemented by UNDP and funded by GEF (2009-2014) and issued in December 2014 a technical report that presents the results of 3 different sets of field trials implemented by the project in 8 pilot sites on different new reforestation techniques Given the current high costs of reforestation in Lebanon estimated at around US $7,000 per hectare (at a density of 800 seedlings/Ha), the main objective of the field trials was to assess the prospects of

successful reforestation in Lebanon at low costs and possibly without irrigation. One of the most promising findings is that direct seeding without irrigation can be used in some situations at very low costs (MoE, 2014).

2- The 40 Million Trees Program

In December 2012, the Lebanese Government launched the 40 million trees programme, a national initiative steered by the MoA to plant 40 million forest trees in 70,000 ha of public lands within the next 20 years – aiming at increasing Lebanon's total green space to reach 20%. An inter-ministerial committee was set up to oversee the programme development and implementation initiated the preparation of a roadmap for this long-term reforestation programme, which proposes ways of sharing responsibilities and coordination mechanism like partnerships between the different stakeholders. The Project was revived in November 2014 with the help of the FAO and the road-map was launched in December 2014.

3- International Program of the US Forest Service (USFS)

The USFS launched in 2011 a multi-year US $12 Million Lebanon Reforestation Initiative (LRI). This initiative aims at planting 300,000 native tree seedlings in various regions of Lebanon, improving seedling quality and increasing awareness towards fire protection and similar issues in forests and reforested lands. The project favors a decentralized approach to engaging communities at the municipal level.

By June 2015, LRI has accomplished the following:

- Improved production practices in up to 10 native tree nurseries across the country, and supported the nurseries in creating the Cooperative of Native Tree Producers of Lebanon (CNTPL), currently the only Cooperative that has the capacity of producing up to 400,000 high quality seedlings for reforestation at international standards;
- Planted, in collaboration with local municipalities and local NGOs, more than 545,000 seedlings of more than 20 native tree species on more than 750 ha of public land distributed over all Lebanese mouhafazas;
- Achieved an overall average survival rate of 76% of the planted seedlings by 2014, which is considered a major improvement;
- Improved reforestation techniques and developed protocols specific for Lebanon for the inspection of planting quality during the reforestation season and for the monitoring of seedling survival in the field on a yearly basis;
- Adapted the Firewise system for community engagement in fire prevention to the Lebanese context and implemented it successfully in 3 communities;
- Developed a Lebanon-specific community engagement strategy to engage local communities in protecting, maintaining and replicating reforestation efforts; and
- Updated the vegetation map of Lebanon and created the first available online mapping tool that helps reforestation stakeholders locate potential sites for reforestation, identify the

vegetation series suitable for every region and determine the fire risk on any site across the country.

Managing Wildfire Risk in Lebanon

The project: "Towards a better assessment and management of wildfire risk in the Wildland-Urban Interface (WUI) in Lebanon: gaining from the US experience" is managed by the Institute of the Environment (IOE), the University of Balamand (UOB) and funded by the Agency for International development (USAID) in agreement with the US National Academies of Science (NAS).

The Goal of the project is to develop the capacity of stakeholders in Lebanon to assess and manage wildfire risk in Lebanon's WUI in light of future climate change and human development in wildland areas. A primary goal of the research is to improve knowledge and understanding among land managers, university students, local community groups, and municipalities about the nature and risks of wildfire in Lebanon's WUI. Results from our research will provide critical information for land managers and municipalities tasked with mitigating increased risk of wildland fires.

Research objectives: (1) investigate the feasibility of developing a wildfire-climate model for Lebanon that simulates the interactions among climate change, expansion of human development into wildland areas, and wildfire risk in the WUI; (2) identify data needs and partnerships necessary for future development of a wildfire-climate model for Lebanon; and (3) develop materials that would demonstrate how such a model can be used by Lebanese stakeholders to adaptively manage wildfire risk in the WUI for future climate and land use changes.

Educational objectives: (4) develop the capacity of the community of interest (i.e., land and wildland fire management agencies, homeowners, and community/regional planners) to assess and manage wildfire risk in the WUI under alternative climate change and residential development futures; and (5) incorporate the research results into educational products that increase understanding and knowledge of wildfire risk to the broader community (i.e., students, members of the public who do not actively make decisions that influence wildfires and wildfire risk, and management personnel for public forests and nature reserves).

The main achievements of the project include the launching of "FireLab", a web-application that produces detailed wildfire reports at both the country and village levels (http://ioe-firelab.balamand.edu.lb).

Environmental Resources Monitoring in Lebanon (ERML)

In response to the conflict of July-August 2006 and the subsequent oil slick on Lebanese shores, the Government of Greece (GoG) allocated US $1.64 million to the Government of Lebanon (GoL) for the implementation of an environmental monitoring project in Lebanon to be implemented by the MoE, under the management of the UNEP in collaboration with UNDP. The project started in 2009 and ended in 2013.

The objective of the project was therefore set to improve the understanding of the environmental quality in Lebanon and its implications for the population through the development and implementation of monitoring programs, review of existing legislation, and development of appropriate monitoring strategies.

The project addressed three (3) components with objectives specific to each component:

- **Component 1:** Improve MoE's capability to understand coastal and marine environments through monitoring and management of the resources;

- **Component 2:** Develop a land-use management strategy in Lebanon's coastal zone (also known as the "GREEN" Integrated Coastal Zone Management (ICZM) strategy) to enhance socio-economic opportunities;
- **Component 3:** Improve MoE's capability to understand the air quality in Lebanon through the implementation of a national air quality monitoring system.

In terms of results, the following were the main achievements and publications:

Achievements	▪ Implementation of a National Air Quality Monitoring Network consisting of 5 automated and online air quality monitoring stations and 2 meteorological stations. ▪ Organization of a technical training on operation and maintenance for MoE as well as for the private sector and research institutions to build the existing capacity. ▪ Engaging partnerships with public and private sector institutions in air quality monitoring activities. ▪ Conducting data validation and reporting under a partnership with the University Saint Joseph.
Publications	**Component A** ▪ Identification and Assessment of Coastal Sensitive Areas in Lebanon Analysis of the Current Land Use and Socio-Economic Activities in the Coastal Zone ▪ Ecosystem Based Monitoring In the Marine Coastal Environment in Lebanon ▪ Analysis of the Institutional and Legal Frameworks of Monitoring and Management of Coastal and Marine Areas **Component B** ▪ Analysis of the Current Land Use and Socio-Economic Activities in the Coastal Zone ▪ Land-use management strategy to enhance socio-economic opportunities in Lebanon's coastal zone. **Component C** ▪ Air Quality Assessment - the Case of Lebanon ▪ Identification of Air pollution Hotspots and Development of a Monitoring and Reporting Programme for Lebanon ▪ Analysis of the Institutional and Legal Frameworks of Monitoring and Management of Air Quality in Lebanon **Project documentary** Arabic Version https://www.youtube.com/watch?v=gnRBZx2XTg4 English Version https://www.youtube.com/watch?v=1jaba57e2Ak

The Economic Value of the Shouf Biosphere Reserve

Economic valuation of biodiversity is a new process in Lebanon. Valuation of nature reserves and mainstreaming biodiversity into economic sectors are the main areas of biodiversity valuation being developed in Lebanon.

In April 2015, the "Economic Value of the Shouf Biosphere Reserve" was officially published. The objective of the study is to calculate the economic value of the Shouf Biosphere Reserve (SBR) which is the largest nature reserve in Lebanon with a focus on carbon sequestration, fuel provision (briquettes production), water provision, food provision, tourism, and cultural services and patrimonial value. The results showed that the economic benefits generated by the SBR are currently in the range of 16.7 to 21.3 million US dollars/ year, a number which vastly exceeds the operational budget of the SBR (about $1 million including investment and maintenance), by a factor of 19 to 1. In other words, every $1 invested in the SBR returns about $19 of benefits to the region and the people.

Main Threats to Biodiversity

The main threats to Lebanon's biodiversity were identified from literature review and working session with a multitude of experts of the field.

The main identified threats are:

- ***Habitat loss, fragmentation and destruction***
- ***Unsustainable exploitation of natural resources***
- ***Pollution***
- ***Invasive species***
- ***Introduction of new improved varieties (agro-biodiversity)***
- ***Climate change***
- ***Lack of data***

Each of these threats to biodiversity is discussed in turn below.

Threats and Causes

Habitat loss, fragmentation and destruction

Habitat conversion, degradation and loss are the main causes for ecosystem fragmentation and species decline given that habitats provide species with all the requirements and elements of their ecological niches. In case the natural habitat is not fully transformed or destroyed, it is degraded to sub-optimal condition.

The terrestrial ecosystem is constantly suffering from habitat loss, fragmentation and destruction. The major causes that are responsible for this phenomenon are listed in the following paragraphs.

In Lebanon, chaotic and anarchical urbanization is the main cause for the loss, fragmentation and destruction of terrestrial ecosystems and their habitats (SOER, 2010). Various factors contributed to haphazard urbanization namely:

- The amplified demographic pressure. Today, with the absence of an adequate urban planning, a high number of illegal constructions and an increase in the number of Syrian refugees that reached 1,144,706 refugees in 2014 (UNHCR, 2014), the pressure on biodiversity became a major concern. Habitats are being lost, fragmented or destroyed and sometimes with no possible regeneration;
- Inappropriate inheritance law and lack of proper enforcement of the construction law;
- Real Estate Speculations; and
- Lack of awareness.

Rangelands are primarily affected by urbanization followed by overgrazing. Some of these lands were fragmented from maquis[5] to garrigue[6] and then to batha[7]. A further degradation of those areas due to unsustainable activities will make them unable to support the biodiversity they initially sustained (SOER, 2010).

Forest fires are also responsible for the destruction of large areas that comprise many ecosystem habitats. The reasons behind this occurrence are the lack of forest management, fire prevention and law enforcement, the absence of civil defense and the insufficient awareness amongst the public. In Lebanon, pine forest ecosystems are mostly affected by forest fires (natural or manmade). The stone pine (*Pinus pinea)* is mainly threatened by urban development and forest fires. Forest fires that occurred during the period 2007-2008, have resulted in the loss of 4,200 ha of Lebanon's vegetation cover. According to AFDC (a national NGO) (2007), during one day in October 2007, the total burned area was equivalent to three times the area afforested during a period of 17 years. These fires were the main reason behind forest fragmentation and loss of related ecosystem services. Consequently, the livelihood of local communities was affected in a dramatic manner given that they depend upon forests for a variety of goods and services including 1) the collection of edible fruits, flowers, tubers, roots and leaves for food and medicines; 2) firewood for cooking, heating, and sale; 3) materials for agricultural implements, house construction and fencing, 4) grazing of livestock, and 5) collection of a range of marketable non-timber forest products.

Another cause for habitat loss, fragmentation and destruction is deforestation which is estimated at 0.4 %/ year (MoE, 2012-a) and which root causes are the lack of awareness and law enforcement, poverty (cutting trees for fuel wood during winter season due to high fuel prices), the lack of a proper forest law enforcement and economic factors (e.g. chopping Juniper and various oak species for the illegal production of charcoal). The uncontrolled production of charcoal and trees cutting for fuel wood, mainly destined for heating, used to constitute a major threat to the vegetation cover, as forests were totally harvested even on very steep slopes. This was frequently followed by intensive grazing as soon as the vegetation started to coppice again. In addition, the risk of occurrence of forest fires was very high during the charcoal production operations. As a result, the MoA issued a decree totally forbidding the production of charcoal; yet illegal productions still occurred. After several years of banning, charcoal production is currently allowed under certain conditions and in certain time periods. These new regulations are being enforced and charcoal production is having fewer impacts on wooded lands and forests.

Declining forests are also threatened by overgrazing which can inhibit regeneration. Recreational activities, such as ATV, quads, hunting, and camping are also considered as causes for deforestation.

Quarrying is also an important factor leading to habitat loss, fragmentation, and destruction. Quarrying activities in Lebanon have always been critical. On one side, quarries are needed to

[5]Maquis is a shrubland biome in the Mediterranean region, typically consisting of densely growing evergreen shrubs such as holm oak, kermes oak, tree heath, strawberry tree, sage, juniper, buckthorn, spurge olive and myrtle.

[6]Garrigue is a type of low, soft-leaved scrubland ecoregion and plant community in the Mediterranean forests, woodlands, and scrub biome. It is found on limestone soils where the climate is moderated. Garrigues are degraded maquis.

[7]Batha is a degraded garrigue

support the construction sector. On the other hand, the encroachment of quarries on forests and agro-ecosystems is a major problem. A number of quarries have been permitted in the past, only to see small sites being transformed into huge cavities in the mountains in a way that does not allow any form of restoration. A number of initiatives have been started including the attempt to locate quarries to the eastern mountain range of Lebanon or to ban quarries altogether and rely on imports. Most of these initiatives failed because of lack of feasibility. Currently, there are around 1,300 quarries scattered all over the country ranging from local to large scale quarries feeding the cement and construction industries. Quarrying activities accelerate the erosion processes and subsequent destruction of existing arable lands, modify preexisting ecosystems, change landscape patterns and integrity, destroy natural habitat and interrupt natural succession (Khater *et al.*, 2003; Khater, 2004), as well as modify genetic resources (El-Fadel *et al.*, 2000; ESCWA, 2001). Moreover, the expansion of quarries in Lebanon between 1989 and 2005 destroyed 738 ha of grasslands, 676 ha of arable lands, and 137 ha of forest area (Darwish *et al.,* 2010).The causes behind extensive and unsustainable quarrying are the lack of awareness amongst quarry owners, the lack of proper law enforcement, urbanization that requires rocks from quarries to build houses, corruption at the political and public levels, and socio-economic factors (income from rock selling).

In addition, growing timber in agricultural lands and the extensive agricultural expansion highly damage these ecosystems. Some farm or home plantations are typically established for the production of timber. In some cases, commercial timber concessions are overlapped by community forests. The root causes are the low profit from forests and natural ecosystems, the lack of awareness at the decision-making level (politicians and civil society), the extension services, the absence of a rural development and agro-forestry policies as well as agricultural planning.

Large-scale public works are without sufficient integration as a result of demographic growth, poor urban planning, wars, civil wars and regime instability. Such activities can negatively affect ecosystems.

Sand is extracted from shores for construction purposes threatening such habitats. Political pressure, the high profit from gravels, sands/ stones and the lack of law enforcement are the factors that allow such activities.

Furthermore, biodiversity and ecosystem services are given very low intrinsic value due to the lack of investment outside the construction sector which indirectly affects ecosystems and their habitats.

Recreational pressure is an additional cause for habitat loss, destruction or fragmentation. The absence of an adequate strategy is the root cause for this incident. Recreational activities are leisure activities practiced by people that can, in some cases, be harmful to the surrounding environment. Examples of recreational activities that are contributing to habitat loss, destruction or fragmentation are:

- Construction of beach resorts and hotels on coastal areas;
- Land reclamation, mainly over the sea, for the creation of restaurants and outdoor activities areas;
- Expansion of ski resorts;
- Construction of mountain resorts and country clubs; and
- Camping and outdoor activities leading to forest fires and littering.

The absence of an adequate strategy to manage the development of resorts, a lack of enforcement of construction regulations, a lack of enforcement of EIA studies recommendations, and a lack of awareness are the causes of such incidents.

Unsustainable exploitation of natural resources

Lebanon is located on one of the world's key migratory bird corridors. Unfortunately, despite that hunting is forbidden officially until the official opening of the hunting season each year by the MoE, specifying the type and number of game birds allowed for hunting only in the hunting season, many violations are witnessed due to unsustainable hunting practices and hunting malpractices, consequently migratory birds such as avian populations are being killed in high numbers.

The substantial harvesting of trees, medicinal plants that are used in rural areas for the treatment of diseases (burns, gastrointestinal diseases etc.) and aromatic plants which are used in Lebanese cuisine, is also being observed. The assessed market value of medicinal and aromatic plants produced by forests in Lebanon is US $29.6 million/year (SOER, 2010). A Survey of Economic Plants for Arid and Semi-Arid Lands (SEPASAL) found 224 plants of economic significance distributed in Lebanon (SEPASAL, 1999). Other economic uses comprise local consumption (staple foods and wild edible plants), honey production (melliferous plants), landscaping (ornamental plants), and environmental uses (erosion control, agro-forestry, soil remediation, biotic indicators of pollution, etc.

With an increasing population, the pressure on groundwater for irrigation purposes is more and more accentuated which puts the freshwater ecosystem at risk.

The unsustainable water consumption can be explained by the excessive use of groundwater for irrigation purposes. This occurrence is the result of the combination of various factors such as the lack of awareness and incentives, the insufficient Governmental support, the lack of adaptation to climate change and the absence of Integrated Water Resource Management (IWRM).

Poverty is a major factor that drives people to behave in an unsustainable manner in order to meet their needs for survival.

Poverty in Lebanon is characterized by geographical and sectoral disparities. It is more concentrated in agriculture and in the informal sector. Poor people also live, in general, far from the country's main centers, in peripheral areas of the North and Bekaa, though slums are expanding and nurturing poverty. The latest official nationwide survey results on the living conditions of households date back to 2004-2005. A study conducted by UNDP and the Ministry of Social Affairs (MoSA) in 2008 used the 2004-2005 survey and applied the unsatisfied basic needs approach based on proxy indicators and found that the share of households that have unsatisfied basic needs accounted for 29.7% of total households (30.9% of the population). Out of these, 4.4% of households lived in extreme deprivation i.e. very low satisfaction of basic needs (3.9% of the population) (UNDP and MoSA 2007) (Figure 6).

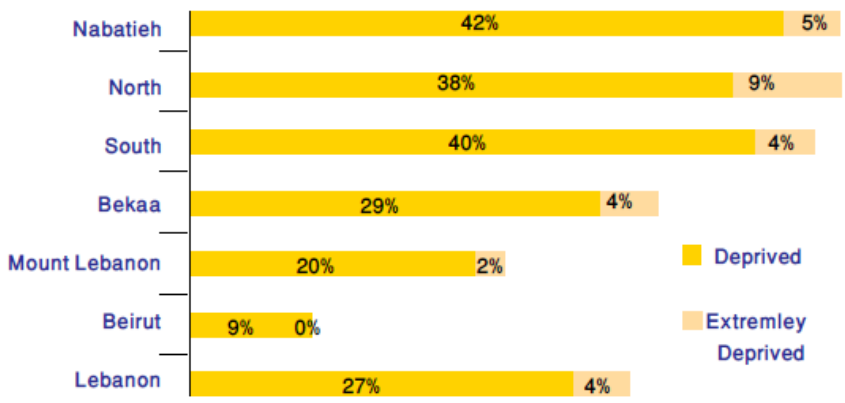


Figure 6 Percentage of Low and Extremely Low Basic Satisfied Needs out of Total Population, by Governorate

Source: UNDP(2013-2014)

Moreover, again using the same last household budget survey of 2004– 2005, a national poverty line was estimated at US$4 per day with a poverty rate of 27%. A lower poverty line of US$2.4 per day and an extreme poverty rate of 8% were also calculated (Table 5) (MoSA, CAS and UNDP 2004).

Table 5 Poverty Rate Estimates

	1995	2004
Living Conditions Index		
Individuals living with very low satisfaction of basic needs	6.6%	4.2%
Individuals living with unsatisfied basic needs (low & very low)	34.0%	25.6%
National Poverty Line		
Population living under lower Poverty Line (2.4$/day)	10.1% (1997)	8.0%
Population living under upper Poverty Line (4$/day)	33.7% (1997)	28.6%

Source: UNDP, 2013-2014

Poverty is concentrated in peripheral areas of the country, both urban and rural areas distant from the capital and mainly in the North and the South. The continuous rural–urban migration trend has also resulted in poverty pockets around big cities other than the capital, such as Tripoli in the North, where the number of poor is substantial. Geographical disparities are notable, for example when considering the lower poverty level. In Beirut the rate is 5.8%, versus 52.6% in North Lebanon (Akkar and Tripoli), where 17.7% are living in extreme poverty conditions.

Poverty in Lebanon is also associated with marginalized social groups such as the disabled, the elderly and female-headed households (often widows). Of female-headed households, 36% are considered deprived, versus 23% of male-headed households (UNDP and MoSA 2007).

Other indicators of inequality based on the 2004–2005 data show that the distribution of expenditure is also highly unequal, with the poorest 20% of the population consuming only 7% of total consumption while the richest 20% consume 43%, meaning that the share of the richest is equivalent to more than 6 times that of the poorest (UNDP and MoSA 2008).

Due to poverty, people illegally cut trees for heating purposes because they cannot afford the ever rising fuel prices. Some people burn forests to gather and sell wood. The root causes for poverty are the lack of alternative incomes and awareness. Another cause for this threat is people's greed and pride which is enhanced by the lack of law enforcement and control. Bad harvesting practices and rangeland management are mainly caused the lack of cultural awareness, and uncontrolled grazing. The absence of sufficient areas dedicated for grazing due to Land use planning gaps is another cause for overexploitation of natural resources. This topic is neglected due to the lack of appropriate education. Some people consider hunting wild species as a hobby and others as a sport, and they carry out this activity without differentiation between the species and through hunting a large number of species, with no regard to the consequences of their actions. This can be explained by the lack of awareness and law implementation, competition among hunters, and economic profit (high income from selling wild animals), medicinal use and fodder purposes. Deforestation is an additional consequence of poverty and is mainly due to the lack of awareness.

Marine species are being harmed by overfishing activities and illegal practices including the use of dynamites, small mesh size trawling nets and the massive collection of molluscs. The average annual capture (not counting aquaculture) of marine fish and molluscs/ crustaceans is 3,646 and 200 metric tons respectively from the marine basin (4,702 km^2) and the continental shelf (~ 1,169 km^2) (SOER, 2010).

The different causes for the unsustainable exploitation of marine natural resources include the lack of data due to the absence of funding and the lack of political will highly affect the ability to control marine natural resources and limit their abuse. Outdated regulation is another challenge and is caused by the lack of political will. Illegal fishing gear is also a cause for this threat and it is driven by the insufficient education and cultural awareness.

Other root causes affecting marine resources also include lack of awareness, competition, lack of inter-institutional cooperation and knowledge transfer between the concerned ministries (mainly MoE, MoA, MoTPW, MoI, and MoEW), the private sector and academic institutions and the need for more suitable expertise and personnel.

Pollution

Pollution from various sources particularly affects the terrestrial, marine and coastal and freshwater ecosystems. The causes behind this phenomenon are listed in the paragraphs below.

The sources of pollution of the terrestrial ecosystem are:

- The discharge of untreated municipal wastewater due to the lack of infrastructure and treatment plants and the absence of adequate policies;
- The discharge of untreated industrial effluents due to the economic profit to industries;
- The improper solid waste disposal from livestock, farms etc. through the creation of open uncontrolled dumps;
- Wars during which illegal chemicals are used and fuel leaks occur causing major pollution problems;
- Agro-industries that use excessive quantities of pesticides, fertilizers and agrochemicals. According to FAO, Lebanon consumed 78,840 tons of fertilizers in 2002 with an average rate of fertilizers of 414 kg/ha;
- Agriculture is considered to be an important energy consumption sector. Agriculture is increasingly dependent on the direct use of lubricants and fuels to operate farm vehicles and machinery; and use of gasoline, liquid propane, and electricity to power dryers, pumps, lights, heaters, and coolers) and indirect input (use of fossil fuels to produce fertilizers) of fossil fuels. If not managed properly, lubricants, fuels and other chemicals that are used in the agricultural sector could be a source of pollution to the surrounding environment and could contribute to climate change (emission of pollutants);
- Healthcare waste that is usually discharged into the environment with no prior treatment; and
- Gas Emissions from industries, incineration processes, cars and transportation (Figure 7).

Greenhouse gas source and sink categories	CO_2 Emissions (Gg)	CO_2 Removals (Gg)	CH_4 (Gg)	CH_4 (Gg CO_2 eq.)	N_2O (Gg)	N_2O (Gg CO_2 eq.)	Total emissions (Gg CO_2 eq.)
Total National Emissions and Removals	15,570.13	-143.87	89.82	1886.22	3.39	1050.90	18507.25
Energy	13,786.19		1.62	34.02	0.11	34.10	13,854.31
Energy Industries	5,752.89		0.23	4.83	0.05	15.50	5,773.22
Manufacturing Industries and Construction	2,830.60		0.06	1.26	0.02	6.20	2,838.06
Transport	3,929.40		1.14	23.94	0.03	9.30	3,962.64
Other Sectors	1,273.30		0.19	3.99	0.01	3.10	1,280.39
Industrial Processes	1,780.98		-	-	-	-	1,780.98
Mineral Products	1,652.98			-	-	-	1,652.98
Metal Production	128.00		-	-	-	-	128.00
Agriculture			6.60	138.60	2.99	926.90	1065.50
Enteric Fermentation	-		6.03	126.63	-	-	126.63
Manure Management	-		0.51	10.71	0.34	105.40	116.11
Agricultural Soils	-			-	2.65	821.50	821.50
Field Burning of Agricultural Residues	-		0.06	1.26	-	-	1.26
Land-Use Change & Forestry		-143.87	2.90	60.90	0.02	6.20	67.10
Changes in Forest and Other Woody Biomass Stocks	-	-807.60	-	-	-	-	-
Forest and Grassland Conversion	663.73		2.90	60.90	0.02	6.20	730.83
Waste	2.96		78.70	1,652.70	0.27	83.70	1,739.36
Solid Waste Disposal on Land	-		78.10	1,640.10	-	-	1,640.10
Wastewater Handling	-		0.60	12.60	0.27	83.70	96.30
Waste Incineration	2.96		-	-	-	-	2.96

Figure 7 Lebanon's Green House Gas (GHG) Emissions Summary for the Year 2000

Source: Lebanon's Second National Communication Report to the UNFCCC (2011)

Other causes include the lack of law enforcement and funding and insufficient awareness and knowledge regarding the impacts of pollution on the terrestrial ecosystem.

The sources of pollution of the marine and coastal ecosystem are:

- Industrial waste (liquid and solid) caused by the lack of political will, the weak enforcement of legislative texts, the lack of waste management and infrastructure;
- Domestic waste due to the absence of waste water treatment;
- Potential spills due to geopolitical reasons, for instance the intentional major oil spill during the Israeli War on Lebanon in 2006, and the absence of an oil and gas contingency plan;
- Shipping and the discharge of ballast water which contain pollutants that occur due to the absence of maritime regulation;
- Agricultural waste disposal (pesticides etc.) contaminate marine waters. Other root causes include the lack of law enforcement, awareness and social behaviors (open dumping of solid waste and wastewater, overgrazing, overfishing, illegal construction, etc.).
- Air Pollution (acidification) due to transportation and industrial activities.

The sources of pollution of the Freshwater ecosystem are:

- Insufficient collection and treatment of domestic wastes mainly due to poor governance, insufficient funds, rapid population growth, lack of sufficient coordination between CDR/ MoEW/ municipal authorities, outdated legal framework, poor enforcement of existing laws and low human capacity. Solid waste affects freshwater quality, sea grasses and marine turtles and changes the habitats of fish, birds and mammals, and impact their distribution and growth;
- Excessive use of pesticides and fertilizers in agriculture related to the limited extension staff for the MoA, the poor management system, the illegal entry of chemicals, pilot projects which did not have a sustainable impact owing to a lack of funding, little promotion of Integrated Pest Management (IPM) initiatives;
- Industrial pollution that results from the lack of accountability and application and enforcement of the law, the absence of effective incentives and fines, and the non-application of the 'polluter pays principle' that holds people accountable for their actions;
- Pollution caused by tourism activities results from tourists' indifference, the lack of awareness by tourist operators and law enforcement and the absence of environmental conditions attached to tourism activity permits.

Invasive alien species

Invasive alien species (IAS) are non-native species which have been introduced by human activities and which now propagate and spread independently throughout the country. Invasive species

rapidly grow and expand and are in conflict with indigenous species, jeopardizing habitats and competing for resources needed for their survival thus causing a loss of native biodiversity. According to the Global Invasive Species Database[8] website, there are 24 IAS found in Lebanon. The introduction of invasive flora and fauna is mainly through the importation of ornamental and donated forestry plants with their accompanied insects, the legal/illegal trade of wildlife, the escape of exotic bird species from cages, and the introduction of non-native marine species when the Suez Canal was opened in 1869.

IAS are not yet considered a major threat to biodiversity in the country nor recognized as a key element of strategy development probably because their posed threat is poorly understood due to the lack of relevant studies and assessments (SOER, 2010). As a result, limited work is being conducted to identify or control or track the introduction of alien species and no significant measures were taken in this purpose except in protected areas. Within protected areas, introduction of alien species is forbidden by law, management plans are in place and operating in respect to some of the invasive species threatening endemic species.

In addition, the following causes also contribute to the appearance of IAS:

- The lack of enforcement of regulations and control due to insufficient governmental infrastructure and knowledge, absence of proper control at the borders (such as genetic bar coding), and the need for more technical expertise and researchers and more laboratories that are able to deliver required outputs and accurate results. IAS regulations and control are currently limited to:
    - MoA Decision 108/1 issued in September 1995 to ban the import and introduction of any Cedar seeds, seedlings and plants. This decision was issued in response to the uncontrolled introduction of trees from the *Cedrus* genus through the ornamental industry;
    - MoA's regulation of the import and export of species through issuing of CITES permits. knowing that Lebanon has ratified the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)[9] through Law 233 dated 22/10/2012;
- The low number of staff at MoA with proper skills to identify IAS and apply the existing regulations;
- The low amount of research undertaken related to IAS. Only few alien species of major concern have been studied. These are limited to the identification of species but there are no scientific publications on the risk assessment of these species in Lebanon even though it is considered to be a real threat;
- Lack of technical expertise and researchers in relation to IAS.

[8] The Global Invasive Species Database is managed by the Invasive Species Specialist Group (ISSG) of the IUCN Species Survival Commission (SSC). URL: http://www.issg.org/database/welcome/

[9] CITES regulates the trade of wild species and restricts the exchange of certain species

- The absence of national monitoring of species which is mainly due to the insufficient coordination between universities and ministries along with limited research funding;
- Climate change which enhances the movement of invasive species due to shifting climatic conditions and a lack of emergency plans;
- The high economic value for some IAS that act as an incentive for their import and release; and
- The discharge of agricultural runoff and untreated sewage waste into water bodies creating nutrient-rich environments favoring the survival of some IAS.An example is the appearance of "Zahret El Nil" plant (*Eichhornia sp.*) in the basin of Al-Kabir River which resulted in clogging irrigation canals, creation of prime habitats for diseases' vectors, and flooding events damaging agricultural lands along the river.

The main impacts of IAS on biodiversity and ecosystems are the replacement/ loss of native species and disturbance of natural habitats, sometimes coupled with socio-economic implications. For instance, a decrease in agricultural production where IAS, when proliferating near agricultural lands, may affect the productive capacity of the land and increase agricultural labor time, affecting human well-being by threatening the availability of food.

Introduction of new improved varieties (agro-biodiversity)

Agro-biodiversity is "the variety and variability of animals, plants and micro-organisms that are used directly or indirectly for food and agriculture, including crops, livestock, forestry and fisheries. It comprises the diversity of genetic resources (varieties, breeds) and species used for food, fodder, fiber, fuel and pharmaceuticals. It also includes the diversity of non-harvested species that support production (soil micro-organisms, predators, pollinators), and those in the wider environment that support agro-ecosystems (agricultural, pastoral, forest and aquatic) as well as the diversity of the agro-ecosystems" (FAO, 1999a). New improved varieties are introduced for three main reasons:

- Better productivity leading to better income. The root cause is economic profit;
- Improved tolerance to biotic/ abiotic stress therefore aiding food security;
- Absence of incentives to keep local varieties of fauna and flora which root cause is the lack of awareness.

New introduced varieties replace local trade varieties and can be difficult to control. Those new species can cause reduced propagation of native biodiversity and the gene pool may eventually be affected and reduced.

Climate change

Ever since the industrial revolution, the concentration of GHGs in the atmosphere is increasing, considerably affecting all forms of life on earth including biodiversity. The causes responsible for this phenomenon are the lack of alternative sources of energy, the overuse of fossil fuels, and the absence of alternative public transportation options. On the other hand, the insufficient adaptation to climate change is another cause which results from the lack of coordination and awareness and the unavailability of data.

Biodiversity in the Arab countries, already deteriorating, will be further damaged by intensifying climate change. A 2°C rise in temperature will make extinct up to 40% of all the species. The Arab countries have many unique formations that are especially vulnerable to climate change risk, such as the cedar forests in Lebanon and Syria, the mangroves in Qatar, the reed marshes of Iraq, the high mountain ranges of Yemen and Oman, and the coastal mountain ranges of the Red Sea (AFED, 2009).

In Lebanon, climate change has yet to be considered as a high priority by national authorities. However, consequences are being felt even if at low degrees. The manifestation of hotter summers, reduced and more irregular winter rainfall which is more likely to fall than snow (high temperatures causing more evaporation than infiltration) and the ensuing reduction of water resources are obvious social and environmental impacts of climate change.

Lebanon's high altitudes, which provide refuges for many specialized species and niche ecosystems, will undoubtedly witness distribution shifts and in some cases disappearance of species. Two coniferous tree species, the cedar of Lebanon and the Silician fir reach their southernmost distribution limit in Lebanon and their distribution range will recede with increasing temperature to higher latitudes and altitudes in the region (AFED, 2009).

Ecosystems that comprise drought resistant species will adapt more easily to climate change compared to other ecosystems. Warmer climates are expected to cause an increase in rodents (field mice, house mice, rats etc.) all through the Lebanese territories. This phenomenon will eventually lead to an increase in rodent predators such as jackals, foxes, stone martins, etc. On the other hand, marginal mammals will become extinct due to the loss of habitat and food. This is the case for otters (*Lutra lutra*) (such as those in the Aammiq wetlands) and other mammals that depend on water bodies whose habitat will be harshly reduced due to the decrease in water resources (MoE, 2009). Increased temperatures will also cause the spread and proliferation of insect pests and disease vector populations. Climate change can also cause a shift of bioclimatic zones to higher altitudes which will mainly affect various reptiles and amphibians (Farajallah, 2008).

Other climate change impacts include modifications in 1) population physiology, 2) ecosystem phenology, and 3) geographical distribution of species.

Trends and routes of migration of birds will also be disturbed. Furthermore, bird populations whose distribution is restricted by cold temperatures will be forced to expand beyond their natural number with warmer temperatures. Inspections of the Lebanese avifauna suggest that few bird species from hot desert climate have started to colonize the vulnerable zone of the semi-arid Qaa by competing with native avifaunal species (SOER, 2010). The arrival of numerous new semi-desertic bird species in Lebanon is expected to occur (SOER, 2010).

In addition, increased temperatures will allow some plant species to become resistant to herbicides and pesticides.

Lack of data

The lack of data constitutes a major threat to biodiversity given that, with inadequate and insufficient data, the gaps and issues concerning the current status of biodiversity and ecosystems cannot be effectively determined, and can have consequences on finding appropriate solutions. The causes for the lack of data on biodiversity and ecosystems are:

- The lack of funds due to the absence of a strategic vision and political will;

- The lack of expertise due to insufficient awareness at the institutional level;
- The lack of a vision allowing for the establishment of a national management framework of Lebanon's biodiversity in the longer term. This is mainly due to little importance be given to biodiversity and the lack of enough data to set a vision;
- The lack of effective responsibilities due to overlapping mandates and regulations; and
- The lack of personnel due to the absence of clear mandates.

As listed in the previous paragraphs, various threats to biodiversity in Lebanon exist and need to be urgently addressed in order to limit the negative impacts that can sometimes become irreversible. Not all the threats are given equal priority at the national level such as climate change that has yet to be considered as a high priority by the National Authorities. Nearly all threats affect all ecosystems where habitat loss appears to be the most prominent, followed by chemical pollution, illegal hunting and persecution (MoE, 2009).

Consequences

The threats described in section Threats and Causes have various consequences on biodiversity, including direct pressures on species and ecosystems (species extinction, reduction in genetic diversity, decrease in ecosystems resilience, etc.) and indirect pressures and consequences on human well-being (impacts on health, increase in natural disasters, loss of tourism revenue, etc.). The consequences of the different threats listed above are presented in Table 6 per major ecosystem type: terrestrial, marine/coastal, and freshwater.

The main consequences can be summarized as follows:

- Perturbation of ecosystem functions (vegetative cover, soil loss, erosion)
- Reduced natural regeneration (overgrazing)
- Alteration of food chains
- Impacts on health and well-being / Food and nutritional Insecurity
- Reduction in genetic diversity / Genetic drift
- Economic losses: less tourism, decrease in agricultural productions, reduced market offer diversity, etc.
- Species extinction/ Increased risk of species extinction
- Increase in invasive species which will increase the toxicity and will compete with native and endemic species
- Loss of accessibility to the maritime public domain
- Increased pest outbreak
- Monoculture and replacement of local trade varieties with new improved ones
- Increased resistance to some herbicides/ pesticides
- Risk of gene pollution from GMOs (long-term consequence)
- Increase in natural hazards (flood, salinization and acid rain, etc.)
- Difficulties in preparing management plans and *(due to lack of data and motivation)* lobbying for conservation

Table 6 Consequences for Each Ecosystem

Terrestrial Ecosystem	Marine/ Coastal Ecosystem	Freshwater Ecosystem
Species extinction/ Increased risk of species extinction		
Impacts on health and well being		
Food and nutritional Insecurity		-
Increase in invasive species which will increase the toxicity and will compete with native and endemic species		
Reduction in genetic diversity	Alteration of food chains	Eutrophication
Perturbation of ecosystem regulations	Loss of accessibility to the maritime public domain	Economic losses (less tourism)
Genetic drift	Alteration of the transport of nutrients	Variation in water cycles (flow regimes)
Increased pest outbreak	Increased erosion	Shrinkage and structural change of Freshwater habitats (disturbance to species)
Acute poverty	Loss of nurseries grounds	Loss of ecosystem services (purification etc.)
Disruption in ecosystem functions (vegetative cover, soil loss, erosion)	Loss of cultural value	Loss of species that live in the freshwaters and amphibians
Perturbation of ecosystem regulations	Alteration of the food web	Impact on marine and coastal ecosystems
Reduced natural regeneration (overgrazing)	Accumulation of hazards in nutrition	Reduction in availability of water resources
Decrease in agricultural productions	Difficulties in preparing management plans	Impact on terrestrial wildlife (less water for plants and terrestrial ecosystems
Disturbance of Natural habitats/ ecosystems	Difficulty in lobbying for conservation	Change in nutrient regimes reaching the coastal area
Need to use more nutrients (pollution)	Difficulty in meeting regional/ international obligations	Increase in natural hazards (floods etc.)
Exportation of agricultural products	Motivation for decision making and the public	Creation of micro-climate
Monoculture	Lack of interest in developing Academic programs	
Disturbance of biological cycles		
Increased resistance to some herbicides/ pesticides		
Amplified growth (CO_2)		
Difficulty of treatment of newly introduced improved varieties		
Replacement of local trade		

Terrestrial Ecosystem	Marine/ Coastal Ecosystem	Freshwater Ecosystem
varieties with new improved ones		
Less propagation of local varieties such as seeds		
Less typical varieties		
Reduced diversity in market offer		
Risk of gene pollution from Genetically Modified Organisms (GMOs) (long-term consequence)		
Socio-economic problems		
Decrease in ecosystems resilience		
Decrease in the quality of resources		
Salinization and acid rains		

Biodiversity and Ecosystem Services

Conserving biodiversity is an essential part of safeguarding the biological life support systems on Earth. All living creatures, including humans, depend on these systems for the necessities of life. For example, we need oxygen to breathe, clean water to drink, fertile soil for food production and physical materials for shelter and fuel. These necessities can be described collectively as ecosystem services. Ecosystem services are produced by the functions that occur in healthy ecosystems. These functions are supported by biodiversity and its attributes, including the number of species, and their relative abundance, composition and interactions. Ecosystems provide protection against natural disasters and diseases and maintain essential processes of life on earth by providing various services that are essential to our physical, social, cultural and economic well-being.

Figure 8 below presents a summary of ecosystem services identified in Lebanon. These services are further described in the subsequent sections per ecosystem subtype identified based on the CNRS 2013 Land Use Maps and include:

- Agricultural lands;
- Wooded lands;
- Scrubland and grassland;
- Bare lands and rocky areas;
- Inland water bodies and wetlands;
- Water courses; and
- Marine water bodies and coastal areas.

Figure 8 Important Ecosystem Services in Lebanon

Agricultural Lands

Agricultural lands provide resources for both agricultural and industrial crops and are used for grazing as well. The share of agriculture was in constant decline from 1997 to 2011, and reached 4% of Gross Domestic Product (GDP) in 2011 (UNDP, 2013-2014). The agricultural sector in Lebanon has a limited level of protection from international competition. In 2014, Lebanon's GDP from agriculture, forestry and fishing was estimated at around 4% (MoF, 2014). About 26.5% of Lebanon's lands are cultivated of which 50% are irrigated. Almost 31% of the exploitable agricultural land is located in the Bekaa. Fruit trees occupy 31% of the total agricultural land used, followed by cereals (22%), olive trees (22%) and vegetables (16%). The remaining 9% of agricultural land is occupied by industrial crops, like tobacco (5%) and other small crops (4%). Agriculture constitutes the main source of income for an average 30-40% of the population in Lebanon.

Due to the important aesthetic and cultural values of agricultural lands in Lebanon, agro-tourism appeared as a new use of agricultural lands. Agro-tourism provides income, utilization of existing facilities, natural conservation, and recreation and education of the population in urban and rural areas. Agro-tourism is still a new and limited tourism area in Lebanon, it is mainly linked to winery tours (mainly in Bekaa and recently in Batroun), seasonal fruits picking (mainly apple and cherry) activities, and olive oil making (from picking to pressing) tours organized by ecotourism agents. In September 2014, the "Rural Tourism Strategy for Lebanon"[10] was developed. The strategy suggests key directions and practical actions that could be implemented over the next five years to improve the competitiveness of rural tourism in Lebanon including agro-tourism.

Wooded Lands

Forests cover 13% of Lebanon's total area while other wooded lands cover 11%. Three major species are found in Lebanon's wooded lands: *Quercus sp.* (41.6%), *Pinus sp.* (20.3%), and *Cedruslibani* (1.6%). In terms of land ownerships, 65% are owned by public entities (communal lands[11] and state lands) while 35% are privately owned (private and religious properties) (EFIMED/MoA, 2013).

From an economic standpoint, wooded lands contribute to 0.93% of the country's GDP and employ 0.02% of the national labor force. The main economic activities related to wooded lands being the production of fuel-wood and charcoal (for sale at markets) and non-wood forests products such as pine nuts, carob pods, honey, and medicinal and aromatic plants (EFIMED/MoA, 2013).

Wooded lands constitute an important source of energy for domestic use. Wood is the most important single source of renewable energy providing over 9% of the global total primary energy supply for cooking and/or heating, particularly in households in developing countries such as Lebanon (FAO, 2013). It represents the only domestically available and affordable source of energy. Today, wood energy is considered as a climate neutral and socially viable source of renewable energy, but only when meeting the following conditions:

- Wood arising from sustainably managed resources (forests, trees outside forests, etc.);

[10] Prepared by MoT in cooperation with DAI and Beyond Beirut in consultation with rural tourism actors under the Lebanon Industry Value Chain (LIVCD) Project funded by the United States Agency for International Development (USAID)

[11] Communal lands are lands owned by municipalities.

- Appropriate fuel parameters (water content, calorific value, shape, etc.);
- Efficient incineration or gasification minimizing indoor and outdoor emissions; and
- Cascade use of wood fibers, favoring material use, re-use and recycling before energy use.

Wooded lands also provide grazing areas for ruminants, while ecotourism and recreational activities are sometimes practiced in those areas. Wooded lands also have cultural, intrinsic, spiritual and aesthetic values.

Scrubland and Grassland

Scrublands are plant communities characterized by vegetation dominated by shrubs. Those ecosystems have diverse origins, which may be natural, anthropogenic, or both. Anthropogenic scrublands occur where humans have altered an environment formerly dominated by trees to such an extent that it is no longer able to support them; this development is usually brought about through some combination of tree clearance, burning, and grazing that leads to soil degradation. In certain situations, deforestation has led to the vigorous growth of shrubby plants that form a scrubland so dense that the originally dominant trees cannot return. Many areas have been converted from forest to scrubland by tree clearance, heavy grazing especially by goats, frequent burning, and consequent soil erosion. In these ways, evergreen forests of pine and oak have been replaced by scrublands in places throughout the northern Mediterranean fringe from Spain to Lebanon. Fire is essential to the health of most scrublands. Without periodic burning, many scrublands would alter in composition; some would gradually develop into tree-dominated vegetation (Smith, 2015).

Grasslands are areas in which the vegetation is dominated by a nearly continuous cover of grasses. Grasslands frequently have been converted to cropland on which edible grains are grown; this allows food for humans to be taken directly from the grasslands themselves rather than via grazing animals feeding on the native grasses in a rangeland situation (Smith, 2015). In other words, scrublands and grasslands are used for grazing, agriculture and forage. Those ecosystem sub-types are known to be great energy sources given their high biomass that is sensitive to fire and have cultural and aesthetic values. In some cases scrublands and grasslands are used for medicinal purposes. Some are used to manufacture cosmetics and others offer shelter to humans and other living creatures. Ecotourism and recreational activities such as camping and hiking are also practiced of those lands.

Bare Lands and Rocky Areas

Bare lands and rocky areas provide building materials through quarrying activities, food and potable water and are often visited by tourists and other people who are interested in group activities such as hiking. Those ecosystem sub-types are in some cases used for medicinal and cosmetic purposes. Ecotourism and recreational activities are often practiced in bare lands and rocky areas especially extreme sports such as mountain biking, rock climbing, and off-roading.

Inland Water Bodies and Wetlands

Inland water bodies are aquatic-influenced environments located within land boundaries and can be fresh, saline or a mix of the two. Inland water bodies in Lebanon include natural lakes (e.g. Yammouneh Lake); artificial lakes constructed for recreational (e.g. Bnachii Lake) hydropower and/or irrigation purposes (e.g. Oyoun Samak Lake, Qaraoun Lake); and wetlands. Despite their important biological importance, there is no inventory of wetlands in Lebanon; according to the

National Physical Master Plan for the Lebanese Territory (NPMPLT) swamps and wetlands cover 0.1% of Lebanon's surface. The following three wetlands are the most known ones in the country:

1. Aammiq wetland is the largest remaining wetland and the only studied one, a remnant of much more extensive marshes and lakes that once existed in the Bekaa Valley. It has been designated an IBA in the Middle East (Birdlife International, 1994), is included in the Directory of Wetlands in the Middle East (IUCN, 1995), was declared Ramsar Convention site number 978 in 1999, and 2005 was designated, with Al Shouf Cedar Nature Reserve, a "Biosphere reserve" by UNESCO.

2. Anjar-Kfar Zabad Wetland is located in the Bekaa valley and formed as a result of Shamsein and Masaya springs and Gozayel River. The wetland also represents a major spot for migratory birds along the African Eurasian Flyway was announced as an IBA in 2004 based on BirdLife criteria.

3. Aaiha wetland is a temporary wetland that only appears every few years in Rashaya south of the Bekaa Governorate and situated in an intermountain basin near Mount Hermon and the Syrian border. Aaiha wetland has no protection status.

These ecosystems feed downstream waters, trap floodwaters, recharge groundwater supplies, remove pollution, allow for nutrient absorption and recycling, provide drinking and irrigation water, and play a role in the regulation of global climate change through sequestering and releasing a major proportion of fixed carbon in the biosphere. In addition to these services, inland water bodies, mainly wetlands, represent important habitats for various diversity of flora and fauna (fish, turtles, crabs, birds, mammals) with endangered species (River Otter and Syrian Serin bird); they represent as well important stop-over sites for migratory birds. Moreover, wetlands in Lebanon are important for sustaining people livelihoods, mainly: agriculture, fisheries, and drinking water supply. Ecotourism and environmental education are promoted by the MoE and several NGOs in the wetlands aiming to support local communities and raise environmental awareness.

Water Courses

Water courses provide food through fishing activities, potable water and irrigation water and are an important source of renewable energy (e.g. hydroelectricity). The installed capacity of hydropower plants in Lebanon today is about 280 MW but the actual generation capacity is 190 MW, since many of the plants have been in service for several decades. The potential for new capacity from hydropower generation exists either from the rehabilitation of existing or the construction of new plants, which within the electricity sector policy paper (2010) has been quantified to range between 40 and 120 MWe.

Another important service provided by water courses is the provision of water for irrigation, domestic, and industrial uses. Agriculture is by far the largest consumer of water in Lebanon accounting for more than two-thirds of the total water demand, reaching upwards of 85 percent in certain predominantly agricultural regions. In the absence of real integrated irrigation schemes on the main rivers such as the Assi, Kabir, Hasbani, Wazzani, El-Bared and others, the main source of irrigation is the Litani River and the Litani-Awali network. Estimates indicate that about 54.3% of the irrigation water comes from water courses (A. Darwish, 2004).

Water sports and recreational activities are often practiced on those waters especially during summer time (canoeing, rafting, water polo, etc.). Water courses also have artistic, spiritual and aesthetic values and offer shelter to fauna and flora.

Marine Water Bodies and Coastal Areas

More than one third of the world's population lives in coastal areas, and people throughout the world depend intimately on the oceans and coasts, and the resources they provide, for survival and well-being (Duffy, 2006). The Lebanese coast extends about 225 km, covering 162,000 hectares (16% of Lebanon's surface area) of coastal plains and hills, where 2.6 million inhabitants (70% of total population) live. Lebanon's economic activity is concentrated in this zone which contributes about three quarters of the national income[12].

During the years 2013 and 2014 according to the MoA, average annual production of trout was around 1,200 tonnes and the value of production was around US $4 million. This is far below the potential production which could be attained given the favourable conditions in Lebanon for trout growing where many studies suggest that trout production can be boosted to 3,000-4,000 tonnes if properly developed in both technical and marketing aspects.

The graph below (Figure 9) shows total aquaculture production in Lebanon according to FAO statistics

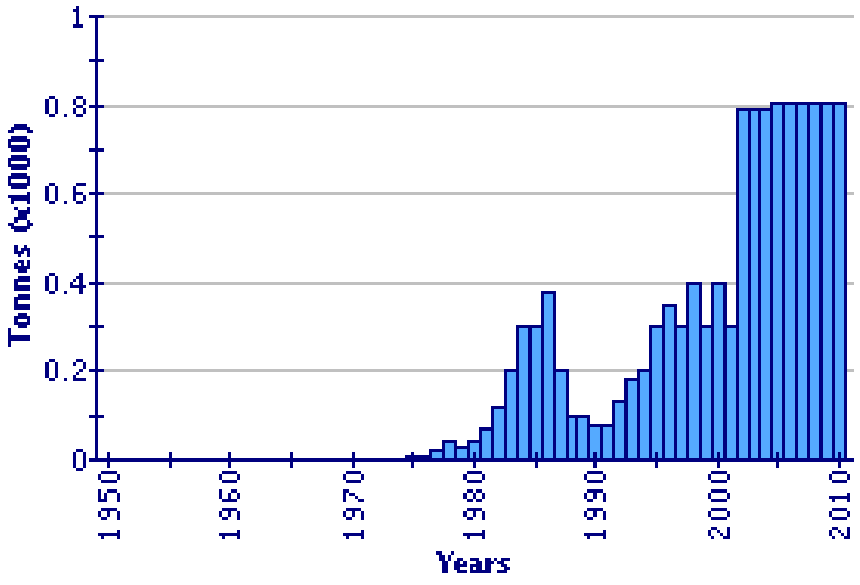


Figure 9 Reported aquaculture production in Lebanon (from 1950)

Source: FAO (2005)

The marine water bodies are important to the society and the economy. They represents a form of natural capital providing value in stocks and flows of goods and services, directly as seafood, pharmaceuticals, oils and additives, potable water (on a small scale), and building materials

[12]Najib Saab: The Lebanese Coast, Environment and Development Magazine

(extraction of sand). It also supplies many services, some of which are critical to human health, such as ecosystem resilience, genetic diversity and aesthetic appreciation.

Beach resorts can be found all along the coastal stretch bodies and attract various tourists, which highly contribute to Lebanon's economy.

In some situations, marine water bodies are used as urban dumping sites where industrial waste, wastewater and solid waste are discharged into marine waters with no prior treatment.

Part II: The National Biodiversity Strategy and Action Plan, its Implementation, and the Mainstreaming of Biodiversity

Part II starts by giving an outline of Lebanon's first national strategy and action plan and how fully it has been implemented so far. It also gives an account of the progress in the review and update of the NBSAP to become in line with the new CBD Strategic Plan for Biodiversity 2011-2020 and the associated Aichi Biodiversity Targets. Other actions taken to implement the Convention since the fourth National Report and outcomes of these actions are presented next, including how biodiversity is integrated into relevant sectoral and cross-sectoral strategies, plans and programmes.

Lebanon's First Biodiversity Goals and Objectives

Lebanon signed the Convention on Biological Diversity (CBD) in 1992 and ratified it in 1994 (Law No. 360/94). The MoE developed in 1998 with the support of UNDP/GEF a National Biodiversity Strategy and Action Plan (NBSAP) thus addressing Article 6a of the Convention which calls contracting Parties to "Develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity". This step was highly significant; especially given that it was the first time that such a comprehensive and wide ranging planning initiative has been undertaken with respect to management of natural resources at the national level. The NBSAP highlighted the main biodiversity themes, goals, and objectives, which are presented in Table 7.

Table 7 Lebanon's First NBSAP Biodiversity Themes, Goals, and Objectives

NBSAP 1998 Theme	NBSAP 1998 Goal	NBSAP 1998 Objective
Terrestrial Ecosystems and Natural Habitats	To protect Lebanon's terrestrial biodiversity from degradation and ascertain their availability for environmental and economic benefits	Provide stability for the ecosystems to permit the establishment of ecological equilibrium
		To manage forests and ranges for productivity and sustainability
Marine Biodiversity Conservation	To protect Lebanon's coastal and marine Biodiversity and develop their resources in a sustainable way	To protect coastal and marine ecosystems and Biodiversity
		To use marine and coastal resources in a sustainable manner by creating partnerships with the stakeholders, in particular, the local communities
Fresh Water Biodiversity Conservation	To conserve fresh water biodiversity, manage and wise use fresh water resources sustainably	To save, use and study biodiversity in fresh water ecosystem
General Measures for the Conservation of Agrobiodiversity in Lebanon	To protect Lebanon's agricultural diversity from degradation, and to maintain agricultural resources availability, while maximizing both environmental and economic benefits	To protect the agricultural ecosystems and to maintain native biological diversity
		To protect agrobiodiversity from deleterious agricultural practices, and to develop and implement policies and practices to minimize loss in genetic diversity
		To establish a national biodiversity database for documentation and monitoring of biodiversity
		To develop partnerships with the environmental community at the national, regional and international level
In-Situ Biodiversity Conservation in Lebanon	To conserve biodiversity under natural conditions and establish a balanced ecosystem where plants and animals evolve naturally	Expand and manage the protected areas system in terrestrial, marine and freshwater environments
Urban Biodiversity Conservation	To conserve Biodiversity ex-situ, utilizing existing capacities	To protect endemic species using urban and landscaping habitats
Biosafety	To protect natural ecosystems from invading species	To protect natural ecosystems and indigenous genetic biodiversity from the purposeful introduction or accidental release of exotic or genetically engineered plant and animal species
International Cooperation	To share global responsibilities in use; conservation and management of biodiversity	To ensure effective participation in international and regional conventions, protocols, agreements and technical programmes regarding biodiversity
Strategy Implementation	To share knowledge, costs and benefits with individuals and communities	To implement the strategy and action plan in partnership with all relevant organizations
Urban Biodiversity Conservation	To protect Lebanon's terrestrial biodiversity from degradation and ascertain their availability for environmental and economic benefits	Provide stability for the ecosystems to permit the establishment of ecological equilibrium

An important consequence of this significant achievement was that it provided the basis for information and policy to properly consider underlying trends and to identify priorities with respect to biodiversity. However, it was only the beginning of the planning process and the critical step remained the transformation of this strategy into actions.

An overview of the 1998 NBSAP achievements showed positive progress in the following areas: In-Situ conservation, research, training, awareness and education, environmental legislation, international cooperation, and mainstreaming biodiversity into SEA and EIA.

A more recent assessment of the 1998 NBSAP against the CBD thematic areas, conducted while reviewing the NBSAP in 2005, showed that the strategy was deficient in several areas: monitoring, alien species, ex-situ conservation, sustainable use, incentive measures, genetic resources, technology transfer, technical and scientific cooperation, biotechnology and information exchange.

In the course of the currently ongoing revision and update of the 1998 NBSAP *(further detailed in "Lebanon's Updated NBSAP" section)*,an assessment of the achievements and obstacles and constraints that faced the full achievement of the strategy and action plan was conducted during one of the consultation workshops. The objective of this exercise was to identify these obstacles and constraints to try to overcome them in the updated NBSAP. Stakeholders mainly faced a problem in assessing the achievement rates as the 1998 Goals and Objectives were considered too broad. The main obstacles identified were a lack of technical, human, or financial resources.

Table 8 below gives an overview of the obstacles that hindered the full achievement of the 1998 NBSAP as identified by a multitude of stakeholders.

Table 8 Obstacles Hindering the Full Achievement of Lebanon's 1998 NBSAP

Main Theme	NBSAP 1998 Goal	NBSAP 1998 Objective	Analysis of the 1998 NBSAP: Obstacles to full Achievement
Terrestrial Ecosystems and Natural Habitats	To protect Lebanon's terrestrial biodiversity from degradation and ascertain their availability for environmental and economic benefits	Provide stability for the ecosystems to permit the establishment of ecological equilibrium	1) It wasn't a SMART objective – too broad and not specific
			2) Lack of research
			3) Incompatible priorities (wars and geopolitical situation)
			4) No enough laws concerning terrestrial ecosystems were improved and no proper implementation of the existing laws
			5) Lack of awareness
			6) Not enough coordination between ministries
			7) Lack of resources
			8) The objective needed more time to be achieved
			9) Inadequate land use management planning
		To manage forests and ranges for productivity and sustainability	1) No proper implementation of forest laws
			2) Urbanization and low value given to forests
			3) Poverty
			4) Lack of technical knowledge and competencies at the local level
			5) No proper zoning for lands
			6) Unsustainable forests management
			7) Land tenure

Main Theme	NBSAP 1998 Goal	NBSAP 1998 Objective	Analysis of the 1998 NBSAP: Obstacles to full Achievement
			8) Lack of awareness of value of forest ecosystem services
			9) Lack of research in the field of forest management
			10) Research is not compiled into a single database
Freshwater Biodiversity Conservation	To conserve freshwater biodiversity, manage and wise use freshwater resources sustainably	To save, use and study biodiversity in freshwater ecosystem	1) Delay in project implementation
			2) Weak parts on biodiversity in EIA studies and reports
			3) Terms of reference of projects lack a defined scope regarding assessment of biodiversity
			4) Excessive water pumping (pressure on freshwater resources)
			5) Unsustainable irrigation practices
			6) Lack of integration of biodiversity into dam projects
			7) Absence of cooperation between the project proponents and the implementing agencies
			8) Lack of adequate infrastructure (dams, wastewater networks, roads, etc.)
			9) Lack of enforcement of MoE's guidelines by other ministries, such as MoI, when issuing and renewing industrial certificates and permits
			10) Lack of detailed management plans for the various freshwater bodies
			11) Absence of studies on the current state of illegal construction on river beds

Main Theme	NBSAP 1998 Goal	NBSAP 1998 Objective	Analysis of the 1998 NBSAP: Obstacles to full Achievement
			12) Very few studies on streams in terms of flow, discharge, quality and source of pollution
			13) No control over the discharge of wastewater into the various freshwater bodies
			14) Absence of mechanisms to regularly monitor ecosystems
			15) Lack of studies on freshwater ecosystems and how they interact
Marine Biodiversity Conservation	To protect Lebanon's coastal and marine Biodiversity and develop their resources in a sustainable way	To protect coastal and marine ecosystems and Biodiversity	1) Very little monitoring and research
			2) No new marine protected areas, however the National Marine Protected Areas Strategy (developed by MoE & IUCN in 2012) identified 14 candidates MPAs (in addition to deep sea MPAs) & 2 new MPAs are in process of declaration by MoE
			3) Weak legal framework
		To use marine and coastal resources in a sustainable manner by creating partnerships with the stakeholders, in particular, the local communities	1) Absence of a strategic vision
			2) Absence of a policy for sustainable use
			3) Political and security situation in Lebanon
			4) Absence of educational and awareness programs at the national level
General Measures for the Conservation of Agrobiodiversity in Lebanon	To protect Lebanon's agricultural diversity from degradation, and to maintain agricultural resources	To protect the agricultural ecosystems and to maintain native biological diversity	Some work has been done like the establishment of gene banks, increase in the number of natural reserves and domestication of some plants. However the obstacles were: 1) Monoculture

Main Theme	NBSAP 1998 Goal	NBSAP 1998 Objective	Analysis of the 1998 NBSAP: Obstacles to full Achievement
	availability, while maximizing both environmental and economic benefits		2) Not a priority 3) No means and resources 4) No national directives and guidance for agriculture 5) Rapid habitat destruction 6) Lack of proper implementation of FAO and National Physical Master Plan for Lebanese Territory (NPMPLT) recommendations 7) Limited studies on land use planning at the local levels 8) Uncontrolled use of pesticides 9) Political and security situation in Lebanon
		To protect agrobiodiversity from deleterious agricultural practices, and to develop and implement policies and practices to minimize loss in genetic diversity	1) Not enough awareness, training and technology transfer activities
			2) Lack of consideration from farmers
			3) Limited extension services in MoA
			4) Absence of standards, laws and national policies that regulate fishing and aquaculture and agrobiodiversity
			5) Lack of management of fishing and aquaculture activities
			6) Lack of definition of the agricultural diversity that needs protection, geographical areas and introduced species
			7) Lack of standards for chemicals used near river beds and streams
			8) Lack of incentives
			9) Absence of control on genetic pools

Main Theme	NBSAP 1998 Goal	NBSAP 1998 Objective	Analysis of the 1998 NBSAP: Obstacles to full Achievement
		To establish a national biodiversity database for documentation and monitoring of biodiversity	1) Lack of funding for the establishment and sustainability of a national biodiversity database
			2) Shortage in human resources to handle updating the database
			3) Lack of access to existing biodiversity database by farmers, municipalities and the public
			4) Agrobiodiversity conservation is not considered a national priority
			5) Lack of research and monitoring (requires financial resources and political will)
		To develop partnerships with the environmental community at the national, regional and international level	It has started but is not yet completed. The obstacles were: 1) No transparency 2) Information not disseminated 3) Agrobiodiversity is not a priority 4) Lack of awareness or consideration 5) Lack of communication and coordination 6) Political and security situation in Lebanon 7) Absence of a strategy on a national level
In-Situ Biodiversity Conservation in Lebanon	To conserve biodiversity under natural conditions and establish a balanced ecosystem where plants and animals evolve naturally	Expand and manage the protected areas system in terrestrial, marine and freshwater environments	The objective was not defined in terms of SMART criteria, but one can say that the status of protected areas in Lebanon has improved: increase in the number of protected areas, better management of nature reserves, development of new relevant legislations, etc. However, some obstacles can be highlighted: 1) Lack of adaptation and mitigation schemes related to climate change

Main Theme	NBSAP 1998 Goal	NBSAP 1998 Objective	Analysis of the 1998 NBSAP: Obstacles to full Achievement
			2) Very few freshwater protected areas 3) To date, Aamiq marshes which is an important wetland has not been officially declared a protected area since it's a private property 4) Private ownership of land (private investment is a priority compared to conservation and EIAs for coastal and marine projects)
Urban Biodiversity Conservation	To conserve biodiversity ex-situ, utilizing existing capacities	To protect endemic species using urban and landscaping habitats	1) Unavailability of endemic species in the nurseries, due to: • Short fife cycle of endemic species • Very small scale initiatives and research, such as IBSAR (AUB), more efforts are needed • Lack of awareness 2) Limited public/municipal owned surface areas in which public entities can control which species are used in urban and landscaping habitats 3) No market for native and endemic tree species 4) Lack of laws and decrees on landscaping that define the species that are allowed and the ones that are not allowed to prevent the spread of invasive species

Main Theme	NBSAP 1998 Goal	NBSAP 1998 Objective	Analysis of the 1998 NBSAP: Obstacles to full Achievement
Biosafety	To protect natural ecosystems from invading species	To protect natural ecosystems and indigenous genetic biodiversity from the purposeful introduction or accidental release of exotic or genetically engineered plant and animal species	1) There's a need to further implement and enforce the Agriculture Quarantine Law dated 10/6/1948 and the Animal Quarantine Law implemented by Decree No. 12301 dated 20/3/1963 *The Agriculture Quarantine Law establishes a department for agricultural quarantine at the MoA which is entrusted with the task of preventing the entrance of the plants which could carry diseases or problems related to the safety of plants. The Animal Quarantine Law subjects all animals and animals' products, which are imported into Lebanon to an animal health control to prevent the leaking of diseases into Lebanese territory*
			2) Lack of control of invasive species through the Suez Canal
			3) Not reached at the implementation level but partially reached at the legal level (e.g. Article 14 of MoA Law 778-2006 bans the import of genetically modified plants that may introduce new diseases and toxins in the country, biosafety national framework was developed by MoE, national biosafety draft decree was developed by MoE, submitted to the CoM, and approved through decision no. 38 dated 27/11/2014)
			4) Not enough action taken regarding invasive species
			5) Absence of a national list of invasive species
			6) Lack of research and expertise
			7) Lack of control and treatment of ballast water before discharge
			8) Lack of control of the aquarium industry
			9) Inadequate legislation related to alien, invasive species

Main Theme	NBSAP 1998 Goal	NBSAP 1998 Objective	Analysis of the 1998 NBSAP: Obstacles to full Achievement
International Cooperation	To share global responsibilities in use; conservation and management of biodiversity	To ensure effective participation in international and regional conventions, protocols, agreements and technical programs regarding biodiversity	1) All major International biodiversity related Conventions were signed and ratified, the implementation was partially achieved), only the Conservation of Migratory Species of Wild Animals (CMS) was signed but not ratified yet 2) The theme, goal, and objectives are not compatible 3) Lack of consideration of non-biodiversity related conventions but that impact biodiversity 4) Lack of cooperation with neighboring countries regarding cross-regional ecosystems (such as the Assi River) 5) Not enough proper implementation at the national level ofthe recommendations of international agreements and conventions in a timely manner 6) Lack of capacity building and technology transfer 7) Absence of issuance of implementation decrees for some of the signed conventions and protocols (there are national legislation for hunting and for each established nature reserve, and national legislation under endorsement for protected areas, ABS, biosafety, forest fires, and fishing and aquaculture, in addition to a draft law on ICZM recently developed)
Strategy Implementation	To share knowledge, costs and benefits with individuals and communities	To implement the strategy and action plan in partnership with all relevant organizations	1) Strategy implemented randomly through projects with MoA, MoE and academic and research institutions
			2) Projects did not cover all goals and objectives of the 1998 NBSAP
			3) Lack of funding
			4) Lack of human resources
			5) Lack of prioritization of biodiversity issues at the decision-

Main Theme	NBSAP 1998 Goal	NBSAP 1998 Objective	Analysis of the 1998 NBSAP: Obstacles to full Achievement
			making level
			6) Lack of identification of stakeholders and allocation of responsibilities
			7) Lack of follow-up on law enforcement (judicial consequences)
			8) Absence of enforcement plans
			9) Absence of environmental specialized committees that would be responsible for supervising and following-up on biodiversity related matters 10) Absence of SMART targets and indicators 11) Absence of leadership for partnership enhancement

Lebanon's Updated NBSAP

Lebanon is in the process of revising and updating its National Biodiversity Strategy and Action Plan (NBSAP). The revised NBSAP is being aligned with the CBD Strategic Plan for Biodiversity 2011-2020 while taking into consideration both global and local needs and aspirations, as well as reflecting Lebanon's specific realm and the current existing professional capacity and awareness levels.

The process has been divided over four major phases being implemented in a broad consultative process with relevant stakeholders through organized workshop and focus groups meetings:

1- **Stocktaking and Assessment Phase**, covering the importance of biodiversity for Lebanon; the values of biodiversity and ecosystem services; the main threats to biodiversity; the cause of threats and their consequences on biodiversity loss; resource use and sustainability of resources; and an introduction to the Aichi biodiversity targets.

2- **Targets and Indicators Phase**, including the development of a vision for biodiversity for the set new NBSAP timeframe, definition of priority areas, development of national targets in line with the Aichi target, and identification of indicators to monitor the degree of achievement of the national targets.

3- **Action Plans Phase,** covering the development of national action plans (including identification of adequate timelines, responsibilities and needed resources) for each national target allowing the implementation of the NBSAP.

4- **Implementation and Monitoring Phase,** including the development of plans for capacity development for NBSAP implementation, communication and outreach, and resources mobilization. This phase also covers the national coordination structures, Clearing-House Mechanism, and monitoring and evaluation proceedings.

The Biodiversity Vision & Guiding Principles

One of the outcomes of the process was the development of a Vision answering to the needs of the country in terms of biodiversity and addressing critical issues; namely: valuing biodiversity, sustainable resources management, preservation and conservation of biodiversity at its different levels (species, habitat, ecosystem), alleviating threats and anthropogenic pressures, and equal access and benefit sharing.

The guiding principles of the 1998 NBSAP were kept and adopted.

Therefore, the developed Vision is as follows:

*"By **2050**, Lebanon's **biodiversity** is **valued** and **sustainably managed** for the **preservation and conservation** of its **ecosystems** and the **habitats and species** they harbor, in order to adequately respond to **anthropogenic** and **natural pressures**, and to ensure Lebanese citizens **equal access to ecosystem goods and services**."*

GUIDING PRINCIPLES

The Lebanese recognize that:

- Biodiversity is a key component of our cultural heritage.
- Our ancestors used biotechnology to extract red-dye from shellfish; figs saved lives in times of food shortage.

We are proud to live in Lebanon, where:

- Snow and water skiing are possible during the same day.
- Definite winter rains and dry warm summers are vital.
- Temperate plants give excellent fruits and subtropical crops are as delicious.
- Highly variable ecosystems allow for all forms of life to exist and flourish.
- Clean air and healthy fresh water are the norm.

We acknowledge and appreciate that:

- Biodiversity conservation is a moral responsibility that should be nourished to flourish with individuals, institutions, and public authorities.
- Biodiversity values (known and yet unknown) are to be acknowledged on the social, economic, and national levels.
- Sustainable users of biodiversity components should be rewarded. Polluters or degraders should be taxed.
- Development programs should be ecologically sound and their impact on the environment and biodiversity very closely examined.

We are very keen to:

- Carefully study and cautiously handle exotic germplasm.
- Monitor the spread and competitiveness of introduced biological material.

The Priority Areas

Based on an analysis of the available baseline information on the status of biodiversity, the threats to biodiversity conservation, their causes and consequences, and the needs of the country; thirteen(13) priority areas have been defined to date:

1. **Threatened Species**
2. **Genetic Diversity**
3. **Protected Areas**
4. **Sustainable Management and use of Natural Ecosystems and Resources**
5. **Ecosystem Restoration**
6. **Access and Benefit Sharing**
7. **Invasive Alien Species**
8. **Education and Public Awareness**
9. **Mainstreaming Biodiversity into National Policies and Plans**
10. **Climate Change**
11. **Research and Knowledge Transfer**
12. **Institutional and Legal Framework**
13. **Resource Mobilization**

The National Targets

The national biodiversity targets developed as part of the ongoing NBSAP process and validated with a multitude of multi-sectorial stakeholders cover the major threats to biodiversity identified in the literature review and NBSAP workshops, cover all applicable Aichi Biodiversity Goals and Targets, are a breakdown of the priority areas, and are formulated in a way to be specific, measurable, attainable, and time-bound (SMART) as much as possible.

Table 9 below reports the set national targets with the corresponding Aichi Target of reference.

Table 9 Priority Areas, National Targets, and the Aichi Targets

Priority Area	National Target	Relevant Aichi Target
Threatened Species	1. By 2030, the status of 75% of known flora and fauna species is identified and conservation actions are implemented on 50% of threatened species	
Genetic Diversity	2. By 2030, the genetic diversity of 50% of economically important fauna and flora is conserved In-situ and Ex-situ 3. By 2030, national legislation on biosafety is enforced and operational	
Protected Areas	4. By 2030, at least 20% of natural ecosystems are protected and all types of ecosystems are represented in the PA network 5. By 2030, the total area of nature reserves is increased to reach at least 5% of Lebanon's area	
Sustainable Management and Use of Natural Ecosystems and Resources	6. By 2030, 50% of all natural ecosystems are sustainably managed and properly considered in land-use planning implementation 7. By 2030, the gap between Lebanon's ecological footprint and biocapacity is alleviated to reach an equal state 8. By 2030 the private sector has taken steps to implement plans for sustainable production and consumption to mitigate or prevent negative impacts on ecosystem carrying capacity through the use of natural resources	 
Ecosystem Restoration	9. By 2030, rehabilitation plans are implemented in at least 20% of degraded sites that will safeguard the sustained delivery of ecosystem services	
Access and Benefit Sharing	10. By 2030, the national law on access and benefit sharing is endorsed, operational, and enforced.	
Invasive Alien Species (IAS)	11. By 2030, effective measures are in place to control the introduction and diffusion of IAS into the environment	

Public Awareness	12. By 2030, 100% of school and university students and at least 60% of the public are aware of the importance of biodiversity, its values, and the need for its conservation and sustainable use	
Mainstreaming Biodiversity into National Policies, Plans and Programs	13. By 2030, relevant government entities consider the conservation of biodiversity, its benefits for people, the pressures that affect it, and the actions they can take for its conservation and sustainable use in their policy making processes and their implementation	
Climate Change	14. By 2030, vulnerable ecosystems to climate change are identified and adaptation plans are developed and implemented	
Research and Knowledge Transfer	15. By 2030, research is improved in Lebanon and shared in a centralized platform (from both public and private institutions), which is updated and made accessible to the public (CHM) 16. By 2030, efforts are made to preserve and document traditional knowledge, uses, and practices of local communities relevant to biodiversity and sustainable use of resources through integrating them into relevant policies and promoting them in relevant economic sectors	
Institutional and Legal Framework	17. By 2020, the institutional and legal framework and government policies are reviewed, updated and reinforced where necessary to ensure effective biodiversity conservation and sustainable use	*Cross cutting priority area & target serving all other targets*
Resource Mobilization	18. By 2020, Lebanon has developed and is implementing a robust resource mobilization strategy with a sustainable mechanism to finance biodiversity initiatives	

Lebanon's Actions to Implement the Convention since the Fourth Report

National responses and actions to implement the convention on biological diversity have been developed in Lebanon since the fourth National Report, with an overall aim of protecting the country's biodiversity and decreasing the threats pressuring it.

These responses and actions, summarized below, are mainly strategic actions to improve environmental conditions which are necessary for biodiversity protection. Actions also include those indirectly impacting biodiversity and more focused on ecosystem services, such as waste management and climate change response.

Treaties, Protocols, and International Environmental Agreements

1. Issuance of the law No. 233 dated 22/10/2012 authorizing the Government of Lebanon to join the CITES.
2. Issuance of the Law No.44 dated 23/10/2008 authorizing the Government of Lebanon to join the Cartagena Protocol on Biosafety.
3. Signature by the Government of Lebanon of the Nagoya Protocol on February 01, 2012 and issuance of the decree No. 206 dated 10/07/2014 transferring to the Parliament a draft law for the accession by the Government of Lebanon to the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation under the Convention on Biological Diversity.
4. Issuance of decree No. 639 dated 18/09/2014 authorising the Government of Lebanon to join the Protocol on Integrated Coastal Zone Management in the Mediterranean as a result of the amendments to the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean adopted in Barcelona 10/6/1995.
5. Presentation of a draft law authorizing the Government of Lebanon to join the Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean under Barcelona Convention (which is the amendment of the Protocol Concerning Specially Protected Areas that the Government of Lebanon has ratified through the Law No. 292 in 22/2/1994).
6. Presentation of a draft law authorizing the Government of Lebanon to join the Arab Union for Protected Areas and approve its by-laws.
7. Signing of a Memorandum of Understanding (MoU) on the Conservation of Migratory Soaring Birds in Africa, Europe, and Asia (under the CMS Convention), based on the approval of the Council of Ministers as per Council of Ministers (CoM) decision No. 51 dated 14/08/2014.
8. Issuance of decree No. 43 dated 28/08/2014 approving the MoU on environmental protection between the Republic of Lebanon and the Republic of Senegal signed on 12/03/2014.

Environmental Laws

9. Adoption of a law appointing full-time environmental attorney generals and inspection judges (Law No. 251 dated 15/04/2014) in six governorates (Beirut, Mount Lebanon, the North, the South, the Bekaa, and Nabatieh) and in two governorates (Beirut and the South), respectively;

as well as the publication of notice No. 1837 dated 09/10/2014 by the Ministry of Justice calling for environmental experts to join the roster of sworn experts at courts.

10. Adoption of the law for the establishment of the Jaj Cedars Nature Reserve (Law No. 257 dated 15/04/2014).
11. Adoption of the law for the establishment of Wadi al Hojeir Nature Reserve (Law No. 121 dated 23/7/2010).
12. Adoption of the law for the establishment of Chnaniir Nature Reserve (Law No. 122 dated 29/7/2010).
13. Adoption of the law for the establishment of Kafra Nature Reserve (Law No. 198 dated 18/11/2011
14. Adoption of the law for the establishment of Ramia Nature Reserve (Law No. 199 dated 18/11/2011).
15. Adoption of the law for the establishment of Debl Nature Reserve (Law No. 200 dated 18/11/2011).
16. Adoption of the law for the establishment of Beit Lif Nature Reserve (Law No. 201 dated 18/11/2011).
17. Adoption of a law setting the principles for financial incentives to municipalities in the vicinity of the Aabey landfill - Ain Drafil, and exempting them from some financials dues (Law No. 280 dated 30/04/2004).
18. Approval of the draft law for "allocating provisions for implementation of projects and land expropriation in the Litani river basin from its source to its estuary" by the "Budget and Finance" Parliamentary Committee. The Law is awaiting its final adoption by the Parliament.
19. Approval of the CoM of a draft framework law on protected areas, and its transfer to the Parliament through decree No. 8045 dated 25/4/2012 for adoption.
20. Approval of the CoM of a draft law for the establishment of the Dennieh Lazzab Nature Reserve, and its transfer to the Parliament through decree No. 92 dated 03/07/2014 for adoption.
21. Presentation of a draft law on forest fires to the CoM.
22. Preparation of a draft law to regulate access to Lebanese genetic resources and equitable sharing of benefits arising from their utilisation and submitting it to the CoM in order to be adopted as a national legislative mechanism for the implementation of the Nagoya Protocol on the national level.
23. Presentation by MOA of a draft law on fisheries and aquaculture to the Parliament
24. Development by MoE of a draft law on ICZM
25. Development by MoE of a draft law establishing Naqoura marine nature reserve
26. Development by MoE of a draft law establishing Ras el Chaqaa marine nature reserve

Environmental Decrees

27. Issuance of the Environmental Impact Assessment (EIA) Decree (Decree 8633/2012).

28. Issuance of the Strategic Environmental Assessment (SEA) Decree (Decree 8213/2012).
29. Issuance ofthe Environmental Compliance for Establishments Decree regulating all activities from classified establishments that may cause harmful pollution and environmental degradation (Decree 8471/2012).
30. Issuance of a decree classifying Jabal Moussa as a Natural Site (Decree No. 7494 dated 2/2/2012).
31. Creation of the National Council for the Environment (NCE) through Decree no. 8157 dated 24/5/2012. The NCE is responsible for the review and approval of the proposed policies-work plans and for securing and approving required budgets.
32. Endorsement of the National Physical Master Plan for the Lebanese Territory (NPMPLT) as a strategic development plan for the territory of Lebanon through Decree no. 2366 dated 20/6/2009. The NPMPLT includes green and blue networks for the protection and management of ecological hot spots and corridors.
33. Issuance of a decree classifying the Grotto of Al Kassarat - Antelias as a Natural Site (Decree No. 11949 dated 23/05/2014).
34. Issuance of a decree for an insurance policy against third-party risks arising from hunting activities, presented by the Ministries of Environment and Economy & Trade (Decree No. 11987 dated 24/05/2014).
35. Approval of the Council of Ministers of the draft decree on biosafety as per decision No. 53 dates 27/11/2014.
36. Preparation of an amended version of the draft decree for the establishment of Environmental Police based on Law 251/2014, responding to the comments of the Ministries of Finance and Justice as well as to those of the Civil Service Board.
37. Preparation of an amended version of the decree relating to Ozone Depleting Substances and submitting it to the relevant ministries for their feedback in view of forwarding it to the Council of Ministers.
38. Presentation to the Council of Ministers of a draft decree classifying the Batroun Coast as a Natural Site.
39. Presentation to the Council of Ministers of a draft decree classifying Raoucheh Rocks and its surrounding marine and coastal area in Beirut as a Natural Site.
40. Presentation to the Council of Ministers of a draft decree classifying a terrestrial site in Ehmej (containing the rare endemic flower *Iris sofrana*) as a Natural Site.

Environmental Strategies

41. Preparation of the National Strategy on forest Fires Management and its adoption by the CoM through decision No. 52 dated 13/5/2009.
42. Preparation and publication of the Marine Protected Areas Strategy in 2012.
43. Preparation and publication of the Rural Tourism Strategy in 2014.

44. Preparation of a road map for integrated solid waste management in coordination with the concerned administrations, amendment of the roadmap as per the recommendations of the appointed ministerial committee and its approval by the Council of Ministers as per decision No. 46 dated 30/10/2014.
45. Submittal by MoE to the Council of Ministers of a proposal for the preparation of a master plan for the protection of mountain peaks, natural areas, coastal zones, green spaces, and agricultural lands together with its specific Strategic Environmental Assessment.
46. Preparation of the Strategic Environmental Assessment of the National Water Sector Strategy in collaboration with the Ministry of Energy and Water and presentation of the preliminary findings to the National Council for the Environment (NCE) in August 2014.
47. Preparation of the Strategic Environmental Assessment of the Renewable Energy Sector in collaboration with the Ministry of Energy and Water.
48. Preparation of the Strategic Environmental Assessment of the Petroleum Activities in Lebanese Waters.

National Environmental Governance

49. Launching of the Support to Reforms – Environmental Governance (StREG) project funded by the European Union by an 8 million Euros grant.
50. Signing of Memorandums of Cooperation between MoE and the various ministries in view of promoting environmental conservation and protection of natural resources in line with the principles of sustainable development. To date, Memorandums of Cooperation have been signed with the Ministry of Industry, the Ministry of Agriculture, the Office of the Minister of State for Administrative Reform, the Ministry of Information, the Ministry of Economy and Trade, the Ministry of Justice, the Ministry of Labour, the Ministry of Youth and Sports, the Ministry of Tourism, and the Ministry of Culture.
51. Signing of a Memorandum of Cooperation between the MoE and the Lebanese University represented by the "Ecole Doctorale des Sciences et de Technologie" on scientific and technical cooperation opportunities.
52. Signing of a MoU on 18/11/2014 between MoE and Le Bureau Cités et Gouvernements Locaux Unis au Liban/ Bureau Technique des Villes Libanaises (CGLU/BTVL) for the promotion of cooperation with municipalities and unions of municipalities on environmental issues.
53. Completing the review of environmental information included in the official handbooks published by the Educational Centre for Research and Development adopted by public schools and proposing modifications in view of integrating them in the publications.
54. Holding an educational and recreational event at the Grand Serail under the slogan "My Environment is My Country" as part of the weekly programme "Appointment at the Serail" on 14/5/2014.
55. Organisation of the 3rd meeting of the European Union-Lebanon Sub-committee on transport, energy, and environment (including water) in collaboration with the Ministry of Economy and Trade in the framework of the European Neighbourhood Policy work plan on 15/10/2014. The meeting covered the most important developments at the level of policies and legislation related to the transport, energy, environment, water, and climate change.

Internal Environmental Governance

56. Recruitment of 21 employees at the Ministry of Environment – third category (i.e. approximately one third of the total number of employees of the ministry).

57. Approval of the CoM - decision No. 24 dated 30/10/2014 - of the publication of a call for candidature to vacant positions at the Ministry of Environment (27 positions - third category corresponding approximately to 40% of planned positions for this category

International Environmental Governance

58. Adoption of the United Nations General Assembly Resolution 63/212 dated 19-20 December 2014 asking Israel to pay Lebanon $856.4 million as a compensation for the oil slick that resulted from the striking of the Jiyeh power plant during the July 2006 war.

Maintaining Lebanon's Natural Resources: Land Biodiversity and Water

Land:

59. Submitting a request by the MoE to the CoM to amend the master plan for quarries upon which a ministerial committee was appointed to develop a new master plan. The committee comprises of the Minister of Public Works and Transport, Public Health, Finance, Agriculture, Environment, Justice, Interior and Municipalities and Industry and is headed by the Deputy Prime Minister.

60. Pursuing activities led by the National Council for Quarries headed by the Minister of Environment for the organization of the sector including taking action to close illegal activities and inspecting sites where activities have ended in order to initiate their rehabilitation. In parallel, a consultant was contracted to select 15 pilot sites for rehabilitation and is currently preparing the respective tender documents.

61. Holding a joint press conference with the Lebanon Mountain Trail Association to highlight the vital environmental, social, and economic importance of protecting mountain trails extending for approximately 470 kilometres from Marjaayoun in the South to Qobayat – Andaket in the North and working on preventing violations.

62. Publication by the MoE of a statistical and analytical report on forest fires for the year 2008, 2009, 2010, 2011, 2012, 2013 and 2014 in collaboration with the Institute of the Environment at the University of Balamand, based on information filled by the ISF using the unified identification card for burnt areas form that was adopted by the Prime Minister through his notification no. 256 dated 1/3/2008.

63. Publication in 2015 of "Lebanon's National Blueprint for a Sustainable Forest Biomass: promoting renewable energy and forest stewardship" developed by the Biodiversity Program, Institute of the Environment, University of Balamand, Lebanon in partnership with the University of Lleida, Spain within the context of the UNDP/CEDRO project .

64. Preparation and publication of a technical report including the results and recommendations of the Safeguarding and Restoring Lebanon's Woodland Resources project which tested a number of reforestation techniques reducing irrigation costs and achieving best results. Several trials

were implemented on large scale municipal lands (total area of 25 hectares) leading to positive results in several Lebanese regions.

65. Reforestation activities carried out by MoE in degraded forest areas in all Lebanese Governorates as follows: 1st phase (2002-2004): 300 hectares, 2nd phase (2004-2006): 300 hectares, 3rd phase(2010-2014): 100 hectares
66. Sponsoring by the MoA of the launching of the campaign "A million trees for Lebanon" supported the firm Diageo who committed to donating one million trees to different municipalities, organisations, and NGOs throughout Lebanon.

Biodiversity:

67. Publication and dissemination in 2015 of the report "Ecological Characterization of Sites of Interest for Conservation in Lebanon: Enfeh Peninsula, Ras Chaqaa Cliffs, Raoucheh, Saida, Tyre and Naqoura" which is based on the result of the field biodiversity surveys in these six candidates marine protected areas that were carried out in 2012 and 2013 through the MedMPAnet regional project by RAC/SPA in close coordination & collaboration with MoE. In addition to the experts from RAC/SPA, experts from the following institutions took part also in the field surveys: IUCN, National Centre for Marine Sciences, University of Allicante.
68. Starting the process for the establishment of the Qammouaa Nature Reserve by communicating with the concerned municipalities and communities in order to reach a final agreement on cadastral issues embedded in the draft law.
69. Declaring the National Marine Turtles Day on May 5 through CoM decision No. 29 dated 19/3/2015 and celebrating this day by organizing a workshop by the Faculty of Sciences at the Lebanese University which brought together representatives from MoE, marine nature reserves, national centre for scientific research, scientific experts & NGOS, in addition to organization of activities by the marine nature reserves' teams in Palm islands and Tyr and NGOs to spread awareness about the marine turtles.
70. Celebrating the Nature Reserves National Environmental Day (March 10) by announcing in 2014-2015 the Nature Reserves Week and inviting students, photographers, and citizens to visit the reserves free of charge and also by organising in 2013 a national workshop to exchange experience and expertise on nature reserves in Lebanon at the Chnaniir Nature Reserve in collaboration with the Chnaniir Reserve Committee.
71. Launching the preliminarily activities for the revision of the National Biodiversity Strategy and the Action Plan and preparing the Fifth National Report to the Convention on Biological Diversity.
72. Preparation and publication of the Birds Atlas.
73. Preparation and publication of the "Birds Identification Manual".
74. Preparation and publication of the "Hunter's Field Guide".
75. Preparation and publication of the "Hunting permit test manual"
76. Preparation and publication of the State of Lebanon Birds & IBAs
77. Preparation and publication of the Field Guide to the Soaring Birds in Lebanon.

78. Patronage of the festival "Our Mountain" dedicated in 2014 to the birds of Lebanon under the slogan "Happy Birday" and that took place throughout the months of August and September 2014 in Al-Shouf Cedars Nature Reserve.

79. Organisation of a training workshop in June 2014 for the guards of nature reserves at the Internal Security Forces institute - Al Warwar in response to the request of the MoE and in line with the hunting law No. 580/2004 (and its implementation decision no. 199/1 dated 3/10/2012) and in preparation for the enforcement of the mentioned law, namely with regards to stopping the hunting violations around the nature reserves and issuing fines for the violators and referring them to concerned competent authorities.

80. Organisation of training workshops to the ISF, forest guards of MoA, the guards of nature reserves in 2011, 2012, 2013 and specifically to ISF in 2015 on the enforcement of the hunting law and the control of the hunting violations and birds identification.

Coastal areas/River Basins/Water bodies:

81. Approval of a 19 million Euros grant by the European Union allocated for the conservation of Lebanon's marine resources and their sustainable use.

82. Appointment of a committee comprising of concerned administrations and municipalities to oversee the implementation of a road map to combat pollution of the Qaraoun Lake as per a CoM decision dated 9/5/2014. The committee convenes monthly at the invitation of the Litani River Authority.

83. Progressing in the preparation of a loan agreement of USD 50 million with the World Bank to implement the first stage of the roadmap to combat pollution of the Qaraoun Lake in collaboration with the concerned administrations. The agreement is expected to be signed in mid-2015.

84. Completing the draft proposal for a USD 3.2 million grant from the Global Environment Facility for the sustainable management of the Litani River basin.

85. Organisation of a roundtable discussion at the Grand Serail under the patronage of the Prime Minister on the occasion of Word Environment Day (5 June) to discuss modalities of implementation of the roadmap to combat pollution of the Qaraoun Lake and the Litani river Basin.

86. Proposing recommendations to address water scarcity as part of the emergency committee organized to address water shortages, including publishing a circular on reducing water consumption in households and urging the Municipality of Beirut to provide USD 10 million for drilling wells to secure water demand for residents of the city.

Management of Environmental Risks (Prevention and Treatment)

87. Publication of the "Lebanon Environmental Assessment of the Syrian Conflict and Priority Interventions funded by the European Union through the EU-funded StREG project and with the technical support of the United Nations Development Program (UNDP). The report highlights the situation in four environmental sectors affected by the Syrian Crisis: solid waste management, water and waste water management, air quality, and land use and ecosystems. The official launching of the report was held at the Grand Serail on 26/9/ 2014. The findings of the report regarding the emergency environmental situation in Lebanon were also presented at

the Council of Arab Ministers Responsible for the Environment which was held in Jeddah – Kingdom of Saudi Arabia on 9/11/2014.

Hazardous and Non-Hazardous Waste

88. Following up on the rehabilitation of the Saida dumpsite into a public park and other spaces and publication of a report on the progress after one year of works in newspapers and on websites. Rehabilitation works are expected to end in October 2015.
89. Preparing a master plan for integrated solid waste management in the Caza of Baalbek.
90. Preparing the plan and tender documents for the treatment of oil spill recovered wastes resulting from the July 2006 war and awaiting tendering by the European Union.
91. Mobilization of a USD 2.5 million grant from the Global Environment Facility for the management of Polychlorinated Biphenyls (PCBs) in the electricity sector in collaboration with Electricite du Liban.
92. Approval of a grant amounting to around USD 180,000 from the Global Environment Facility for updating the National Programme of Action on Unintentionally Produced Persistent Organic Pollutants (POPs).
93. Reaching out to 88 public and private hospitals to request information regarding the modalities adopted by the these hospitals for the disposal of hazardous and infectious waste in line with decree 13389/2004 (related to defining the type of wastes in health care facilities and their treatment methods), and inspecting private hospitals to confirm their compliance with the said decree.

Climate Change, Energy, and Transport

94. Institutionalisation of greenhouse gas emission reporting from the industrial sector in collaboration with the Ministry of Industry as a prelude to a better reporting mechanism to the United Nations Framework Convention on Climate Change.
95. Launching of the MoE's climate change projects website.
96. Completion of a Summary for Policy Makers: Technology Needs Assessment for Climate Change Mitigation and Adaptation.
97. Establishment of pilot projects in the areas of Damour, Amrousieh, and Kfar Mashoun aiming to rationalise water consumption through installing rainwater harvesting systems on the top of agricultural greenhouses to be reused for crop irrigation. This initiative, for example, has contributed to collecting approximately 15,000 litres of rainwater in one day, supplying enough water for four days' irrigation.
98. Patronage of the national awareness campaign "Be an Eco Driver and Preserve your Health and Environment" under the National Campaign for air Pollution reduction in Lebanon through Efficient Energy Use in Land Transportation organised by IPT Energy Centre (IPTEC) with the support of the Ministry of Environment, the ESCWA, and the UNDP on 15/09/2014.
99. Signature of MoUs with the Lebanese University, the Ministry of National Defence, the Rafic Hariri High School – Saida, and the municipality of Zahle for the hosting and operation of air quality monitoring stations in the Hadath University campus, the Lebanese Army Teaching Institute– Baalbek, the Rafic Hariri High School and the Memshieh Garden – Zahle in the

framework of the Environmental Resources Monitoring in Lebanon (ERML) project aiming at improving the Ministry's monitoring capacities particularly air quality monitoring through the design and implementation of a National Air Quality Monitoring Network.

100. Launching of "Camil the Chameleon" as the Mascot of the Air Quality Index (AQI). The AQI is updated daily and can be found on the website of the MoE www.moe.gov.lb and on that of the ERML project erml.moe.gov.lb.

Mainstreaming Biodiversity into Relevant Sectoral and Cross-Sectoral Strategies, Plans and Programmes

The impacts and root causes of biodiversity loss cut across a wide range of economic sectors. It is therefore essential to "mainstream" biodiversity in development policy and planning processes, rather than pursue them as separate agendas. The challenge of integration, or "mainstreaming", is to bring on board and engage other development sectors, in particular those government ministries and agencies that are responsible for national development.

Considerable efforts were made in order to include biodiversity concerns in policies, legislation and regulations governing most of the productive sectors in the country: agriculture, tourism, industry, energy, transport, etc.

Mainstreaming Biodiversity Conservation into the Industrial Sector

1. Launching of the Lebanon Environmental Pollution Abatement Project (LEPAP). LEPAP is a joint initiative between the MoE, the Ministry of Finance (MoF), Banque Du Liban (BDL), the World Bank and the Italian Cooperation. LEPAP is designed to support the MoE in establishing a mechanism that would support the industrial enterprises in their compliance to the stipulations of Decree No. 8471/2012 – which regulates all activities from classified establishments (such as industrial ones) that may cause harmful pollution and environmental degradation – and create a mechanism to foster pollution abatement investments from technical and financial standpoints. The Project's implementation period is three years (2012 - 2015), during which 36 industries would have conducted an environmental audit and set a compliance action plan.
2. Endorsement of the Central Bank of Lebanon (BDL) of financial facilities channelled through BDL to commercial banks and financial institutions to finance industrial pollution abatement interventions in the framework of cooperation between the MoE and the Central Bank of Lebanon to encourage such interventions.
3. The completion of the technology re-conversion project at Lematic industries (Refrigeration and Air-conditioning), to Ozone and environment friendly technology using HFC-410A refrigerant (Hydro Fluoro Carbon Technology), under the context of the National Ozone Unit work-plan at the Ministry of Environment. The project budget value: USD 768,000, implemented during the period from May 2012 – March 2014.
4. The completion of the technology re-conversion project at Dalal Steel industries (Rigid Foam), to Ozone and environment friendly technology using Cyclo-Pentane (Hydrocarbon Technology), in the context of the National Ozone Unit work-plan at the MoE. The project budget value: USD 1,025,000, implemented during the period from May 2012 – April 2014.

5. Grant approval of USD 150,000 from the Multilateral Fund of the Montreal Protocol (MLF), for the preparation of the second stage of the HCFCs phase-out management plan, to be implemented during the period from 2015-2025. The expected budget for the implementation of the projects is to be around USD 4 million.

Mainstreaming Biodiversity Management into Medicinal and Aromatic Plants (MAP) Production Processes in Lebanon

Around 365 Medicinal and Aromatic Plants (MAPs) are found and exploited in Lebanon, 47 of which are endemic to the region (UNDP/LARI/GEF, 2014). MAPs are threatened by various factors including destructive harvesting and overharvesting. Wild stocks provide around 98% of the MAP market. However, the existing practices are threatening the market's supply base as well as globally significant biodiversity values. The "Mainstreaming Biodiversity Management into MAP Production Processes in Lebanon project" is a UNDP/GEF project, executed by LARI, and that was designed to address the security of Lebanon's high levels of MAPs diversity by developing MAPs as a resource-base for local livelihood and national development. The project started in 2009 and ended in 2012.

The project intends to incorporate conservation objectives into the gathering, processing and marketing of globally significant MAPs. The theory is that non-destructive harvests, along with income generated by MAP business opportunities for local people, will preserve the wild stocks of globally significant endemic MAP species that are commercially traded and threatened by existing harvesting practices.

The project targets seven MAP species: *Salvia fruticosa, Origanum syriacum, Cyclotricium origanifolium, Micromeria libanotica, Viola Libanotica, Alcea damascene and Origanum ehrenbergii* (UNDP,2011).

Mainstreaming Conservation of Migratory Soaring Birds (MSB) into Key Productive Sectors

The MSB regional project aims to ensure the preservation of globally threatened bird species into key productive sectors along the Rift Valley/ Red Sea Flyway. The project spanned over a period of 5 years from June 01, 2008 until December 31, 2014. The overall project goal is to ensure that globally threatened and significant populations of soaring birds that migrate along the Rift Valley/Red Sea flyway are effectively maintained. The project is working in 11 countries within the Rift Valley/Red Sea Flyway: Djibouti, Egypt, Eritrea, Ethiopia, Jordan, Lebanon, Palestine, Saudi Arabia, Sudan, Syria and Yemen.

MSB Lebanon (2010-2015) is executed by the MoE, funded by the GEF and implemented by UNDPand technically supported by BirdLife's partner in Lebanon, the Society for Protection of Nature in Lebanon (SPNL). MSB Lebanon has produced some publications that support MoE in the management of the hunting sector. For that purpose, the project has developed the hunter manual guide as well as the guide for the hunting permit exam and have conducted in 2011, 2012, and 2013 several training workshops across the country to build the capacity of the hunting law enforcers (ISF, forests guards and nature reserves guards) on the enforcement of the hunting law and on birds identification and to the hunting clubs on the approach that should be adopted to run the hunting permit exams (since they are the responsible entities to run these exams).The project has also set-up a specific software and acomputerized system so that the hunting exams are performed on computers at the certified hunting clubs and results go automatically to the MoE. A webpage (http://hunting.moe.gov.lb/) has

also been developed to inform hunters about the hunting exam procedures, allow them to register for an exam, and keep them up-to-date with any new publications.

Furthermore, the project has produced the following publication on conservation of birds: the Birds Atlas, Birds Identification Manual, the State of Lebanon Birds and IBAs and the Field Guide to the Soaring Birds in Lebanon and hunting clubs on bird identification and on the new hunting law.

MSB Lebanon is also targeting the energy sector in its future activities through the updating of the National Physical Land Use Plan in cooperation with the Council for Development and Reconstruction (CDR) through the integration of IBAs and bottlenecks areas into the NPMPLT and putting specific conditions for infrastructure in these areas in order to minimize the threats on the soaring birds during their migration over Lebanon.

Market Policy and Legislative Development for Mainstreaming the Sustainable Management of Marine and Coastal Ecosystems in Lebanon

This is an ongoing project; which started in November 01, 2013 and expected to end on October 31, 2016), funded by GEF and implemented by UNEP and MoE, which aims at conserving and protecting marine and coastal biodiversity through policy and legal reforms, enhanced stakeholder participation and mainstreaming biodiversity priorities into national plans and programs. The project components include:

- Reviewing, strengthening and developing policy and legislative frameworks for mainstreaming the sustainable management of marine and coastal biodiversity in Lebanon;
- Improving and building capacities of and cooperation between stakeholders contributing to the conservation of the marine and coastal biodiversity in Lebanon;
- Achieving a better knowledge and understanding of the current marine biodiversity status;
- Establishing a database and monitoring program for the marine and costal biodiversity; and
- Raising the public's awareness on the significance and values of conserving marine and coastal biodiversity.

Mainstreaming Biodiversity Conservation in Land Use Planning

The National Physical Master Plan for the Lebanese Territory (NPMPLT) was issued by the CDR in 2005, and approved by decree no. 2366 on 20 June 2009, as a strategic development plan for the territory of Lebanon to which all public authorities are bound. The NPMPLT defines the principles of development in various regions, clarifies the basics of territorial usage for all areas; and proposes facilities and sites of planned activities, specifying their objectives, dimensions and locations. The NPMPLT accounts for biodiversity conservation through the development of a green and blue network, the introduction of regional and natural parks concepts, and the definition of the coastal areas, mountain, and valleys in need of protection. Moreover, ongoing efforts and coordination are in place in order to integrate a new layer consisting of sensitive bird area (IBAs and bottleneck areas) into the NPMPLT.

Mainstreaming Biodiversity Conservation through SEAs and EIAs

1. Preparation of the SEAs for national plans and policies, ensuring that the biodiversity component is well addressed in these studies. Examples of such SEAs are the National Water Sector Strategy SEA, the Renewable Energy Sector SEA, and the SEA for the Petroleum Activities in Lebanese Waters.
2. MoE seeking to activate the application of the Environmental Impact Assessment (EIA) decree based on the Prevention principle by ensuring that all projects threatening the environment are subject to such studies, by ensuring the participation of stakeholders from the public and private sectors as well as civil society in these studies.
3. Development and publication of the "Biodiversity Manual: A Tool for Biodiversity Integration in EIA and SEA". Based on evidence that biodiversity constitutes the weakest link in environmental assessment in Lebanon, a grant was secured from the International Association for Impact Assessment (IAIA) to develop practical guidelines, in the form of a manual, for the integration of biodiversity in SEA and EIA. This initiative falls within the framework of the "Capacity Building for Biodiversity and Impact Assessment (CBBIA) Program", a targeted capacity building program intended to promote good practice in biodiversity and impact assessment. The CBBIA program is administered by the IAIA and funded by the Dutch Government. It builds on work carried out in support of the biodiversity-related global conventions, including the Convention on Biological Diversity, the Ramsar Convention and the Convention on Migratory Species.

Despite all these efforts, biodiversity conservation is still viewed as an environmental issue and still needs to be more effectively integrated into national development planning and policy-making. The main challenges to a better integration being:

1. Lack of awareness of the potential impacts of biodiversity loss for ecosystem services and for people. Much remains to be done to understand and forecast the likely socioeconomic impacts of biodiversity loss at the local and national levels.
2. The lack of effective institutional mechanisms for integrating biodiversity issues in broader national development policies to ensure coordination, cross-sectoral policy integration and budgetary allocations. Implementation of the NBSAP should not be the sole responsibility of the MoE but of all stakeholder governmental institutions.

Part III: Progress towards the 2020 Aichi Biodiversity Targets and Contributions to the Relevant 2015 Targets of the Millennium Development Goals

Part III provides an overview of Lebanon's progress towards the CBD Strategic Plan for Biodiversity 2011-2020 and the associated Aichi Biodiversity Targets; it also presents the country's contribution towards the achievement of the 2015 Millennium Development Goals with a focus on those affecting biodiversity; then highlights the lessons learnt from the implementation of the Convention.

Lebanon's Progress towards the Implementation of the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets

As part of the revision and update of Lebanon's first NBSAP, a survey was launched to assess stakeholders' perception of the country's progress towards the 2020 Aichi Biodiversity Targets. An online survey was developed and shared with all stakeholders identified (refer to Appendix IV) in the NBSAP revision and update process; for each Aichi target they had to choose one of the following four statements:

1. Reached;
2. Can be reached on the medium-term (5-10 years);
3. Can be reached on the long-term (10-15 years); and
4. Hard to reach.

In general, results showed that respondents believe that Lebanon can achieve the Aichi Targets on the long-term (49%), 24% consider them achievable on the medium-term, and only 3% of respondents consider some Targets achieved. Figure 10 below presents the detailed answers in percentages for each Aichi Target.

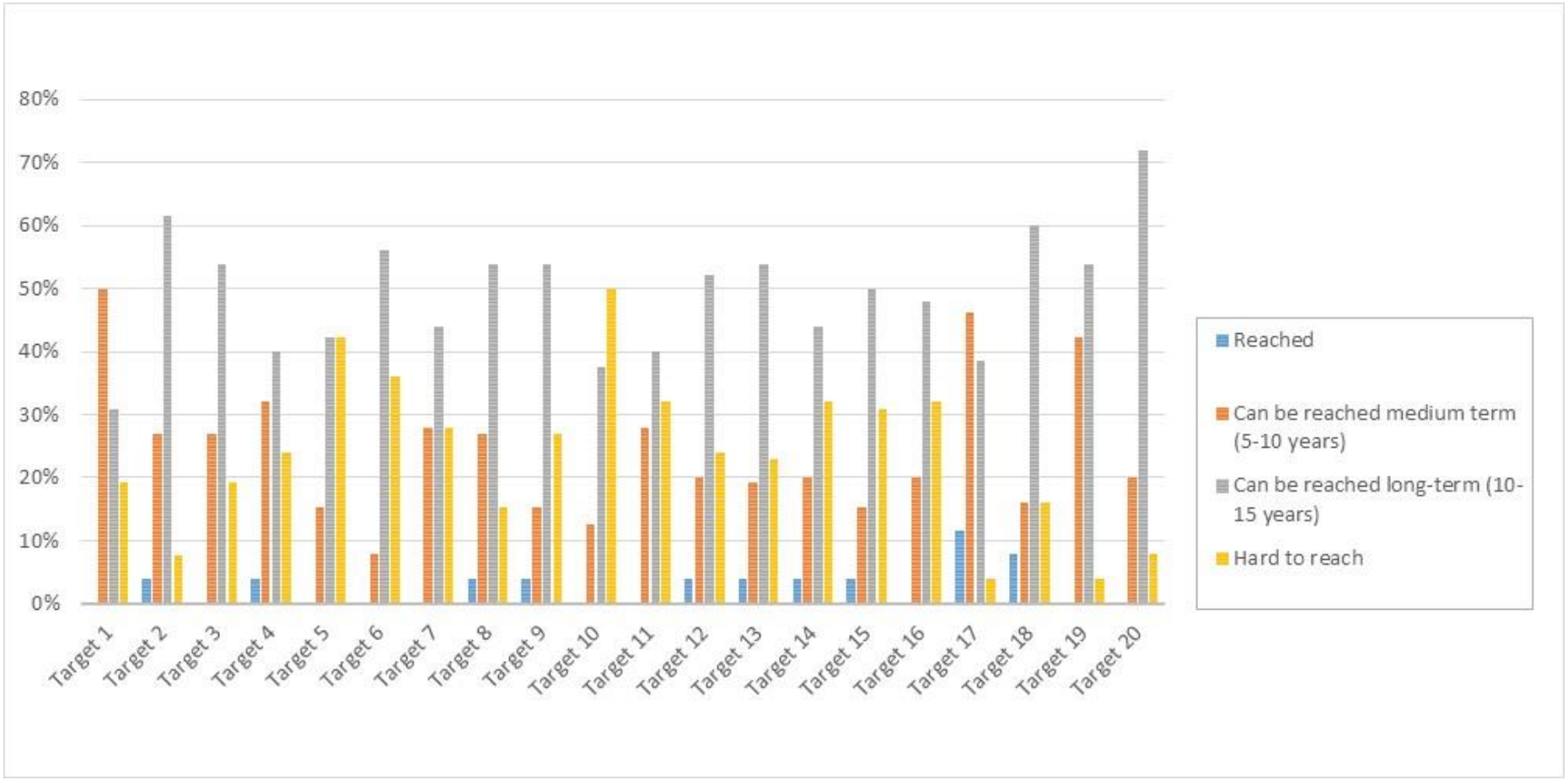


Figure 10 Results of the Online Survey – Progress Toward 2020 Aichi Targets

However, Lebanon has made in the past few years huge efforts and achievements toward implementing the Strategic Plan for Biodiversity and the Aichi Target; which shows that one of the country's areas that need development is communication and dissemination of information.

As mentioned earlier, Lebanon's national biodiversity strategy and action plan (NBSAP) is currently being revised and updated. Therefore, many actions across the Strategic Goals and the 2020 Aichi Targets are being drafted. Lebanon's actual progress and contributions to each Aichi Target during the 5th National Reporting period are summarised below per target under each strategic goal, where applicable.

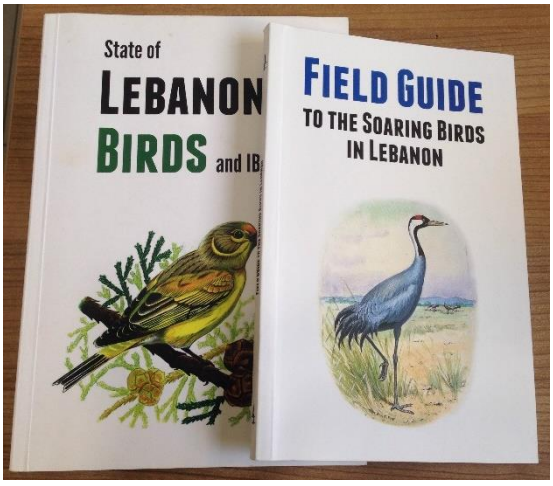
Note: Plans, programmes, and projects which are only cited under the various targets were further detailed under Parts I or II of this report.

Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society

Target 1: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

The MoE has prepared and conducted several awareness campaigns, press conferences, patronages, and publications to reach the public and raise awareness with regards the values of biodiversity, its conservation and sustainable use; to name a few:

- Celebrating the Nature Reserves Environmental Day (March 10) and announcing the Nature Reserves Week and inviting students, photographers, and citizens to visit the reserves free of charge.
- Holding workshops about sustainable hunting and publishing of the Birds Atlas, Birds Identification Manual, the Hunter's Field Guide, the guide for the permit hunting exam, the State of Lebanon Birds and IBAs and the Field Guide to the Soaring Birds in Lebanon.



- Patronage of the festival "Our Mountain" dedicated this year to the birds of Lebanon under the slogan "Happy Birday" and that took place throughout the months of August and September 2014.
- Promoting school visits and hosting students at the MoE as part of community service program, to raise environmental awareness

within their community and mainstreaming of environmental issues in the educational sector.

- Addressing the youth by holding an educational event for a private Bank's staff and children on biodiversity, climate change, and energy conservation on 23/5/2014.
- Holding an educational and recreational event at the Grand Serail under the slogan "My Environment is My Country" as part of the weekly programme "Appointment at the Serail" on 14/5/2014.
- The Council of Ministers approved the MoE's request to officially designate 5 May "Sea Turtles Day".

Target 2: By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.

Biodiversity values have not yet been fully integrated into poverty reduction strategies but are being mainstreamed into national planning strategies through the enforcement of the SEA decree, where SEAs have been prepared for sectoral and regional plans such as the National Water Sector Strategy, the Renewable Energy Sector, the Petroleum Activities in Lebanese Waters, and the newly developed Sustainable Regional Plans. The SEAs are being, in most cases, developed in parallel to the plans for a better and easier integration of the findings. The MoE has been allocating special attention to the biodiversity sections of these SEAs.

The MoE has submitted a proposal to the CDR to include in the NPMPLT, which is the country's governing land use planning strategy, a new component: the sensitive birds' areas (IBAs and bottleneck areas). These areas shall be accounted for in future land use planning.

Sandy beaches, which are maritime domain, constitute a rare resource in Lebanon, therefore the CDR indicates that it is important to assure free access to the public, to protect these beaches from sand extraction and litter disposal, and to properly manage and maintain them.

Target 3: By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.

The following initiatives and projects are examples of how Lebanon is providing incentives to minimize and to the extent possible eliminate negative impacts and unsustainable use of biodiversity:

- Lebanon Environmental Pollution Abatement Project (LEPAP) which aims at regulating activities from industrial establishments that may cause harmful pollution and environmental degradation and create a mechanism to foster pollution

abatement investments from technical and financial standpoints. As part of the project, environmental audits and compliance plans were offered free of charge to the participating establishments.

- Endorsement of the Central Bank of Lebanon (BDL) of financial facilities to commercial banks and financial institutions to finance industrial pollution abatement interventions in the framework of cooperation between the MoE and the Central Bank of Lebanon to encourage such interventions.
- Green financing: The Central Bank of Lebanon (BDL) introduced a new policy to facilitate loans for environmentally friendly projects and then introduced new loan incentives to finance environmental projects in energy (renewable energy, energy efficiency, and green buildings) and non-energy sectors.

	Target 4: By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

Sustainable production and consumption are being developed in Lebanon through mainstreaming biodiversity conservation into productive sectors and the expansion of green jobs, namely:

- Mainstreaming Biodiversity Management into Medicinal and Aromatic Plants (MAP) Production Processes.
- Mainstreaming Conservation of Migratory Soaring Birds (MSB) into Key Productive Sectors.
- Mainstreaming the Sustainable Management of Marine and Coastal Ecosystems.
- Mainstreaming Biodiversity Conservation in Land Use Planning.
- Development of the Lebanon Rural Tourism Strategy by the Ministry of Tourism in 2014. The strategy promotes optimal use of environmental resources that constitute a key element in tourism development, maintaining essential ecological processes and helping to conserve natural heritage and biodiversity.

- Promoting green jobs: Lebanon has for centuries offered jobs that restore environmental quality, green jobs, mostly in agriculture (bench terracing), reforestation (Green Plan) and manufacturing (handicraft). A 2010 preliminary assessment of potential green jobs in Lebanon examined four key job sectors: energy, construction, agriculture/forestry and waste management (ILO/UNDP, 2010). The study assessed Lebanon's current and projected employment potential in those sectors as the country gradually shifts towards a greener economy. The results estimate a total of 24,300 new green jobs by 2020 (MoE, 2012-a).

Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use

Target 5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.

In efforts to reduce natural habitats loss, Lebanon is more and more considering the forest sector as a national asset and reforestation initiatives are being implemented; the main four being the "National Reforestation Plan of the MoE", "Safeguarding and Restoring Lebanon's Woodland Resources", "The 40 Million Trees Program", and the "Lebanon Reforestation Initiative". Moreover, a draft law on forest fires has also been prepared and submitted to the COM for approval and endorsement.

In terms of reduction of degraded and fragmented sites other than forests, activities are being pursued for the rehabilitation of quarrying and MSW dumping sites. The National Council for Quarries headed by the MoEis working on the organization of the sector: closing illegal activities and inspecting sites where activities have ended in order to initiate their rehabilitation. In parallel, a consultant was contracted to select 15 pilot sites for rehabilitation and is currently preparing the respective tender documents. Efforts are also pursued for the amendments of the quarries master plan. As for MSW, a road map for integrated solid waste management has been prepared and approved by the COM in October 2014. The rehabilitation of the Saida dumpsite into a public recreational park is expected to begin in October 2015.

Target 6: By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

- The Ministry of Agriculture banned dynamite fishing and trawling nets, imposed minimum mesh size and regulated scuba-diving. However, the ministry lacks the equipment and human resources needed to enforce these protection measures.
- The FAO EastMed-Project (between September 2009 and August 2014) in collaboration with the MoA and funded by Greece, Italy and the European Community, is supporting the development of regionally-consistent fisheries management plans among the Eastern Mediterranean countries. The project aims to contribute to the sustainable management of marine fisheries, and thereby supporting national economies and protecting the livelihoods of those involved in the fisheries sector.

- A draft report about Socio-Economic Evaluation of Maritime Activities have been published in January 2015 by the MoE under the Plan Bleu Mediterranean Regional Activity. The report highlights the importance of the marine aquaculture sector and presents the impacts on marine biodiversity from pollution, overfishing, and illegal fishing methods. The report presents a set of recommendations to improve sustainable exploitation of the stocks and explore the possibility to exploit new fishing grounds such as the deep water grounds and offshore waters for large pelagic species.
- The Ministry of Agriculture has finalized a new draft framework law on fisheries and aquaculture and has submitted it to the Parliament for approval.
- IUCN ROWA and the Association of the Development of Rural Capacities "ADR" (a national NGO) are implementing since 2014 the "Sustainable Fisheries Management for Improved Livelihoods of the Coastal Fishing Community in Tyre - Lebanon" Project funded by DROSOS foundation. The project aims at assisting the members of the Tyre Fishing Syndicate and their families to jointly improve their livelihoods. The South Governorate, to which Tyre Caza belongs, is the second poorest Governorate, with a 42% prevalence of overall poverty. Within this context, the fishing community forms an economically, socially and culturally distinct, highly specialized but also highly impoverished subgroup, which is stable across generations. An integral component of the project is also monitoring landed catch, and fishermen activities, etc. As an outcome of the project, the municipality of Tyre has banned fishing by dynamite in Tyre beach; and monitoring fish stock is being carried out; even though monitoring is still in its early stages, an increase in fish stock has been noted.

Target 7: By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

- LARI has finalized in 2015 a draft law on "Management of Plant Genetic Resources for Food and Agriculture".
- The Minister of Agriculture issued a Decision regulating the exploitation and exportation of *Origanum* & *Salvia Fructicosa* (Decision No. 179/1 dated 3/3/2012).
- Development in 2014 of the "National Strategy for Conservation and Management of Plant Genetic Resources" by the "National Committee on Plant Genetic Resources for Food and Agriculture" established by the Minister of Agriculture.
- The national forest programme (NFP) (2015-2025) developed by the MoA has envisioned a strategy for protected forest in particular related to the implementation and enforcement of existing laws and regulations. The Ministry's objective is to meet the needs of the people as a priority while protecting forest and ensuring their sustainability. The new NFP will guide and strengthen the Ministry's activities in the management and protection of forest across the country while keeping the needs of the people as a priority.

Target 8: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Pollution alleviation plans and projects have been developed to safeguard ecosystem function and biodiversity, these include:

- Developing and initiating the implementation of the road map to combat pollution of the Qaraoun Lake.
- Initiating the development of the road map to combat pollution of the Litani River basin.

Monitoring activities have also been initiated to assess pollution levels, namely:

- Sea campaigns were conducted aboard the National Center for Marine Sciences (NCMS) vessel "CANA" between September 2009 and August 2012 in order to monitor certain species of marine biodiversity. Such studies offer baseline data for the development of strategies to protect these animals and they are needed to study the impact of anthropogenic factors on these species and evaluate their heavy metal and organic contaminant levels.
- Implementing the "Environmental Resources Monitoring in Lebanon" project by MoE, co-managed by UNEP and UNDP and funded by the Greek government (since 2011) in the aim of improving the understanding of environmental quality and its impact on health and ecosystems, through monitoring and management of marine and coastal zone (component 1) and air quality assessment and monitoring (component 2).

Target 9: By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated and measures are in place to manage pathways to prevent their introduction and establishment.

Invasive Alien Species (IAS) is still a newly developing field in Lebanon. Available inventories of invasive alien species in Lebanon are mainly related to birds and marine species. The management plans of both Ammiq Wetland and Tyre Nature Reserve include lists of invasive species and some monitoring and management practices related to birds (MoE, 2012-c).The National Center for Marine Sciences is currently working on invasive marine species.

View of Tyre Reserve invaded by *Heterotheca subaxillaris*

Lately, a new flora invasive species was detected in the Tyre Coast Nature Reserve, the *Heterotheca subaxillaris* commonly known as Camphorweed and is thought to come from Palestine through birds (MoE, 2012-c).In response, the

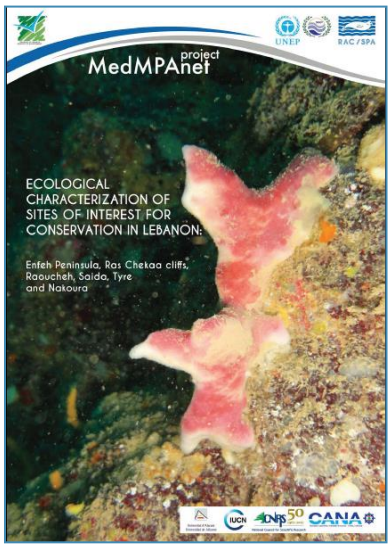
Saint Joseph University, as ECOPLANTMED Project Partner, organized an event during May 2015 where people were invited to join the team of experts at the reserve to introduce them to the repercussions of the invasive plant *Heterotheca subaxillaris* on the city's natural reserve and on native species and help in removing it.

Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity

	Target 11: By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

In-Situ conservation of biodiversity is always evolving and advancing in Lebanon:

- In addition to the country's 8 nature reserves, seven (7) new nature reserves have been established between 2010 and 2014: Wadi Hojeir, Chnaniir, Beit Leef, Debl, Ramya,Kafra and Jaj Cedars. Moreover, an 8th reserve is currently pending parliamentary approval, the Dennieh Lazab Nature Reserve.
- The development of the first Natural Park Charter ("Charte Du Haut-Metn") (published in September 19, 2013) introducing the concept of Natural Parks to Lebanon and paving the way for the development of two other park charters (Jezzine and Akkar, Upper Dennieh, and Upper Hermel.
- Preparation and publication of the Marine Protected Areas (MPAs) Strategy which aims at creating a network of MPAs in Lebanon, the Strategy has identified a list of candidates MPAs in Lebanon: 9 coastal & marine sites, 5 estuaries and 1 to 4 sites in the deep sea.
- The development of two draft laws for the establishment of two new MPAs and their management plans: Ras El Chaqaa Cliff and Naqoura.
- Submission to the CoM a draft decree for the classification of Raoucheh rocks and its surrounding marine and coastal areas as natural protected site.
- Execution by RAC/SPA through the MedMPAnet regional project, in close coordination & collaboration with MoE, of extensive field biodiversity surveys in six candidates marine



protected areas: Enfeh, Ras El Chaqaa Cliffs and Raoucheh rocks in 2012 and Naqoura, Sidon Rocks & Tyre Rocks in 2013. In addition to the experts from RAC/SPA, experts from the following institutions took part also in the field surveys: IUCN, National Center for Marine Sciences and University of Allicante. The results of the survey were published in 2015 in the report "Ecological Characterization of Sites of Interest for Conservation in Lebanon: Enfeh Peninsula, Ras El Chaqaa Cliffs, Raoucheh, Saida, Tyre and Naqoura", the report was launched by the Minister of Environment in an event that was organized in Beirut on April 14, 2015.

- The MoE submitted a proposal for the preparation of a master plan for the protection of mountain peaks, natural areas, coastal zones, green spaces, and agricultural lands to the Council of Ministers together with its specific Strategic Environmental Assessment.
- Ongoing efforts to establish three Plant Micro-Reserves (PMR) in Ehmej, Sarada and Baskinta. PMRs aim to preserve rare microhabitats and their characteristic plant species whose populations have a reduced distribution area within a defined region. The Ehmej site includes the rare endemic flower *Iris sofrana* and was already proposed to be classified as a Natural Site through a draft decree that was submitted to the Council of Ministers.

- Presentation of a draft law authorizing the Government of Lebanon to join the Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean under Barcelona Convention (which is the amendment of the Protocol Concerning Specially Protected Areas that the Government of Lebanon has ratified through the Law 292 in 22/2/1994).
- Presentation of a draft law authorizing the Government of Lebanon to join the Arab Union for Protected Areas and approve its by-laws.

12	Target 12: By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

In its efforts to improve the status of threatened species, Lebanon has conducted the following:

- Lebanon became an official signatory to the Memorandum of Understanding (MoU) on the Conservation of Migratory Soaring Birds in Africa, Europe, and Asia (under the CMS Convention), based on the approval of the Council of Ministers as per Council of Ministers (CoM) decision No. 51 dated 14/08/2014.
- Lebanon became an official signatory to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) on 26 May 2013.
- Within the framework of the implementation of the Action Plan for the conservation of Mediterranean marine turtles and in order to define their migratory routes, an experience of satellite tracking of marine turtles has been

carried out in July 2012 in the Tyre Nature Reserve with the collaboration of Regional Activity Centre for Specially Protected Areas (RAC/SPA), the Stazione Zoologica «Anton Dohrn» Naple (Italy), the MoE, and the Municipality of Tyre. Moreover, in order to strengthen the monitoring and research efforts on marine turtles in the reserve, a rescue center is being set-up to host marine turtles that require care and release them back to the natural environment when they become healthy.

- One of the main objectives of the three PMRs mentioned under Target 11 above is to provide protection for rare and threatened plant species that are under pressure from unsustainable practices, namely the *Drosera rotundifolia* a carnivorous plant that is often found in bogs, marshes and fens, and two endemic iris species: *Iris cedretii* and *Iris sofarana*.
- Establishment of a facility to maintain a secure, long-term seed collection of Lebanese endemic, threatened and otherwise significant plant species that is available and utilized for research and possible species recovery activities; through the Millennium Seed Bank Project. The project is an Ex-Situ conservation initiative of the wild flora of Lebanon established jointly between the Kew Royal Botanic Gardens and Lebanese Agricultural Research Institute (LARI) with the purpose of complementing existing In-Situ conservation.
- Conservation of threatened seeds of Lebanon in the Royal Botanic Garden Edinburgh (RBGE) as part of RBGE's International Conifer Conservation Programme.

Target 13: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

The genetic diversity of Lebanon's species, other than threatened and endangered ones, is being preserved Ex-Situ through the establishment of seed banks:

- The establishment of the Laboratory for Seed Germination and Conservation (LSGC) from the partnership between Jouzour Loubnan, a local NGO dedicated to forestation, and the Faculty of Science - Saint-Joseph University. The LSCG is headed by Dr. Magda Bou Dagher Kharrat and carries both fundamental and applied research activities in many fields, namely:
    - Seed conservation and germination of native plant species in order to support the regeneration and management of woodlands in the Lebanese mountains
    - Ecosystem restoration through the creation of micro-reserves in threatened areas that are particularly rich in biodiversity as well as reforestation in arid areas in order to combat the expansion of desertification especially in the north-eastern parts of Lebanon
    - Development of the Lebanon e-flora database (http://www.lebanon-flora.org), which aims at providing easy access to Lebanese plant species, sharing data and research findings as well as serving as a discussion platform between plant experts
- The Millennium Seed Bank mentioned under Target 12 above also aims at collecting and conserving seeds of Medicinal, Aromatic, Edible, and of Economic Value Species. On 31 July 2013, the Seed Bank has been officially launched and assigned as the National Seed Bank of Lebanon, holding 1,380 seed collections representing 881 different Lebanese wild species

which are stored under long term conditions, with duplications held at Kew's Millennium Seed Bank of the Royal Botanic Gardens. A great number of wheat and barley landraces, improved varieties of wheat, barley, lentil, chickpea, and vetch are also conserved as ex-situ collections at LARI and are regularly regenerated every five years.

- MoE has developed in 2005 the National Biosafety Framework and has submitted to the CoM a draft decree on national measures regarding biosafety, which was approved by the CoM through its decision No. 53 dated 27/11/2014.

Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services

Target 14: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

Forest ecosystems in Lebanon play a major role in the life of villagers and city dwellers as source of direct goods (e.g. charcoal, pine kernels, honey) and services (e.g. amenity, watershed protection, carbon sequestration). Thus, all reforestation and forests rehabilitation initiatives under Target 5 contribute as well to Target 14.

Drinking water availability is an important ecosystem service as well, pollution abatement projects at the Qaraoun Lake and Litani River Basin contribute to the provision of clean water.

Moreover, giving an economic value to ecosystems is an important milestone for their restoration and safeguard. In this context, an economic valuation of the the Shouf Biosphere Reserve was conducted in 2015 and revealed that every $1 invested in the SBR returns about $19 of benefits to the region and the people (refer to Part I, "*Main Strategies, Programs, and Projects*").

Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

Lebanon completed and published in 2011 its Second National Communication (2nd NC) Report to the United Nations Framework Convention on Climate Change (UNFCCC). The report assessed the vulnerability and adaptation of Lebanon's forestry sector. As per the 2nd NC, the sector contributed to the reduction of 807.60 Gg of CO_2 for the year 2000, the assessment of the adaptive capacity of different forest types in Lebanon, in terms of the impact of climate variability, socio economic importance, resilience to forest fires and pest attacks, ability to migrate upward, and the resources needed to adapt to climate change, revealed that the upper zone coniferous forests(*Cedrus libani*; *Abies cilicica*) and high mountain formations (*Juniperus excelsa*) have the lowest natural adaptive capacity to current and future trends. Proposed adaptation measures were targeted to assist the natural resilience of forests, anticipate future changes and promote landscape scale, and mainly consist of:

- Strengthening the legal and institutional framework to integrate climate change needs;
- Integrating landscape levels planning in local/regional development plans;
- Strengthening awareness and education and supporting research; and
- Developing forest management plans for most vulnerable ecosystems.

Lebanon's Third National Communication to the UNFCCC is currently being prepared and expected by December 2015.

Target 16: By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.

Lebanon has signed the Nagoya Protocol on February 01, 2012 and issuance of has issued decree No. 206 on 10/07/2014 transferring to the Parliament a draft law for the accession by the Government of Lebanon to the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation to the Convention on Biological Diversity.

MoE has prepared a draft national ABS law and has submitted it to the COM for approval.

Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building

	Target 17: By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan

Lebanon's national biodiversity strategy and action plan (NBSAP) is currently being revised and updated. The revision process is presented in Part II of this report.

	Target 18: By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

- Establishment of the following Himas adopting a community based approach, through municipal decisions: Andqet, Menjez, Rouaime-Al-Maabour Al-Abyad, Kherbet Anafar, Qaroun, Fakiha, Charbine, Qaytouli, Roum, Ebel es-Saqi, Qoleileh and Al Mansouri.

- Establishment of the first Hima adopting a community based approach: Hima El-Fekha in the Anti-Lebanon Range. In order to highlight the ecological importance of El-Fekha area, the following districts within the village: El-Fekha, El-Jdeydeh, El-Zaytoon and El-Maallaqa were declared in April 2013 by the concerned municipality as a Hima conservation area. A municipal decision was released by adopting a community based Hima approach for sustainable grazing (based on the traditional system of grazing), organized hunting and ecotourism. A women empowerment project is also linked to the Hima and the sustainable use of its resources; the women are supporting their community in activities related to traditional crafts, food products and handmade carpets using goat milk and wool as raw material.

- After the initiatives of the local authorities mentioned above, the MoE has included in the draft Protected Areas law that was submitted to the Parliament in 2012 for endorsement a category related to Himas which is defined as a Community Based Natural Resources Management (CBNRM) System that promotes Sustainable Livelihood, Resources Conservation, and Environmental Protection for the human wellbeing. A Hima is under the supervision of the municipality, the union of municipalities or the Qaimaqam.

Target 19: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

The main national monitoring national project during this period was the Improving National Assessment and Monitoring Capacities for Integrated Environmental and Coastal ecosystem Management (INCAM) implemented by the NCSR.

INCAM project contributes to increase Lebanon's capacity in important environmental concerns based on a regional approach that assess the anthropological impacts on natural resources towards achieving its objective of improving assessment and monitoring capacities in environmental protection and coastal zone management in Lebanon by strengthening and enforcing the role of the National Council for Scientific Research (CNRS) through capacity/institutional building and training and education of its staff. INCAM Project was launched in January 2011 and succeeded to collect data at a national scale through a thorough investigation of existing information on present status of natural resources including published reports on water, marine ecosystem, soil, vegetation, natural risks, manmade risks, human development index and legislation. Following the creation of this database, a 328-pages book entitled "Review and Perspectives of Environmental Studies in Lebanon" was published including fourteen chapters covering most of the critical issues that Lebanon is facing.

Moreover, the French National Center for Scientific Research (CNRS), the Research Institute for Development (IRD) and the University of Montpellier 2 via its Observatory of the Sciences of the Universe (OREME) have associated with the Lebanese National Center for Scientific Research (CNRS-Lebanon) and several Lebanese and French universities (The University of Toulouse, the University of Grenoble, the Lebanese University, the University of Balamand, the University of Saint Joseph, the American University of Beirut, the University of Saint Esprit de Kaslik, Beirut Arab University, Lebanese American University) to create the O-LiFE observatory: Observatoire Libano-Francais de L'Environnement (Lebanese-French Environmental Observatory). O-LiFE has the following objectives:

- Conduct simultaneously: Observation, Research, Training and Valorization
- Federate skills through common tools and objects
- Organize, share, sustain and enhance environmental data

Target 20: By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.

The MoE is actively and continuously working with donors, including environmental funds, foreign governments and international bodies to guarantee the necessary funds for soft loans and grants

allowing thus the continuous implementation and development of plans and activities. Selected examples are as follows:

- The "Safeguarding and Rehabilitating of the Lebanese Forest Resources" project with a budget of $2,255,000. The project has attracted as well grants and assistance of the donors to reforest Lebanon. The most important of which is a cash grant of $12,000,000 from the USAID, to work on developing the forest arboretum in Lebanon.
- Signature of $1.5 million grants to support research on biodiversity.
- Signature of a $2.5 million grant to implement the National Program for Hydro-Chloro-Fluorocarbon disposal and follow up on the implementation.
- 19 million Euros grant by the European Union allocated for the conservation of Lebanon's marine resources and their sustainable use.
- Launching of the Support to Reforms – Environmental Governance (StREG) project funded by the European Union by an 8 million Euros grant.
- $3.2 million grant from the Global Environment Facility for the sustainable management of the Litani River basin
- In 2012 the MoE signed contracts with 69 municipalities to implement environmental projects to the value of $9.3 million for each. This assistance comes within a common work plan between the Ministry and the municipalities to protect the environment and enforce solutions to the problems they are facing, through buying waste bins and pumps for pesticides and through building concrete reservoirs to collect water to fight fires.
- Execution of the National Reforestation Plan by MoE funded by the Lebanese National Budget with an amount of 16.67 million USD: Phase I (2002-2004) and Phase II (2004-2006) were done through sub-contracting private companies, Phase III (2010-2014) through direct contracts with the municipalities.

Lebanon's Contribution towards the Achievement of the Relevant 2015 Targets of the Millennium Development Goals

In September 2000, the United Nations General Assembly adopted the Millennium Declaration (MD). The Declaration that was ratified by 191 countries, including Lebanon, pledged to achieve, by the year 2015, eight goals, 21 targets and 58 indicators including poverty reduction and hunger eradication, achieving universal education for all, promoting gender equity, improving mother and child health care, preventing from contagious diseases, protecting the environment, and enhancing global partnerships for development.

Within the framework of the MDG, the Government of Lebanon, with the support of the United Nations Agencies in the country, has produced to date three (3) Millennium Development Goals Report (MDGR):

- The 2003 MDGR aimed at establishing a baseline situation, monitor progress achieved till date, and provide indication on what should be done.
- The 2008 MDGR assessed the progress made in the achievement of the MDGs based on new national data which was formulated after the first MDGR. The 2008 MDGR highlighted efforts towards achieving the goals, and articulated the main challenges and opportunities, as well as put forth recommendations for decision-makers and other concerned stakeholders for achieving the MDGs. Very few targets were reached during the period since the publication of the first Report due to the instable political situation in the country (assassination of Prime Minister Rafic El Hariri in February 2005 and Israel's war on Lebanon in July 2006).
- The 2013-2014 MDGR present, like its precedents, the country's track record. It reviews Lebanon's experience and the main lessons learned in order to contribute to the formulation of a new post-2015 development agenda.

The latest MDGR showed that Lebanon met the targets of the education goal (MDG 2) and the three health goals, especially reducing child and maternal mortality, i.e. MDG 4 and 5. However, it is not expected to achieve the poverty reduction goal (MDG1) and the environmental sustainability goal (MDG7). In addition to the multifold socio-economic and political conditions that require structural changes, Lebanon's progress towards the achievement of the MDGs has been recently challenged by a complicated political situation and spillovers of the Syrian crisis, especially the massive influx of refugees.

Of direct relevance to biodiversity is MDG7: "Ensure environmental sustainability", yet MDG1: "Eradicate Extreme Poverty" and MDG2: "Achieve Universal Primary Education" can be considered as biodiversity cross-cutting issues:

- **MDG 1:** Poverty has been associated with biodiversity loss through habitats fragmentation and destruction. Poverty is a major factor that drives people to behave in an unsustainable manner in order to meet their needs for survival (e.g. illegal trees cutting, overgrazing, overfishing, etc.).
- **MDG 2:** Education is a factor that highly contributes to biodiversity conservation. While it is crucial to ensure all children have access to primary education, it is also important to mainstream biodiversity conservation into school programs to raise children's awareness. Children who are educated develop a sense of responsibility towards the environment they live in, including respecting nature and animals and keeping their surroundings clean. Education as well prevents people from incriminating their environment and committing irrational behaviors (illicit cutting of trees, pollution, unsustainable exploitation of natural resources, destruction of ecosystems habitats etc.).

The sub-sections below present the actions taken to achieve the above mentioned three (3) goals and the faced challenges. For MDG 1 and MDG 2, the actions are presented for the overall goal while for MDG 7 the actions are presented per target since it is the one directly affecting biodiversity.

MDG 1: Eradicate Extreme Hunger and Poverty

Good practices initiated to achieve MDG 1

Consecutive recent Lebanese Governments have started incorporating poverty in their priority list for action which could indicate political will in that area. The main initiatives taken in Lebanon to combat poverty are the following:

- **The Paris III Social Action Plan (2007):** the plan proposed a series of social safety net measures to reduce poverty and improve social indicators and addressed achievement of the MDGs as a main objective through the set of suggested interventions, including establishment of an inter-ministerial committee whose main task was to coordinate government efforts and develop an overall social strategy.
- **The National Social Development Strategy (NSDS) (2011):** the strategy made a political statement and set a new vision for Lebanon's social development by promising citizens social and economic rights, addressing multidimensional poverty specifically, and striving for achievement of a number of development goals cross-cutting with the MDGs.
- **The National Poverty Targeting Program (NPTP) (2013):** the program is the main outcome of the NSDS with an objective to create a targeting mechanism that can be used by the government to deliver social transfers and services to the extremely poor (i.e. around 80, 000 households below the 8% lower poverty line) and the most vulnerable, using proxy means testing targeting mechanism. Since August 2013, around 74,000 households applied to the program, out of these 18,801 households were categorized as beneficiaries (i.e. spending less than US$3.84/capita/day, which is the extreme poverty line of 2004 adjusted to inflation from 2004 to 2011).

- **The Community Development Project (2012):** The objective of the project was to deliver services in different fields from agriculture and infrastructure to cultural and training activities through the establishment of partnerships with local NGOs and municipalities. During the period 2006-2008, 324 projects were implemented and were successful to different degrees. The project created job opportunities and agricultural development which had a positive impact on Local communities. For example, 75% of projects in agriculture were considered quite successful. The main factors behind the degree of success and sustainability related to the nature of the sector of intervention, type of contract and budget, poverty area, and characteristics of the partnering civil society organization (CSO).
- **The ongoing Economic and Social Fund for Development (funded by the European Union)**

  The Fund carries out community development projects through partnerships with municipalities and the private sector. The Fund provided loans to small and medium enterprises to create jobs. In 2012, the Fund was improving the livelihoods of about 310,000 inhabitants. Loans financed by the Fund have supported more than 6,500 projects and created about 4,000 new jobs[13].
- **ADELNORD (2009):** Appui au Développement Local dans le Nord du Liban (ADELNORD) is a programme to support local development in northern Lebanon in partnership between the Lebanese Republic (CDR) and the European Union**.** ADELNORD adopts an approach based on three intervention sectors: agricultural infrastructure development, community development, and sustainable management of environmental resources.
- **Local Economic Development Agencies (LEDA)** in four regions of interventions, recognized as most in need: North Lebanon, South Lebanon, Bekaa and Beirut suburbs. The LEDA concept is based on strategic economic development of the region. It begins with the development of identified sectors in the areas of production and industry and focuses on the different sub-sections of value chains of each sector.

Challenges and setbacks

To date, neither the National Social Development Strategy (NSDS) nor the Social Action Plan has been completely implemented. The NPTP still faces challenges in enhancing visibility, awareness, operational mechanisms and sustainability in a confined fiscal environment. The NPTP also offers limited public services that might not be needed by all poor households (for example, elderly households without children do not benefit from education services, and therefore get less support). Consequently, incorporating the program under an all-inclusive social strategy becomes crucial.

MDG 2: Achieve Universal Primary Education

Good practices initiated to achieve MDG 2

Lebanon has accomplished the second goal of the MDGs and indicators (net enrolment ratio in primary education, proportion of pupils starting grade 1 who reach last grade of primary and literacy

[13]Economic and Social Fund for Development website: http://www.esfd.cdr.gov.lb/news/Achievements%20of%2010%20Years

rate of 15-24 year-olds, women and men). The problems related to universal primary education have been well studied by the Lebanese Ministry of Education and Higher Education (MoEHE) and have been incorporated as pillars of the **Education Sector Development Plan for 2010–2015**. The plan comprises an implantation strategy with five priorities expected to be completed by 2015 according to 10 relevant programs and achievement performance indicators.

The priorities consist of:

- Making education available on the basis of equal opportunity;
- Promoting quality education that contributes to building a knowledge society;
- Education that contributes to social integration;
- Education that contributes to economic development; and
- Enhancing education governance.

Additional progress has been made in the **program on infrastructure development**, with all 183 targeted schools rehabilitated. Science laboratories are being equipped, with infrastructure completed for 46 laboratories, and preschool rehabilitation works are still being carried out. Regarding the **professionalization of the teaching workforce**, National Standards for teachers have been drafted and a progress scale has been piloted. The latter two projects are still to be validated (MoEHE, 2013).Operationalization decrees for the Law of Enactment of Compulsory Education up to the Age of 15 have been drafted.

Challenges and setbacks

The 2010-2015 plan is rather comprehensive and should have positive outcomes. However, a huge challenge remains: "how to keep progress on track and meet Lebanese ambitions and needs while housing the school-age Syrian refugee children whose number is likely to increase to 550,000 by the end of 2013?" (UNDP-CDR, 2014).

MDG 7: Ensure Environmental Sustainability

MDG 7 is of direct relevance to biodiversity and is includes the following four targets:

1. Target 7.A: Integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources
2. Target 7.B: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss
3. Target 7.C: Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation
4. Target 7.D: By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers

While, Targets 7.A and 7.B (conservation of environmental resources and biodiversity respectively) have direct impacts on biodiversity conservation, Targets 7.C and 7.D (reduction of pollution and poverty alleviation respectively) will indirectly benefit biodiversity and ensure its conservation.

Good practices initiated to achieve Targets 7.A and 7.B

While Lebanon has made some progress in following a more sustainable development path, much more effort is still needed from the authorities and from the civil society and local communities. The main successful achievements of the MoE (MoE, 2012-b) are listed below:

- **Biodiversity Conservation:** In order to maintain forest coverage, Lebanon has resumed **the National Reforestation Plan**, (NRP) in 2010, which was initiated in 2002 and was stopped between the years 2006 and 2010 (after the Israeli war) the NRP has executed reforestation activities in degraded forest areas in all Lebanese regions as follows: 1st phase (2002-2004): 300 hectares, 2nd phase (2004-2006): 300 hectares, 3rd phase(2010--2014): 100 hectares. Moreover, a five-year Reforestation Initiative was launched in 2010 to strengthen Lebanon's forest seedling-producing nurseries. Furthermore, after the overwhelming forest fires that occurred in 2007 and 2008, Lebanon developed a **National Strategy for Forest Fire Management endorsed by the CoM through decision No.52 dated 13/5/2009**, and in 2010 **a law prohibiting the exploitation of burned forest areas** was approved. The law aimed to prevent arsonists, who in some situations started fires for the purpose of changing the land use (MoE and UNDP, 2010).In addition, the MoE has submitted to the CoM a draft national framework law on forest fires, The draft law proposes the establishment of a National Higher Council on Forest Fires Management which includes representatives from all concerned ministries and institutions, in order to enhance and strengthen the coordination and collaboration between all concerned ministries and institutions in facing this problem, since this issue falls under the prerogatives of many administrations. The draft law also sets measures to enhance the capacity of the Directorate General of Civil Defense, the Ministry of Agriculture, and the Municipalities, and also set specific measures for 1) Forest fires prevention, 2) Data collection, research and analysis, 3) Risk mitigation, 4) Limitation of forest spread, 5) Rehabilitation, 6) Violations & sanctions, and 7) Awareness & capacity building.

- **Air Quality**: **Air quality-monitoring program** that should eventually lead to the development of an air pollution management strategy in the country. In the last decade, dozens of municipalities and universities have started to invest resources in procuring air quality monitoring instruments and training air quality professionals. In the same context, the total ban on leaded gasoline is another positive air pollution reduction measure, with considerable benefits for public health and the environment. Similarly, the environmental guidelines developed by the MoE for manufacturing industries (mainly cement industries) have contributed considerably to regulating GHGs and other emissions from manufacturing.

Challenges and setbacks

The above listed planning initiatives are all beneficial practices endorsing environmental sustainability. Nevertheless, severe implementation and enforcement and continuous follow-up will conclude on the sustainability of success. The ability of the MoE, other ministries and intergovernmental agencies to engage in plans is, as in many other countries, bound to political conditions and Cabinet reshuffles. With every reshuffle, plans are reconsidered and redrafted (MoE and UNDP 2010).

Good practices initiated to achieve Target 7.C

The **Economic and Social Reform Action Plan** focused on infrastructure works. Its main objective was to improve the coverage and continuity of water supply across Lebanon by increasing storage capacity, reducing network losses and expanding irrigation coverage, together with increased levels of wastewater collection and treatment. In addition, the MoEW has formulated a **national water sector strategy**, approved by the CoM in 2012. Likewise, the ministry launched a **National Wastewater Strategy** in December 2012. The CDR has also embarked on an **action plan to finalize the rehabilitation and expansion of potable water supply in all parts of Lebanon and increase water sources across all governorates**.

Regarding the solid waste sector, the CoM approved a **draft law on integrated solid waste management** (ISWM) and referred it to Parliament.

Challenges and setbacks

The assessments and knowledge of environmental problems are well formulated and plans have been put in place and successive governments have featured the sector as a priority. However, the political will and resources for implementation are still missing. Also, the draft law on ISWM has not been passed yet; Lebanon is still operating under the outdated 1997 Emergency Plan for Solid Waste Management (SWM).

Good practices initiated to achieve Target 7.D

To date, a solution to the continuous expansion of slums and camps has not been found. Slums and camps continue to host the most vulnerable and poorest.

Challenges and setbacks

Palestinian and Syrian refugee camps and slums are major challenges for the Lebanese Government and no plans exist as to the future of those camps and slums.

Lessons Learned from Implementing the Convention in Lebanon

Implementing the Convention initially resulted in the development of the National Biodiversity Strategy and Action Plan in 1998 aiming at enhancing biodiversity and many works and achievements have been taking place since then, such as the establishment of gene banks and the domestication of some plants, establishment of a national biodiversity database for documentation and monitoring of biodiversity, partnerships with the environmental community at the national, regional and international level, increase in the number of protected areas, etc.

Enhance biodiversity related issues in a cross-cutting and cross-sectoral approach was introduced to the country as part of the implementation of the Convention, namely mainstreaming biodiversity into productive and economic sectors.

The currently ongoing review and update of Lebanon's NBSAP to align it with the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets, allowed for an internal assessment of the country's 1998 NBSAP and a highlight of the constraints and obstacles to be contoured and avoided. To date, the main identified areas of intervention to enhance the implementation of the CBD at the national level include:

- Increase funding to enhance research;
- Direction research towards fields with low data, e.g. IAS, Deep Sea, etc.
- Ensure a coherent government policy by all relevant policy areas, including agriculture and fisheries, international cooperation, environmental policy, industry policy and trade policy;
- Ensure proper zoning of lands;
- Enhance quarantine activities to protect natural ecosystems from invading species;
- Ensure information dissemination;
- Prioritization of biodiversity issues at the decision-making level;
- Manage fishing and aquaculture activities; and
- Create environmental specialized committees that would be responsible for supervising and following-up on biodiversity related matters.

APPENDICES

APPENDIX I - INFORMATION CONCERNING THE REPORTING PARTY AND PREPARATION OF THE FIFTH NATIONAL REPORT

Reporting Party

National Focal Point	
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Submission	
Signature of officer responsible for submitting the national report	Mr. Mohamad Al Mashnouk Minister of Environment
Date of submission	August 2015

Preparation of the Fifth National Report

The Fifth National Report to CBD was prepared under the GEF/UNEP project "Biodiversity-Enabling Activity for revision/updating of the National Biodiversity Strategy and Action Plan (NBSAP), preparation of 5th National Report to the Convention on Biological Diversity (CBD) and undertaking clearing house mechanism (CHM) activities" executed by the Lebanese Ministry of Environment.

This report was prepared by Earth Link and Advanced Resources Development (ELARD) s.a.l. on behalf of the executing agency, the Ministry of Environment (MoE) and in close collaboration, coordination and participation of the CBD national focal point at the Ministry of Environment, Ms. Lara Samaha who efficiently contributed in the development of this report. The international consultant Mr. Tristan Tyrrell was also part of the preparation team providing guidance and peer review.

The methodology used to prepare the Fifth National Report is tailored in response to the guidelines provided by CBD for the FNR, which recommends that in preparing their national reports, Parties involve a wide range of stakeholders in order to avoid subjective inputs by the consultant team, provide a sense of ownership of the document at the national level and to ensure a participatory and transparent approach to the reporting process.

The work methodology focused on the below four (4) tasks:

1. REVISION OF EXISTING LOCAL AND INTERNATIONAL REPORTS AND GUIDELINES

The first step in the Project includes a thorough compilation and review of existing local and international reports and guidelines, such as CBD updates, guidelines, publications along with the COP-10 47 decisions, national reports, scientific publications, etc.

Appendix II provides a list of all consulted documents.

2. IDENTIFICATION OF KEY STAKEHOLDERS

Partnerships between multiple stakeholders are key to achieving biodiversity goals at the national scale and stakeholder involvement for data gathering is a key aspect of the Project. The template of the 5th National report includes a long list of questions which need feedbacks and answers from concerned stakeholders.

Thus, one of the main added-values of the process is actually the mobilization of stakeholders and the increase of the sense of ownership. Multiple stakeholders, including government, academic and research institutions, NGOs, civil society and the private sector were identified based on an "Influence Interest Matrix" where the high interest and high influence stakeholders are the most critical ones and their support is sought. The developed stakeholders' engagement matrix and all concerned stakeholders are provided in Appendix IV.

Moreover, a steering committee, formed by representatives of the concerned public institutions, research centers, and academia, was established with the aim of further increasing ownership sense and soliciting participation of key stakeholders in the preparation of both the 5th NR and Lebanon's updated NBSAP. Several Meetings for the Steering Committee were organized during the project's implementation, the Committee was mainly involved in facilitating data collection and was consulted about the project's workshops agenda and their main outcomes.

3. DATA COLLECTION AND STAKEHOLDERS CONSULTATION

Data collection is the main component allowing the update of the development of the 5th NR. After the identification of key stakeholders during Task 2; they need to be interviewed in order to answer the questions required in the 5th NR and other questions developed by the team allowing collection of needed data.

Interviews and online surveys were carried out to collect and update information about the main achievements in biodiversity since the fourth national report (in terms of legislation, technical studies, implementation of activities, projects under construction, strategies under development or finalized…).

Stakeholders were approached as well during organized workshops where they were updated about the progress of the project and worked in focus groups on prepared materials and exercises allowing data collection and feedback from each stakeholder based on his field of expertise.

4. DATA ANALYSIS AND REPORTING

Based on the literature review, stakeholders' individual meetings, and workshops, the draft report was prepared in phases (first Part I, then Parts II & III and Appendices I & II, followed by Appendix III) and peer reviewed internally by the MoE and the international consultant. Workshop reports were produced as well and sent to participants for validation of the collected information.

Following reviews, the report was finalized and shared with the CBD.

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APPENDIX III -IMPLEMENTATION OF THE THEMATIC PROGRAMMES OF WORK AND CROSS-CUTTING ISSUES

Given that Lebanon was still in process of updating its NBSAP when the 5NR was finalized, the table below shows the country's main implementations of the CBD's thematic programmes of work and cross-cutting issues during the period ranging from the submission of the 4th National Report (submitted to the CBD in 2009) until April 2015. The national implementation activities and actions are listed with regards to the goals and objectives offset in the country's first NBSAP developed in 1998.

Please note that this is by no means an exhaustive list of Lebanon's activities and actions under the thematic programme areas. The table below includes a compilation of some of the main works and achievements.

CBD Thematic programme areas	National goal of the 1998 NBSAP	National objective of the 1998 NBSAP	National implementation activities/actions taken or outcomes
Agricultural biodiversity	To protect Lebanon's agricultural diversity from degradation, and to maintain agricultural resource availability, while maximizing both environmental and economic benefits	To protect the agricultural ecosystems and to maintain native biological diversity	**Projects:** ❑ Execution of the UNDP/GEF project (2009-2012) "Mainstreaming Biodiversity Management into Medicinal and Aromatic Plants (MAP) Production Processes in Lebanon" by LARI. The project intended to incorporate conservation objectives into the gathering, processing and marketing of globally significant MAPs. The project was based on the theory that non-destructive harvests, along with income generated by MAP business opportunities for local people, contributes in the preservation of the wild stocks of globally significant endemic MAP species that are commercially traded and threatened by existing harvesting practices. The project targeted seven MAP species: *Salvia fruticosa*, *Origanum syriacum*, *Cyclotricium origanifolium*, *Micromeria libanotica*, *Viola Libanotica*, *Alcea damascene* and *Origanum ehrenbergii*. ❑ Execution (since 2014) of the "Sustainable Fisheries Management for Improved Livelihoods of the Coastal Fishing Community in Tyre - Lebanon" Project by IUCN ROWA and the Association of the Development of Rural Capacities "ADR" (a national NGO), funded by the DROSOS foundation. The project aims at assisting the members of the Tyre Fishing Syndicate and their families to jointly improve their livelihoods. An integral component of the project is also monitoring landed catch, and fishermen activities, etc. As an outcome of the project, the municipality of Tyre has banned fishing by dynamite in Tyre beach; and monitoring fish stock is being carried out; even though monitoring is still in its early stages, an increase in fish stock has been noted.
		To protect agrobiodiversity from deleterious agricultural practices, and to develop and implement policies and practices to minimize loss in	

CBD Thematic programme areas	National goal of the 1998 NBSAP	National objective of the 1998 NBSAP	National implementation activities/actions taken or outcomes
		genetic diversity	❑ Establishment of the Millennium Seed Bank by LARI which aims to collect and conserve seeds of Medicinal, Aromatic, Edible, and Economic Value Species. On 31 July 2013, the Seed Bank was officially launched and designated as the National Seed Bank of Lebanon, holding 1,380 seed collections representing 881 different Lebanese wild species which are stored under long term conditions, with duplications held at Kew's Millennium Seed Bank of the Royal Botanic Gardens. A great number of wheat and barley landraces, improved varieties of wheat, barley, lentil, chickpea, and vetch are also conserved as ex-situ collections at LARI and are regularly regenerated every five years. ❑ Execution of the FAOEastMed-Project "Pilot Survey on Fisheries Dependent Data Collection in Lebanon Including Training" in collaboration with the MoA between September 2009 and August 2014. The project developed the "National Artisanal Fisheries Dependent Data Collection Program" in Lebanon and trained related staff of the MoA. This web is an internet-driven system that handles Catch/Effort data with the purpose of regularly producing monthly estimates on catch, fishing effort, prices, values and average fish size. The project also contributed to the sustainable management of marine fisheries to support national economies and protect the livelihoods of those involved in the fisheries sector. **National legislation** ❑ Finalization of a new draft framework law on fisheries and aquaculture by MoA. This draft law has been submitted to the Parliament for endorsement. ❑ Finalization of a draft law on "Management of Plant Genetic Resources for Food and Agriculture" by LARI. ❑ Approval by the CoM of the draft decree on biosafety as per decision No. 53/2014. ❑ Banning dynamite fishing and trawling nets, imposition of minimum mesh size and regulated scuba-diving by the MoA. ❑ Issuance of a Decision from the Minister of Agriculture regulating the exploitation and exportation of *Origanum* & *Salvia Fructicosa* (Decision No.179/1 dated
		To establish a national biodiversity database for documenting and monitoring of biodiversity	
		To develop partnerships with the environmental community at the national, regional and international level	

CBD Thematic programme areas	National goal of the 1998 NBSAP	National objective of the 1998 NBSAP	National implementation activities/actions taken or outcomes
			3/3/2012) **Strategies**: ❑ Development of the Lebanon Rural Tourism Strategy by the Ministry of Tourism in 2014. ❑ Development in 2014 of the "National Strategy for Conservation and Management of Plant Genetic Resources" by the "National Committee on Plant Genetic Resources for Food and Agriculture" established by the Minister of Agriculture.
Marine and coastal biodiversity	To protect Lebanon's coastal and marine biodiversity and develop thoseresources in a sustainable way	To protect coastal and marine ecosystems and biodiversity	**Projects & Activities:** ❑ Execution of the project "Supporting the management of Important Marine Habitats and Species in Lebanon" by the MoE and IUCN (2010-2013) with the aim of supporting the development of a network of Marine Protected Areas (MPAs) in Lebanon and an associated monitoring program to evaluate their effectiveness. ❑ Implementation by MoE and UNEP of "the Market Policy and Legislative Development for Mainstreaming the Sustainable Management of Marine and Coastal Ecosystems in Lebanon" project funded by GEF (2013-2016). The project aims at conserving and protecting marine and coastal biodiversity through policy and legal reforms, enhanced stakeholder participation and mainstreaming biodiversity priorities into national plans and programs. ❑ Execution of the "Environmental Resources Monitoring in Lebanon" (ERML) by MoE, under the management of the UNEP in collaboration with UNDP (2009 – 2013). The project addressed three (3) components, two of which are related to marine and coastal ecosystems: Component 1: Improve MoE's capability to understand coastal and marine environments through monitoring and management of the resources; Component 2: Develop a land-use management strategy in Lebanon's coastal zone (also known as the "GREEN" Integrated Coastal Zone Management (ICZM) strategy) to enhance socio-economic opportunities. The main achievement of the project are:
		To use marine and coastal resources in a sustainable manner by creating partnerships with the stakeholders, in particular the local communities	
	To conserve biodiversity under natural conditions and establish a balanced ecosystem where plants and animals evolve naturally	Expand and manage the protected areas system in terrestrial, marine and freshwater environments	

CBD Thematic programme areas	National goal of the 1998 NBSAP	National objective of the 1998 NBSAP	National implementation activities/actions taken or outcomes
			▪ Identification and Assessment of Coastal Sensitive Areas in Lebanon Analysis of the Current Land Use and Socio-Economic Activities in the Coastal Zone ▪ Ecosystem Based Monitoring In the Marine Coastal Environment in Lebanon ▪ Analysis of the Institutional and Legal Frameworks of Monitoring and Management of Coastal and Marine Areas ▪ Analysis of the Current Land Use and Socio-Economic Activities in the Coastal Zone ▪ Land-use management strategy to enhance socio-economic opportunities in Lebanon's coastal zone. ❑ Execution since 2014 of the project "Sustainable Fisheries Management for Improved Livelihoods of the Coastal Fishing Community in Tyre - Lebanon" – detailed above under the Agricultural Biodiversity related national projects. ❑ Publication and dissemination in 2015 of the report "Ecological Characterization of Sites of Interest for Conservation in Lebanon: Enfeh Peninsula, Ras Chaqaa Cliffs, Raoucheh, Saida, Tyre and Naqoura" which is based on the result of the field biodiversity surveys in these six candidates marine protected areas that were carried out in 2012 and 2013 through the MedMPAnet regional project executed by RAC/SPA. Field surveys were executed in close coordination and collaboration with MoE, by experts from RAC/SPA, IUCN, National Center for Marine Sciences and University of Alicante. ❑ Conduction by the National Center for Marine Sciences (NCMS) of Marine biodiversity surveys aboard the (NCMS) vessel "CANA" between September 2009 and August 2012 of halieutic marine resources (mammalian and fishery). Such studies offer baseline data for the development of strategies to protect these animals and they are needed to study the impact of anthropogenic threats and evaluate their heavy metal and organic contaminant levels. ❑ Conduction by the National Center for Marine Sciences (NCMS) of a mammalian scientific mission onboard CANA vessel over two years (2011-2013) in coordination with the ACCOBAMS (Agreement on the Conservation of Cetaceans in the Black

CBD Thematic programme areas	National goal of the 1998 NBSAP	National objective of the 1998 NBSAP	National implementation activities/actions taken or outcomes
			Sea, Mediterranean Sea, and Contiguous Atlantic Area). The main output of this task is a protection plan both for mammalian and fishery resources on the basis of qualitative evaluation of marine fauna. Specific research and studies on the Cetaceans in the Lebanese waters were conducted with the aim of detecting the existence of their habitats, their areas of distribution and density, their status and development, their proliferation and migration patterns and routes, breeding areas and food requirements. ❑ Conduction of an experience of satellite tracking of marine turtles in July 2012 in the Tyre Nature Reserve with the collaboration of RAC/SPA, the Stazione Zoologica «Anton Dohrn» Naple (Italy), the MoE, and the Municipality of Tyre within the framework of the implementation of the Action Plan for the conservation of Mediterranean marine turtles and in order to define their migratory routes. Also, a rescue center is being set-up to host marine turtles that require care and release them back to the natural environment when they become healthy. ❑ Adoption of the United Nations General Assembly Resolution 63/212 dated 19-20 December 2014 asking Israel to pay Lebanon $856.4 million as a compensation for the oil slick that resulted from the striking of the Jiyeh power plant during the July 2006 war. ❑ Approval of a 19 million Euros grant by the European Union allocated for the conservation of Lebanon's marine resources and their sustainable use. ❑ Declaration of the National Marine Turtles Day on May 5 through CoM decision No. 29/2015. ❑ Preparation of the Strategic Environmental Assessment of the Petroleum Activities in Lebanese Waters. ❑ Preparation and publication in January 2015 of a report about Socio-Economic Evaluation of Maritime Activities in Lebanon by Plan Bleu. ❑ Establishment of the following two (2) marine Himas adopting a community based approach, through municipal decisions: Qoleileh and Mansouri.

CBD Thematic programme areas	National goal of the 1998 NBSAP	National objective of the 1998 NBSAP	National implementation activities/actions taken or outcomes
			National Legislation: ❑ Finalization in 2015 of a new draft framework law on fisheries and aquaculture by MoA. This law was submitted to the Parliament for endorsement. ❑ Development by MoE in 2015 of a draft law on ICZM ❑ The development in 2015 of two draft laws for the establishment of two new MPAs and their management plans: Ras El Chaqaa Cliff and Naqoura. ❑ Presentation by MoE to the Council of Ministers in 2015 of a draft decree classifying Raoucheh Rocks in Beirut and its surrounding marine & coastal area as a Natural Site. **International Treaties**: ❑ Issuance of decree No. 639/2014 authorizing the GoL to join the Protocol on Integrated Coastal Zone Management (ICZM) in the Mediterranean as a result of the amendments to the Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean. ❑ Presentation of a draft law authorizing the Government of Lebanon to join the Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean under Barcelona Convention (which is the amendment of the Protocol Concerning Specially Protected Areas that the Government of Lebanon has ratified through the Law No. 292 in 22/2/1994). **Strategies**: ❑ Preparation and publication of the National Marine Protected Areas Strategy (developed by MoE and IUCN in 2012). The strategy identified 14 candidate MPAs (9 marine & coastal sites: Naqoura, Sidon rocks, Raoucheh cliffs and caves, Beirut port outer platform, Byblos, Madfoun rocky area, Batroun Phoenician wall, Ras Al-Chaqaa cliffs and Enfeh peninsula, in addition to 5 estuaries), out of which three (3) are in process of declaration by MoE: two as MPAs and one as Nature Site.

CBD Thematic programme areas	National goal of the 1998 NBSAP	National objective of the 1998 NBSAP	National implementation activities/actions taken or outcomes
Biodiversity of inland waters	To conserve freshwater biodiversity, and manage and wise use freshwater resources sustainably	To save, use and study biodiversity in freshwater ecosystem	❑ Banning fishing all year round in all estuaries by MoA, the protected zone extends over 500m on each side of the estuary, 500 m inside the river and two kilometers seawards. All human activities are banned except those related to scientist and Coast Guards (MoA Decision No. 358/1 dated 26/1/1997). ❑ Preparation by MoA in 2015 of a new draft framework law on fisheries and aquaculture and its submission to the Parliament for endorsement. ❑ Preparation of the Strategic Environmental Assessment of the National Water Sector Strategy in collaboration with the Ministry of Energy and Water and presentation of the preliminary findings to the National Council for the Environment (NCE) in August 2014. ❑ Development by the MoE and UNDP in 2011 of a roadmap to combat pollution of the Qaraoun Lake, and progressing in the preparation of a loan agreement of USD 50 million with the World Bank to implement the first stage of the roadmap in collaboration with the concerned administrations. ❑ Approval of the draft law for "Allocating provisions for implementation of projects and land expropriation in the Litani river basin from its source to its estuary" by the "Budget and Finance" Parliamentary Committee. The Law is awaiting its final adoption by the Parliament. ❑ Completion of a draft proposal for a US$3.2 million grant from the Global Environment Facility for the sustainable management of the Litani River basin. The program is being implemented by the International Resources Group (IRG), in cooperation with the Litani River Authority (LRA), and is funded by USAID. ❑ The National Marine Protected Areas Strategy (developed by MoE and IUCN in 2012) identified 5 estuary sites among the 14 proposed MPAS (Litani estuary, Awalli estuary, Damour estuary, Nahr Ibrahim estuary, Arida estuary) ❑ Establishment of the following three (3) inland water Himas adopting a community based approach, through municipal decisions: Qaraoun, Kfar Zabad, and Anjar.
	To conserve biodiversity under natural conditions and establish a balanced ecosystem where plants and animals evolve naturally	Expand and manage the protected areas system in terrestrial, marine and freshwater environments	

CBD Thematic programme areas	National goal of the 1998 NBSAP	National objective of the 1998 NBSAP	National implementation activities/actions taken or outcomes
Terrestrial biodiversity including forests, dryland and sub-humid lands, and mountains	❑ To protect Lebanon's terrestrial biodiversity from degradation and ascertain their availability for environmental and economic benefits ❑ To conserve biodiversity under natural conditions and establish a balanced ecosystem where plants and animals evolve naturally	❑ To manage forests and ranges for productivity and sustainability ❑ Provide stability for the ecosystems to permit the establishment of ecological equilibrium ❑ Expand and manage the protected areas system in terrestrial, marine and freshwater environments	**Projects & activities:** ❑ Execution of the "National Reforestation Plan by MoE" funded by the Lebanese National Budget with an amount of US$16.67 million. Phase I (2002-2004) and Phase II (2004-2006) were done through sub-contracting private companies and Phase III (2010-2014) was done through direct contracts with the municipalities. ❑ Execution of the "Safeguarding and Restoring Lebanon's Woodland Resources" project by MoE. The project was implemented by UNDP and funded by GEF (2009-2014). In December 2014, a technical report that presents the results of 3 different sets of field trials implemented by the project in 8 pilot sites on different new reforestation techniques was issued. Given the current high costs of reforestation in Lebanon estimated at around US $7,000 per hectare (at a density of 800 seedlings/Ha), the main objective of the field trials was to assess the prospects of successful reforestation in Lebanon at low costs and possibly without irrigation. One of the most promising findings is that direct seeding without irrigation can be used in some situations at very low costs. ❑ Launching of the "40 million trees programme" by the GoL in December 2012. The 40 million trees programme is a national initiative steered by the MoA to plant 40 million forest trees in 70,000 ha of public lands within the next 20 years; aiming at increasing Lebanon's total green space to reach 20%. ❑ Launching of a multi-year program US$12 Million "Lebanon Reforestation Initiative (LRI)" in 2011 by the US Forest Service (USFS). To date this initiative mainly contributed in improving production practices in native trees' nurseries, planted about 545,000 seedlings (76% of the initiative's goal), adapted the Firewise system for community engagement in fire prevention, updated the vegetation map of Lebanon and created the first available online mapping, and enhanced the engagement of local communities in protecting, maintaining and replicating reforestation efforts. ❑ Execution of the "Mainstreaming Conservation of Migratory Soaring Birds into Key Productive Sectors" (MSB) project by MoE and UNDP with GEF funds (2010-2015). The overall project goal is to ensure that globally threatened and significant

CBD Thematic programme areas	National goal of the 1998 NBSAP	National objective of the 1998 NBSAP	National implementation activities/actions taken or outcomes
			populations of soaring birds that migrate along the Rift Valley/Red Sea flyway are effectively maintained. ❑ Pursuing activities led by the National Council for Quarries headed by the MoE for the organization of the sector including taking action to close illegal activities and inspecting sites where activities have ended in order to initiate their rehabilitation. ❑ Establishment of the Laboratory for Seed Germination and Conservation (LSGC) from the partnership between Jouzour Loubnan, a local NGO dedicated to forestation, and the Faculty of Science - Saint-Joseph University. The LSGC's main activities include: ▪ Seed conservation and germination of native plant species in order to support the regeneration and management of woodlands in the Lebanese mountains; ▪ Ecosystem restoration through the creation of micro-reserves in threatened areas that are particularly rich in biodiversity as well as reforestation in arid areas in order to combat the expansion of desertification especially in the north-eastern parts of Lebanon; and ▪ Development of the Lebanon e-flora database (http://www.lebanon-flora.org), which aims at providing easy access to Lebanese plant species, sharing data and research findings as well as serving as a discussion platform between plant experts. ❑ Conservation of threatened seeds of Lebanon in the Royal Botanic Garden Edinburgh (RBGE) as part of RBGE's International Conifer Conservation Programme. ❑ Assessment of the vulnerability and adaptation of Lebanon's forestry sector through the Second National Communication (2nd NC) Report to the United Nations Framework. ❑ Preparation and publication of the Birds Atlas, Birds Identification Manual, the Hunter's Field Guide, the guide for the hunting permit exam, the State of Lebanon Birds and IBAs, and the Field Guide to the Soaring Birds in Lebanon by the MSB project. ❑ Publication by the MoE of a statistical and analytical report on forest fires from the

CBD Thematic programme areas	National goal of the 1998 NBSAP	National objective of the 1998 NBSAP	National implementation activities/actions taken or outcomes
			year 2008 to the year 2014 in collaboration with the Biodiversity Program, Institute of the Environment at the University of Balamand, based on information filled by the ISF using the unified identification card for burnt areas form that was adopted by the Prime Minister through his notification no. 256/2008. ❑ Publication in 2015 of "Lebanon's National Blueprint for a Sustainable Forest Biomass: promoting renewable energy and forest stewardship" developed by the Biodiversity Program, Institute of the Environment, University of Balamand, Lebanon in partnership with the University of Lleida, Spain within the context of the UNDP/CEDRO project . ❑ Development of the first Natural Park Charter ("Charte Du Haut-Metn") (published in September 19, 2013) introducing the concept of Natural Parks to Lebanon and paving the way for the development of two other park charters (Jezzine and Akkar, Upper Dennieh, and Upper Hermel ❑ Conduction of an economic valuation of the Shouf Biosphere Reserve (SBR) in 2015. The study revealed that every $1 invested in the SBR returns about $19 of benefits to the region and the people. ❑ Ongoing efforts to establish three Plant Micro-Reserves (PMR) in Ehmej, Sarada and Baskinta. PMRs aim to preserve rare microhabitats and their characteristic plant species whose populations have a reduced distribution area within a defined region. In this regards, MoE has submitted to the CoM a draft Decree classifying the terrestrial site in Ehmej (containing the rare endemic flower *Iris sofrana*) as a Natural Site. ❑ Establishment of the following eleven (11) terrestrial Himas adopting a community based approach, through municipal decisions: Andqet, Menjez, Rouaime-Al-Maabour Al-Abyad, Kherbet Anafar, Ain Zebdeh, Fakiha, Charbine, Qaytouli, Roum, Ebel Es-Saqi, and Tarchich.. ❑ Organization through the MSB project of training workshops to the ISF, forest guards of MoA, the guards of nature reserves in 2011, 2012, 2013 and specifically to ISF in 2015 on the enforcement of the hunting law and the control of the

CBD Thematic programme areas	National goal of the 1998 NBSAP	National objective of the 1998 NBSAP	National implementation activities/actions taken or outcomes
			hunting violations and birds identification. **National Legislation:** ❑ Issuance of seven laws between 2010 and 2014 establishing each a new terrestrial nature reserve: Wadi Hojeir, Chnaniir, Beit Leef, Debl, Ramya, Kafra and Jaj Cedars, increasing the number of nature reserves in the country from eight to fifteen nature reserves. ❑ Preparation of draft law on forest fires and its submission by MoE to the Council of Ministers (COM) for approval and endorsement. ❑ Approval by the CoM of the draft Protected Areas Framework Law, and its transfer to the Parliament through Decree No. 8045 dated 25/4/2012. The draft law was discussed by the Parliamentary Committees which approved its latest amendments and is currently pending final endorsement. The Draft law defines a new categorization system for PAs which includes four categories: 1) Nature Reserve, 2) Natural Park, 3) Natural Site and Monument, and 4) Hima, and defines criteria for the establishment of each category. ❑ Approval by the CoM of a draft law for the establishment of the Dennieh Lazzab Nature Reserve, and its transfer to the Parliament through decree No. 92/2014 for adoption. ❑ Preparation of a draft national law to regulate access to Lebanese genetic resources and equitable sharing of benefits arising from their utilisation and submitting it to the CoM in order to be adopted as a national legislative mechanism for the implementation of the Nagoya Protocol on the national level. ❑ Approval by the CoM of the draft national decree on biosafety as per decision No. 53/2014. ❑ Issuance of a decree for an insurance policy against third-party risks arising from hunting activities, presented by the Ministries of Environment and Economy and Trade (Decree No. 11987/2014). ❑ Issuance of a decree classifying Jabal Moussa as a Natural Site (Decree No.

CBD Thematic programme areas	National goal of the 1998 NBSAP	National objective of the 1998 NBSAP	National implementation activities/actions taken or outcomes
			7494/2012). ❑ Issuance of a decree classifying the Grotto of Al Kassarat - Antelias as a Natural Site (Decree No. 11949/2014). ❑ Presentation to the CoM of a draft decree classifying a terrestrial site in Ehmej (containing the rare endemic flower *Iris sofrana*) as a Natural Site. ❑ Issuance in 2012 by the Minister of Environment after approval of the Higher Hunting Council (HCH), the following organizational decisions of the hunting law: ▪ Procedures for private and public land owners to submit a request to include their lands to the list of areas where hunting is not allowed(MoE Decision 236/1 of 2012); ▪ Procedures for selecting and defining the hunting clubs to be accredited by the MoE to run the hunting test (MoE Decision 71/1 of 2012); ▪ Procedures and conditions for conducting the hunting test (MoE Decision 212/1 of 2012); ▪ Procedures for obtaining the hunting license (MoE Decision 245/1 of 2012); and ▪ Procedures to grant the Nature Reserves rangers an authorization to control hunting violations in the surroundings of the nature reserves and issue fines to the violators (MoE Decision 199/1 of 2012). ❑ Issuance by the Minister of Finance based on the proposal of the Minister of Environment and the Higher Council for hunting, the following Decisions related to the hunting law: ▪ Defining the design and details of the hunting stamp (MoF Decision 900/1 of 2012); and ▪ Defining the hunting license fee (MoF Decision 901/1 of 2012). ❑ Approval by the HCH of the following draft organizational decisions for the Hunting

CBD Thematic programme areas	National goal of the 1998 NBSAP	National objective of the 1998 NBSAP	National implementation activities/actions taken or outcomes
			law defining: ▪ The hunting season from 15 September until the end of January; and ▪ The birds and animals species allowed to be hunted during the hunting season. The list is subject to change every season. **International Treaties:** ❑ Ratification of the CITES by the GoL through the law No. 233/2012. ❑ Presentation of a draft law authorizing the GoL to join the Arab Union for Protected Areas and approve its by-laws. ❑ Signature by the GoL of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization under the CBD on February 01, 2012 and issuance of decree No. 206/2014 transferring to the Parliament a draft law for the accession by the GoL to the Nagoya Protocol. ❑ Signature of a Memorandum of Understanding (MoU) on the Conservation of Migratory Soaring Birds (MSB) in Africa, Europe, and Asia (under the CMS Convention), based on the approval of the Council of Ministers (CoM) as per CoM decision No. 51/2014. **Strategies and Plans**: ❑ Preparation of the National Strategy on forest Fires Management and its adoption by the CoM through decision No. 52/2009. ❑ Development of the Lebanon Rural Tourism Strategy by the Ministry of Tourism in 2014. ❑ Finalization of the National Forest Programme (NFP) by MoA (2015-2025). The NFP has envisioned a strategy for protected forest in particular related to the implementation and enforcement of existing laws and regulations. The Ministry's objective is to meet the needs of the people as a priority while protecting forest

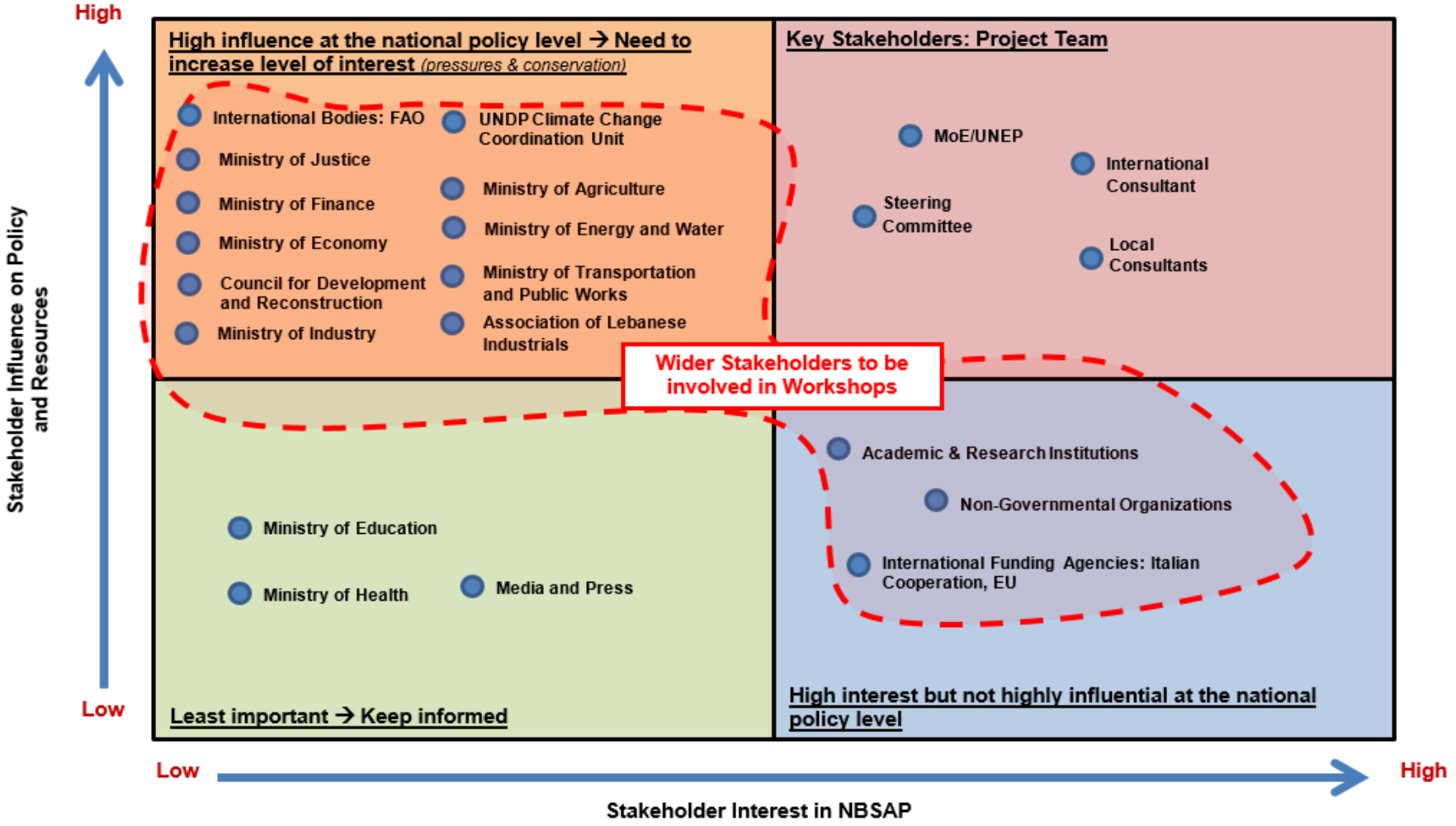
CBD Thematic programme areas	National goal of the 1998 NBSAP	National objective of the 1998 NBSAP	National implementation activities/actions taken or outcomes
			and ensuring their sustainability. The new NFP will guide and strengthen the Ministry's activities in the management and protection of forest across the country while keeping the needs of the people as a priority. ❑ Submission of a request by the MoE to the CoM to amend the master plan for quarries upon which a ministerial committee was appointed to develop a new master plan. ❑ In order to conserve birds along their migratory paths, the MoE has submitted a proposal to the Council for Development and Reconstruction (CDR) to include in the National Physical Master Plan of the Lebanese Territory (NPMPLT), which is the country's governing land use planning strategy, a new component: the sensitive birds' areas (IBAs and bottleneck areas). These areas shall be accounted for in future land use planning.
Island Biodiversity	*Lebanon has only a set of small islands, included in the Palms Islands Nature Reserve, so this thematic area is being addressed under Marine Biodiversity as a Marine Nature Reserve.*		

Cross-Cutting issues	National implementation activities/actions taken or outcomes
	❑ Adoption of a law appointing full-time environmental attorney generals and inspection judges (Law No. 251 dated 15/04/2014) in six governorates (Beirut, Mount Lebanon, the North, the South, the Bekaa, and Nabatieh) and in two governorates (Beirut and the South), respectively; as well as the publication of notice No. 1837 dated 09/10/2014 by the Ministry of Justice calling for environmental experts to join the roster of sworn experts at courts. ❑ Creation of the National Council for the Environment (NCE) through Decree no. 8157 dated 24/5/2012. The NCE is responsible for the review and approval of the proposed policies-work plans and for securing and approving required budgets. ❑ Endorsement of the National Physical Master Plan for the Lebanese Territory (NPMPLT) as a strategic development plan for the territory of Lebanon through Decree no. 2366 dated 20/6/2009. The NPMPLT includes green and blue networks

	for the protection and management of ecological hot spots and corridors ❑ Preparation of an amended version of the draft decree for the establishment of Environmental Police based on Law 251/2014, responding to the comments of the Ministries of Finance and Justice as well as to those of the Civil Service Board. ❑ Submittal by MoE to the Council of Ministers of a proposal for the preparation of a master plan for the protection of mountain peaks, natural areas, coastal zones, green spaces, and agricultural lands together with its specific Strategic Environmental Assessment. ❑ Signature of Memorandums of Cooperation between MoE and the various ministries in view of promoting environmental conservation and protection of natural resources in line with the principles of sustainable development. To date, Memorandums of Cooperation have been signed with the Ministry of Industry, the Ministry of Agriculture, the Office of the Minister of State for Administrative Reform, the Ministry of Information, the Ministry of Economy and Trade, the Ministry of Justice, the Ministry of Labour, the Ministry of Youth and Sports, the Ministry of Tourism, and the Ministry of Culture. ❑ Ratification and implementation of the Environmental Impact Assessment (EIA) Decree (Decree 8633/2012). ❑ Ratification and implementation of the Strategic Environmental Assessment (SEA) Decree (Decree 8213/2012), which is the first SEA enacted decree in the Middle East and North Africa Region. To date three SEAs have been conducted and published in Lebanon allowing the integration of environmental consideration into important national sectors: 1) SEA for Petroleum Activities in Lebanese Waters, 2) SEA for the New Water Sector Strategy for Lebanon, and 3) SEA for the Renewable Energy Sector. SEAs are currently being prepared in tandem with regional development plans. ❑ Issuance of the Environmental Compliance for Establishments Decree regulating all activities from classified establishments that may cause harmful pollution and environmental degradation (Decree 8471/2012).

APPENDIX IV - STAKEHOLDERS

Stakeholders interest influence matrix



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APPENDIX V -LIST OF SPECIES COMMON NAMES AND SCIENTIFIC NAMES MENTIONED IN THE REPORT

Common name	Scientific name
Lesser Crested Tern	*Sterna bengalensis*
Blue-Cheeked Bee-Eater	*Meropspersicus*
Madrone	*Arbutus*
St. John's Bread	*Ceratonia*
Atlas Pistache	*Pistacia*
Bishop Pine	*Pinus*
Black Oak	*Quercus*
Grecian Laurel	*Laurus*
Lebanon Cedar	*Cedruslibani*
Levantine Minnow	*Phoxinelluslibani*
Carp Family	*Cyprinidae*
Pupfish Family	*Cyprinodontidae*
True Loaches	*Cobitidae*
Stone Pine	*Pinuspinea*
Jackal	*Canisaureussyriacus*
Fox	*Vulpesvulpespalaestina*
Stone Marten	*Martesfoina*
Otter	*Lutralutra*
Golden Wreath Wattle	*Acacia saligna*

APPENDIX VI -SITES OF NATURAL AND/OR ECOLOGICAL IMPORTANCE IN NEED FOR NATIONAL PROTECTION

Site of natural and/or ecological importance in need for protection	Location
Ammiq wetland	Bekaa Mohafazat
Al Rwaess grotto	Mount Lebanon Mohafzat – Jbeil Caza
Afqa grotto	Mount Lebanon Mohafzat – Jbeil Caza
Ain Labne grotto	Mount Lebanon Mohafzat – Jbeil Caza
Salem grotto	Mount Lebanon Mohafzat – Kesrouan Caza
Al Tarash grotto	Mount Lebanon Mohafzat – Kesrouan Caza
Kfarhim grotto	Mount Lebanon Mohafzat – Shouf Caza
Dahr El Ain grotto	North Lebanon Mohafazat
Al Rahwa Spring grotto	North Lebanon Mohafazat – Batroun Caza
Zoud grotto	North Lebanon Mohafazat
Al Motran grotto	North Lebanon Mohafazat
Al Hawa grotto	North Lebanon Mohafazat
Al Shatawi spring grotto	South Lebanon Mohafazat
Al Rihan grotto	South Lebanon Mohafazat – Jezzine Caza
DeirAmess grotto	South Lebanon Mohafazat – Bent Jbeil Caza
Haris grotto	South Lebanon Mohafazat – Bent Jbeil Caza
Debl Grotto	South Lebanon Mohafazat – Bent Jbeil Caza
Jeita grotto	Mount Lebanon Mohafazat – Kesrouan Caza
KateenAzar Hole (Tarshish)	Mount Lebanon Mohafazat – North Metncaza
Fawar Dara Hole (Tarshish)	Mount Lebanon Mohafazat – North Metncaza
Meshemshiyit Hole (Tarshish)	Mount Lebanon Mohafazat – North Metncaza
Al Badwiyi Hole	Mount Lebanon Mohafazat – Kesrouan Caza
Al Abed Hole (Tannourine)	North Lebanon Mohafazat – Batroun Caza
Al Kadaha Hole (Tannourine)	North Lebanon Mohafazat – Batroun Caza
Osman Al Ramhi Hole	North Lebanon Mohafazat
Smokhaya Sinkhole (Rmeich)	South Lebanon Mohafazat – Bent Jbeil Caza
Katmeen Sinkhole (Rmeich)	South Lebanon Mohafazat – Bent Jbeil Caza

Site of natural and/or ecological importance in need for protection	Location
Al Laqlouq Natural Bridge	North Lebanon Mohafazat – Batroun Caza
Sites with Calcerous- Karstic rocks ex. Faytroun and Rayfoun in Kesrouan; Douma in Batroun	-
Al Qellé Forest (Akkar)	North Lebanon Mohafazat – Akkar Caza
Al Ozor (Fneidek)	North Lebanon Mohafazat – Akkar Caza
Bshaalé Olives	North Lebanon Mohafazat – Batroun Caza
Sir Doniyeh Valley	North Lebanon Mohafazat – Doniyi Caza
Sheikh Zenadwetland	North Lebanon Mohafazat
Al Sheikh Mountain - Hermoun	Mount Lebanon Mohafazat – Rashaya Caza
Al Rihan Mountain	South Lebanon Mohafazat – Jezzine Caza
Al Kneisse Mountain (Sinkholes and dollines)	-
Sanine Mountain	-
Black Summit	North Lebanon Mohafazat – between Dah Sogrine and Bscharre
Sandy beach between Al Abassiyé – Al Mansouri (South of Litani)	South Lebanon Mohafazat
Litani Stream	Bekaa Mohafazat -South Lebanon Mohafazat

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