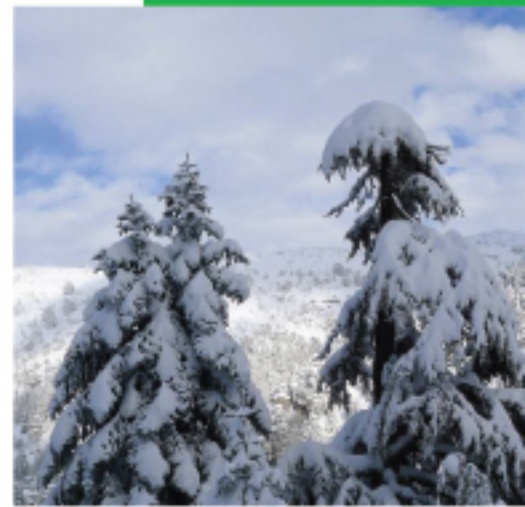


2016

*Lebanon's
National Biodiversity
Strategy and Action Plan*



Lebanon's
National Biodiversity
Strategy and Action Plan



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LIST OF ACRONYMS

ABS	Access and Benefit Sharing
AECID	Spanish agency for International Cooperation and Development
AF	Adaptation Fund
AFDC	Association for Forest Development and Conservation (National NGO)
AFED	Arab Forum for Environment and Development
AFESD	Arab Fund for Economic and Social Development
ALI	Association of Lebanese Industrialists
APJM	Association for the Protection of Jabal Moussa
ATV	All-Terrain Vehicle
AUB	American University of Beirut
BAU	Beirut Arab University
BCH	Biosafety Clearing House
BCS	Biodiversity Country Study
BIOFIN	Biodiversity Finance Initiative
BMZ	German Federal Ministry for Economic Cooperation and Development
CAS	Central Administration of Statistics
CBD	Convention on Biological Diversity
CBNRM	Community Based Natural Resources Management
CDR	Council for Development and Reconstruction
CEPA	Communication, Education and Public Awareness
CEPF	Critical Ecosystem Partnership Fund
CHM	Clearing House Mechanism
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CNRS	Centre National de la Recherche Scientifique
CoM	Council of Ministers
CSR	Corporate Social Responsibility
CTI	Climate Technology Initiative
DAI	Development Alternatives Incorporated
DGA	Directorate General of Antiquities

DGUP	Directorate General of Urban Planning
EIA	Environmental Impact Assessment
EIB	European Investment Bank
ELARD	Earth Link and Advanced Resources Development
EU	European Union
FAO	Food and Agriculture Organization
FAOSTAT	Food and Agriculture Organization Statistics Division
FFEM	Fonds Français pour l'Environnement Mondial
FSAA	Faculté des Sciences Agronomiques et Alimentaires
GCF	Green Climate Fund
GEEREF	Global Energy Efficiency and Renewable Energy Fund
GEF	Global Environment Facility
GFDRR	Global Facility for Disaster Reduction and Recovery
GFN	Global Footprint Network
GHA	Global Hectare
GHG	Greenhouse Gases
GIS	Geographical Information System
HCH	Higher Council for Hunting
IAS	Invasive Alien Species
IBA	Important Bird Area
ICARDA	International Center for Agricultural Research in the Dry Area
ICT	Information and Communications Technology
IDRC	International Development Research Center CANADA
IEE	Initial Environmental Examination
IFC	International Finance Corporation
IPM	Integrated Pest Management
ISF	Internal Security Forces
IT	Information Technology
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
IUCN	International Union for Conservation of Nature
IWRM	Integrated Water Resource Management
JICA	Japan International Cooperation Agency
LARI	Lebanese Agricultural Research Institute

LEF	Lebanese Environment Forum
LIVCD	Lebanon Industry Value Chain Development
LMOs	Living Modified Organisms
LPA	Lebanese Petroleum Administration
LU	Lebanese University
LULC	Land Use/Land Cover
MAB	Man and the Biosphere
MDG	Millennium Development Goal
MEU	Middle East University
MIF	Mediterranean Investment Facility
MoA	Ministry of Agriculture
MoC	Ministry of Culture
MoE	Ministry of Environment
MoEHE	Ministry of Education and Higher Education
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
MoSA	Ministry of Social Affairs
MoT	Ministry of Tourism
MoPWT	Ministry of Public Works and Transport
MPA	Marine Protected Area
MT	Metric Ton
NBSAP	National Biodiversity Strategy and Action Plan
NCE	National Council for Environment
NEF	National Environmental Fund
NEFCO	Nordic Environment Finance Corporation
NGO	Non-Governmental Organization
Norad	Norwegian Agency for Development Cooperation
NPMPLT	National Physical Master Plan for The Lebanese Territory

NR	National Report
ODA	Overseas Development Assistance
OFID	OPIC Fund for International Development
OMSAR	Office of the Minister of State for Administrative Reform
OWL	Other Wooded Land
PA	Protected Area
PFAN	Private Financing Advisory Network
PINR	Palm Island Nature Reserve
PPIAF	Public Private Infrastructure Advisory Facility
QHSE	Quality Health Safety Environment
RAC/SPA	Regional Activity Center for Specially Protected Areas
RVOs	Remote Operating Vehicles
SCCF	Special Climate Change Fund
SDGs	Sustainable Development Goals
SEA	Strategic Environmental Assessment
SEPASAL	Survey of Economic Plants for Arid and Semi-Arid Lands
SIDA	Swedish International Development Cooperation Agency
SISPAM	Stable Institutional Structure for Protected Areas Management
SISSAF	Support Programme for Infrastructure Sector Strategies and Alternative Financing
SMART	Specific, Measurable, Achievable, Realistic, Time-Bound
SMS	Short Message Service
SOER	State of the Environment Report
SPA	Specially Protected Area
SPAMI	Specially Protected Area of Mediterranean Importance
STIP	Science Technology and Innovation Policy
TEEB	The Economics of Ecosystems and Biodiversity
TV	Television
UK-ICF	United Kingdom-International Climate Fund
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UN-ESCWA	United Nations Economic and Social Commission for Western Asia

UNFCCC	United Nations Framework Convention on Climate Change
UNHCR	United Nations High Commissioner for Refugees
UNIDO	United Nations Industrial Development Organization
UNU-INWEH	United Nations University-Institute of Water, Environment and Health
UoB	University of Balamand
USAID	United States Agency for International Development
USD	United States Dollar
USEK	Université Saint Esprit De Kaslik
USEPA	United States Environmental Protection Agency
USJ	Université Saint Joseph
WB	World Bank

EXECUTIVE SUMMARY

Lebanon's National Biodiversity and Action Plan (NBSAP) 2016-2030 addresses Lebanon's obligations under Article 6a of the Convention on Biological Diversity (CBD) and is an update of the country's first NBSAP issued in 1998. The revised NBSAP was aligned with the new CBD strategic goals and integrated the 2020 Aichi Biodiversity Targets while taking into consideration both global and local needs and aspirations, as well as reflecting Lebanon's

specific realm and the current existing professional capacities and awareness levels. One of the main objectives of the NBSAP is to mainstream biodiversity into sectoral and cross-sectoral strategies, plans and programmes. The NBSAP has been prepared through an interactive process of stakeholder consultation and approval translated into five workshops and several steering committee meetings.

Chapter 1 presents an overview of the status of biodiversity in Lebanon, its importance, the main threats it is facing along with their causes and consequences.

There are 9,116 known species in Lebanon, including both fauna (4,486 species) and flora (around 4,630 species) (BCS-MOA/UNEP/GEF, 1996). 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.

For the purpose of protecting natural habitats, and endemic and endangered species, Lebanon has declared fifteen nature reserves of which only six have management plans. Nature reserves occupy around 2.7% of the country's area and incorporate a rich biodiversity. Moreover, some sites are recognized by international entities and conventions; i.e. World Heritage Sites by UNESCO, Ramsar sites under the Ramsar Convention, Important Bird Areas (IBAs) by BirdLife International, and Specially Protected Areas of Mediterranean Importance (SPAMI) under the SPA and Biodiversity Protocol.

Biodiversity provides services that are critical to human well-being and economic prosperity. Those include: (i) regulating services (i.e. climate regulation), (ii) provisioning services (i.e. food security), cultural services (i.e. water sports) and (iii) supporting services (i.e. nutrient cycles and crop pollination).

Lebanon's total biocapacity reached 1.6 million gha in 2008 (Arab Forum for Environment and Development, 2012). This value is much less



than its total ecological footprint of 11.9 million gha for the same year; showing an unsustainable management of natural resources.

Lebanon's biodiversity is facing various threats, namely; (i) habitat loss and fragmentation, (ii) unsustainable exploitation of natural resources, (iii) pollution, (iv) invasive species, (v) introduction of new improved varieties (agro-

biodiversity), and (vi) climate change. Those threats 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.).

Chapter 2 sets out the NBSAP pillars: Vision, Priority Areas, Targets, and Actions.

Lebanon's vision for biodiversity adopted in the NBSAP is the following:

“By 2030, Lebanon’s biodiversity is valued and sustainably managed for the preservation and conservation of its ecosystems and habitats and the 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.”

This Vision sets a significant challenge for Lebanon in taking the appropriate measures to halt the decline in biodiversity; these measures are presented under thirteen **(13) Priority Areas**: (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) Communication, Education and Public Awareness, (9) Mainstreaming Biodiversity into National and Sub-National Policies and Plans, (10) Climate Change, (11) Research and Knowledge Transfer, (12) Institutional and Legal Framework, and (13) Resource Mobilization.

The Action Plan to reach the Vision includes **18 National Targets** and their respective **91 National Actions**. The national targets reflect the identified priority areas and are based on

the result of the review of the past NBSAP guided by the Aichi Biodiversity Targets. Progress towards the identified national targets entailed the development of the 91 national actions (institutional, technical, legislative, economic or other policy actions); which consist of a continuation of existing programs and practices and include new initiatives based on altering circumstances and evolving science.



Chapter 3 highlights the main NBSAP implementation components.



The endorsement of the NBSAP in the form of a Council of Ministers Decree is a crucial step in its implementation.

The National Council of Environment (NCE) established through Decree No. 8157 of 2012, headed by the MoE and including representatives of the relevant government institutions, academic sector, private sector and environmental NGOs, has been identified as the most suitable entity to adopt the Strategy and mainstream it into the works of the various entities in the country.

This chapter presents the NBSAP's capacity development plan which identifies key capacity building areas in terms of human and technology resources and defines three levels of work: systemic capacity development, institutional capacity development, and individual capacity development.

The financial needs for the implementation of the NBSAP have been estimated in the order of 40 million USD. To meet these needs a resource mobilisation plan covering national sources, international sources, and new funding opportunities is developed.

Improving public access to knowledge through sharing and clear communication of data is an integral part of the NBSAP; therefore a communication and outreach plan is introduced. The plan covers all aspects of communication and outreach from planning, to defining target groups, goals, expected outcomes, activities, and messages as well as monitoring procedures to measure the effectiveness of the plan. The Clearing House Mechanism (CHM), created under the CBD global CHM website (<http://www.biodiv.be/liban>), will serve as the main instrument for periodic updates, including electronic alerts mailed out widely

As part of the monitoring and evaluation process, impact indicators were developed for each target; a total of 98 indicators are presented along with their availability/need for establishment, frequency of monitoring, and source. Monitoring and evaluation will aid in assessing the extent of implementation of the updated NBSAP, areas of success, and areas requiring additional effort.



CHAPTER 1
LEBANON'S BIODIVERSITY:
WHAT ARE THE STAKES

1.1 Status of Biodiversity in Lebanon: an Overview

1.1.1 An Important Diversity

According to the United Nations Convention on Biological Diversity (CBD), biological diversity, generally shortened to 'biodiversity', is "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems".

Lebanon has a very rich and unique biodiversity mainly due to its biogeography, geology, ecology and historic human settlements in the Mediterranean area. According to the Critical Ecosystem Partnership Fund (CEPF), the Mediterranean area is considered to be a true biodiversity "hotspot" and globally ranks third among hotspots in plant diversity and endemism after the Tropical Andes and Sundaland (Figure 1.1)

There are 9,116 known species in Lebanon, including both fauna (4,486 species) and flora (around 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 with a shoreline length of about 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

Kornet Es-Saouda in the north. It extends over 160 km long and is 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 (Tallat Moussa). 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. Lebanon has a high percentage (12%) of endemic terrestrial and marine plant species (SOER, 2011).

Table 1.1 presents the recorded 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/km² 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/km² and South Africa's species-area ratio is 0.0081/km²). The fauna species-area ratio in Lebanon is also considered high and reaches 0.028 species/km² compared to neighbouring countries (e.g. Syria with 0.019 species/km²) (SOER, 2011).

Figure 1.1 Lebanon in the Mediterranean Area



Source: www.cepf.net

Table 1.1 Species Richness in Lebanon

Taxon	Number of described species in Lebanon	Reference for species number
Freshwater	610	BCS, 1996
Reptiles	54	Hraoui <i>et al.</i> , 2002
Birds	395	Ramadan-Jaradi <i>et al.</i> , 2008
Marine Fish	367	BCS, 1996
Mammals	59	Ramadan-Jaradi <i>et al.</i> , 2008
Terrestrial Plants	3,790	BCS, 1996
Invertebrates	3,835	BCS, 1996
Amphibians	6	Hraoui <i>et al.</i> , 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, 2011). 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. 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). Lebanon encompasses important components of the Mediterranean vegetation (Madrone, St. John's Bread; Palestine Pistachio; Brutia, Aleppo and Stone Pine; Black and Palestine Oak; and Laurel) which are relicts from the ancient forests that dominated the Mediterranean Basin two million years ago. The 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. Lebanon is accordingly known for its forests which occupy 13% of the territory while Other Wooded Land (OWL) covers 10% (FAO, 2010). About 65% of

the total canopy coverage is considered dense (LULC, 1998) with the highest concentrations found in Mount Lebanon (37%) and North Lebanon (30%), 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%¹ (MoE, 2012).

Analyses show that 46% of faunal species are terrestrial and that seven mammal species are already extinct, 31% of the existing mammals are rare, 20% vulnerable and 7.5% are close to extinction species (BCS, 1996).

In terms of avifauna, Lebanon has recorded 394 species, out of which two (Lesser Crested Tern and Blue-Cheeked Bee-Eater) are extirpated from Lebanon, 6.3% are threatened and 32% are rare (MoE, 2015).

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, 2011). This phenomenon can be explained by various historical, ecological and paleo-geographical factors. The Lebanese coastal and marine flora is mainly characterized

as Mediterranean while having some subtropical features.

In a study conducted recently by the University of British Columbia and the University of Balamand in Lebanon, the historical fish catch reconstruction was done for Lebanon from 1950 till 2010. It is calculated that 7,100 tons of fish were caught in 2010 (Nader, 2014).

¹ Percentages are calculated based on data from the Ministry of Agriculture (2003) and FAO (2005)

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 in fresh water represent just 6% of the total flora species in Lebanon. Five percent of the country's freshwater fauna are

threatened and 1.3% endemic (BCS, 1996). The only endemic freshwater fish to Lebanon, Levantine Minnow, was considered extinct in the country (BCS, 1996) but later it has been observed at least in Yammouneh Lake, Litani River and Qaraoun Lake (El Zein, 2002). Many have been extirpated from certain river systems due to overfishing.

1.1.2 National Protected Areas

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

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

The current PAs in Lebanon are divided into three categories:

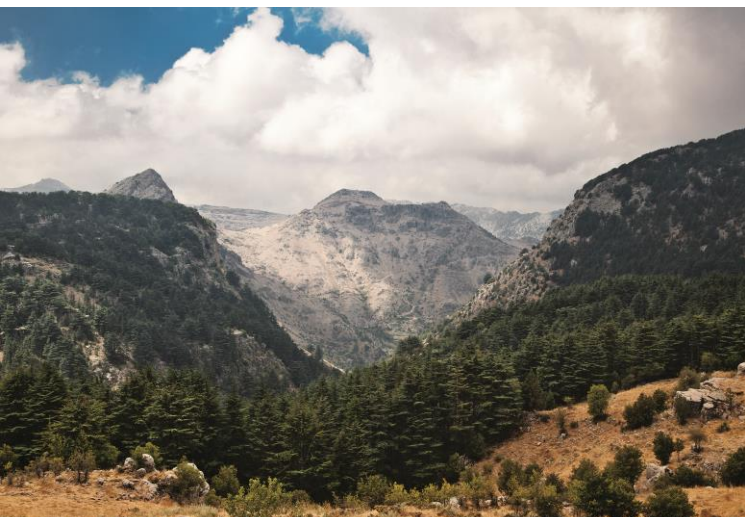
1. Nature Reserves established by law since 1992 (refer to Table 1.2 and Figure 1.2);
2. Nature sites under the protection of MoE and established by MoE decisions or decrees based on MoE proposals on the basis of the law of protection of natural sites (08/07/1939) (refer to Table 1.3); and
3. Protected forests established by MoA decision before 1996 based on the Law of Protection of Forests Wealth (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 (MoE, 2015); these sites are listed in Table 1.4.

Moreover, some sites are recognized by international entities and conventions; i.e. World Heritage Sites by UNESCO, Ramsar sites under the Ramsar Convention, Important Bird Areas (IBAs) by BirdLife International, and Specially Protected Areas of Mediterranean Importance (SPAMI) under the SPA and Biodiversity Protocol (refer to section 1.1.3).





In order to 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's 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 their related 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 human wellbeing (Saleh, 2011). A Hima is under the supervision of the municipality, the union of municipalities or the Qaimaqam² in the case of villages where there are no municipalities.

The draft Protected Areas Framework Law was approved by the CoM in 2012 and transferred to the Parliament through Decree No. 8045 dated 25/4/2012 and was discussed by the Parliamentary Committees which approved its latest amendments. The draft law is currently still pending final endorsement. The draft application Decree that was consequently developed is under review and sets the legal framework for the various categories of PAs including objectives, classification, management, and financing mechanisms.

"Nature Reserves" is the most well-established, managed, and studied form of PAs in the country. For the purpose of protecting natural habitats as well as endemic and endangered

² 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.

species, Lebanon has declared fifteen nature reserves (Table 1.2). Reserves are created through legislative texts defining their geographical borders, objectives, restricted 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 six out of the 15 reserves have management plans.

Nature Reserves occupy around 2.7% of the country's area (Table 1.2) 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 also constitute a crucial component in local and rural development, through the influx of visitors who contribute, via ecotourism, to 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 on-going 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 the many examples are the activities of the Association for the Protection of Jabal Moussa (APJM) related to the Jabal Moussa Biosphere Reserve; the APJM published a book for children entitled 'Tabsoun Tabsoun' as well as books for adults including '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 150 published articles about Jabal Moussa Biosphere Reserve. 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.

Figure 1.2 Nature Reserves in Lebanon

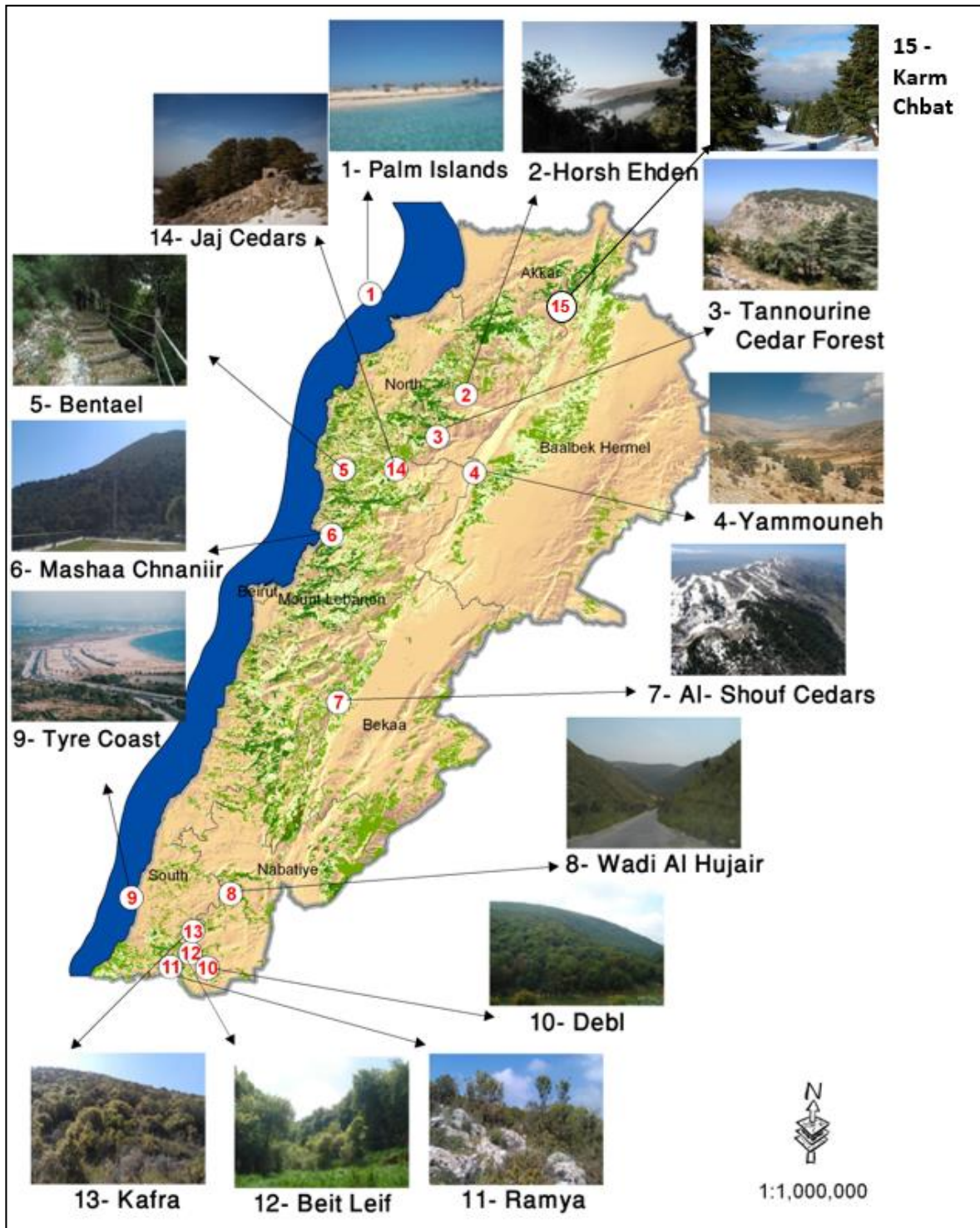


Table 1.2 Nature Reserves in Lebanon

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 (The three islands with 500m. of surrounding water)	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	<i>None</i>	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	<i>None</i>	No
Tannourine Cedars 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	<i>None</i>	No
Mashaa Chnaniir	Law 122	July 29, 2010	27	500 – 530	<i>None</i>	No
Kafra	Law 198	November 18, 2011	40	~650	<i>None</i>	No
Ramya	Law 199	November 18, 2011	20	~650	<i>None</i>	No
Debl	Law 200	November 18, 2011	25	~600	<i>None</i>	No
Beit Leef	Law 201	November 18, 2011	20	~550	<i>None</i>	No
Jaj Cedars	Law 257	April 15, 2014	20	~1,650	<i>None</i>	No

Source: MoE, 2015



Table 1.3 Nature Sites under the Protection of the 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
13	Decision 19	2002	Al Qammoua 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	Jabal Moussa	Kesrouan
18	Decree 11949	2014	Kassarot Grotto	Metn

Source: MoE, 2015

Table 1.4 Sites in Need of National Protection

Site of Natural and/or Ecological Importance in Need for Protection	
<p><u>Wetlands:</u></p> <ol style="list-style-type: none"> 1. Ammiq wetland 2. Cheikh Zennad wetland 	<p><u>Natural Bridges and Rocks:</u></p> <ol style="list-style-type: none"> 1. Al Laqlouq Natural Bridge 2. Sites with Calcerous- Karstic rocks ex. Faytroun and Rayfoun in Kesrouan; Douma in Batroun
<p><u>Grottos:</u></p> <ol style="list-style-type: none"> 1. Al Rwaess grotto 2. Afqa grotto 3. Ain Labne grotto 4. Salem grotto 5. Al Tarash grotto 6. Kfarhim grotto 7. Dahr El Ain grotto 8. Al Rahwa Spring grotto 9. Zoud grotto 10. Al Motran grotto 11. Al Hawa grotto 12. AlShatawi spring grotto 13. Al Rihan grotto 14. Deir Amess grotto 15. Haris grotto 16. Debl grotto 17. Jeita grotto 	<p><u>Trees, Forests, and Valleys:</u></p> <ol style="list-style-type: none"> 1. Al Qellé Forest (Akkar) 2. Al Azer Forest (Fneidek) 3. Bshaalé Olives 4. Sir Doniyeh Valley
	<p><u>Rivers, coastal and marine areas:</u></p> <ol style="list-style-type: none"> 1. Sandy beach between Al Abassiyé and Al Mansouri (South of Litani) 2. Litani Stream
	<p><u>Holes:</u></p> <ol style="list-style-type: none"> 1. Kateen Azar Hole (Tarshish) 2. Fawar Dara Hole (Tarshish) 3. Meshemshiyit Hole (Tarshish) 4. Al Badwiyi Hole 5. Katmeen Sinkhole (Rmeich) 6. Al Abed Hole (Tannourine) 7. Al Kadaha Hole (Tannourine) 8. Osman AlRamhi Hole 9. Smokhaya Sinkhole (Rmeich)
<p><u>Mountain Tops:</u></p> <ol style="list-style-type: none"> 1. Al Sheikh Mountain – Hermoun 2. Al Rihan Mountain 3. Al Kneisse Mountain (Sinkholes and dollines) 4. Sanine Mountain 5. Black Summit 	

Source: MoE, 2015

1.1.3 Internationally Recognized Areas

On a global scale, 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 Al Rihane Biosphere Reserve (2007); and
- The Jabal Moussa Biosphere Reserve (2008).

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

Four Ramsar sites are recognized in Lebanon under the Ramsar Convention on Wetlands of International Importance:

- 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, the fifteen sites listed below are defined as Important Bird Areas (IBAs) by Birdlife International and are illustrated in Figure 1.3:

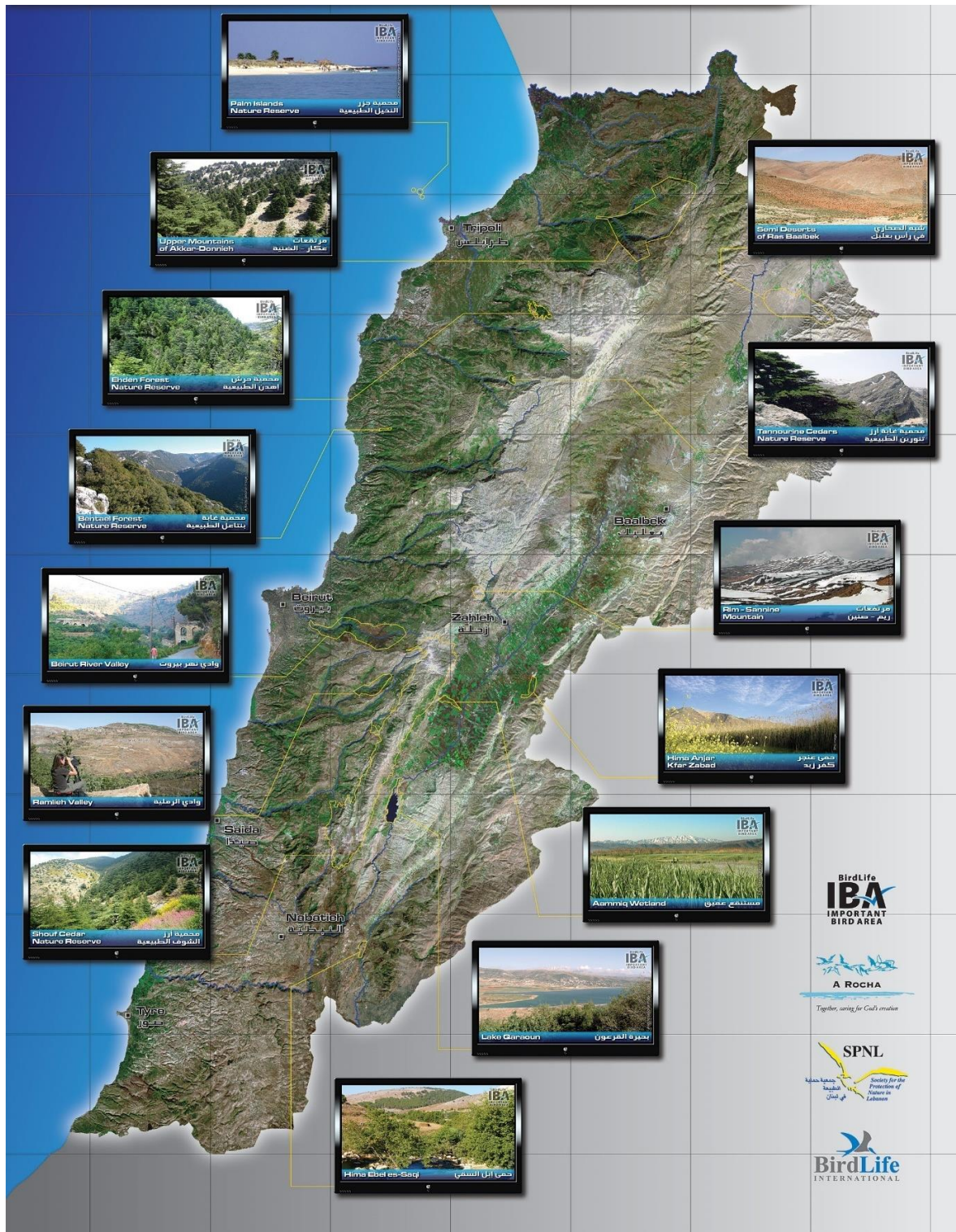
1. Horsh Ehden Nature Reserve
2. Palm Islands Nature Reserve
3. Aamiq Wetland
4. A-Shouf Cedar Nature Reserve
5. Hima Anjar / Kfar Zabad
6. Lake Qaraoun
7. Riim / Sannine Mountain
8. Bentael Nature Reserve
9. Tannourine Cedars Nature Reserve
10. Hima Ebel es-Saqi
11. Semi Deserts of Ras Baalbek
12. Beirut 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 Specially Protected Areas (SPA) and Biodiversity Protocol:

- Tyre Coast Nature Reserve; and
- Palm Islands Nature Reserve.



Figure 1.3 Important Bird Areas in Lebanon



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

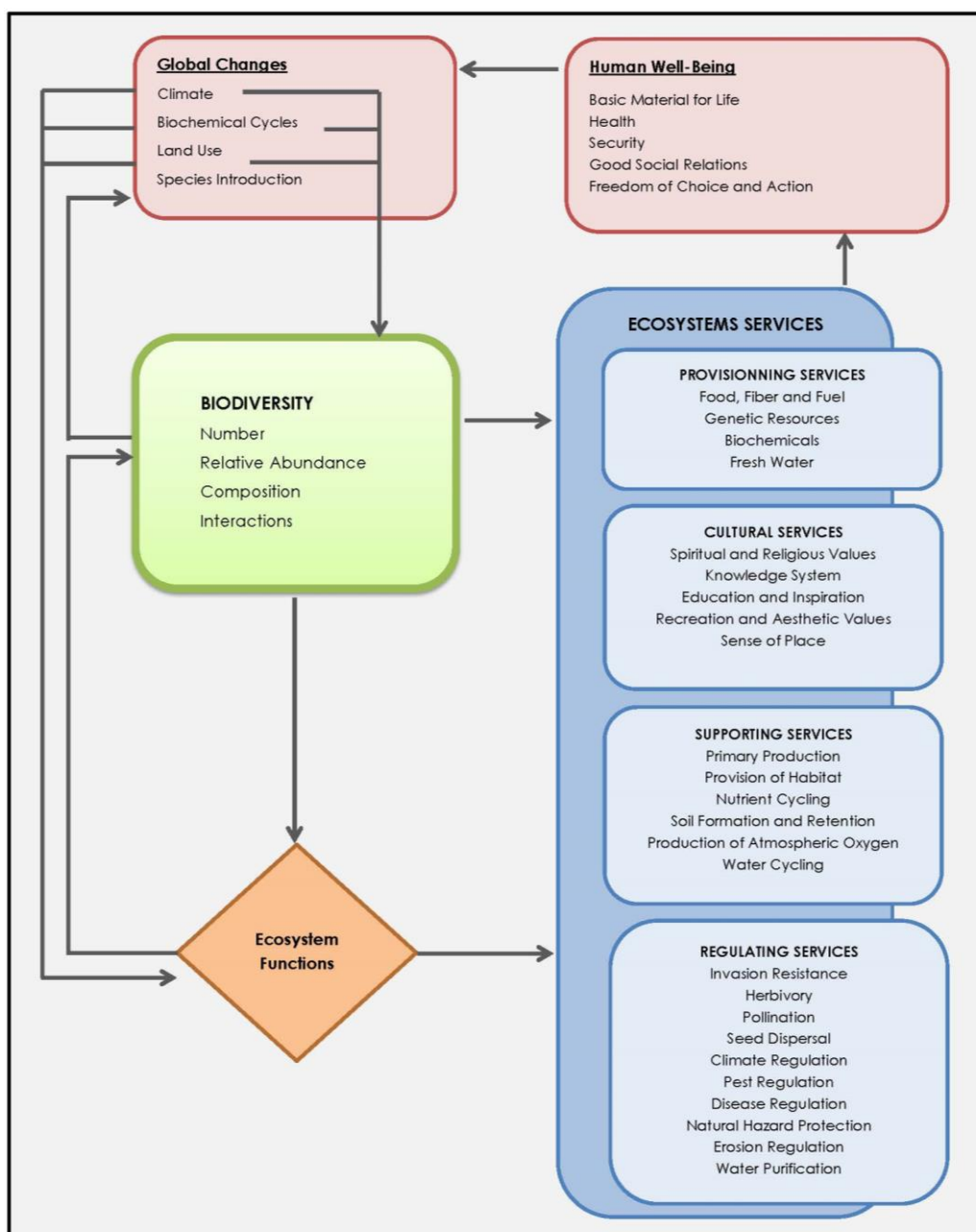
1.2 Importance of Biodiversity Conservation and Sustainable Use

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.

Figure 1.4 illustrates how biodiversity is linked, via ecosystem functions and services, to our physical, social and economic well-being.

Figure 1.4 Overview of Human-Ecosystem Interactions



Source: Adapted from Millennium Ecosystem Assessment (2005)

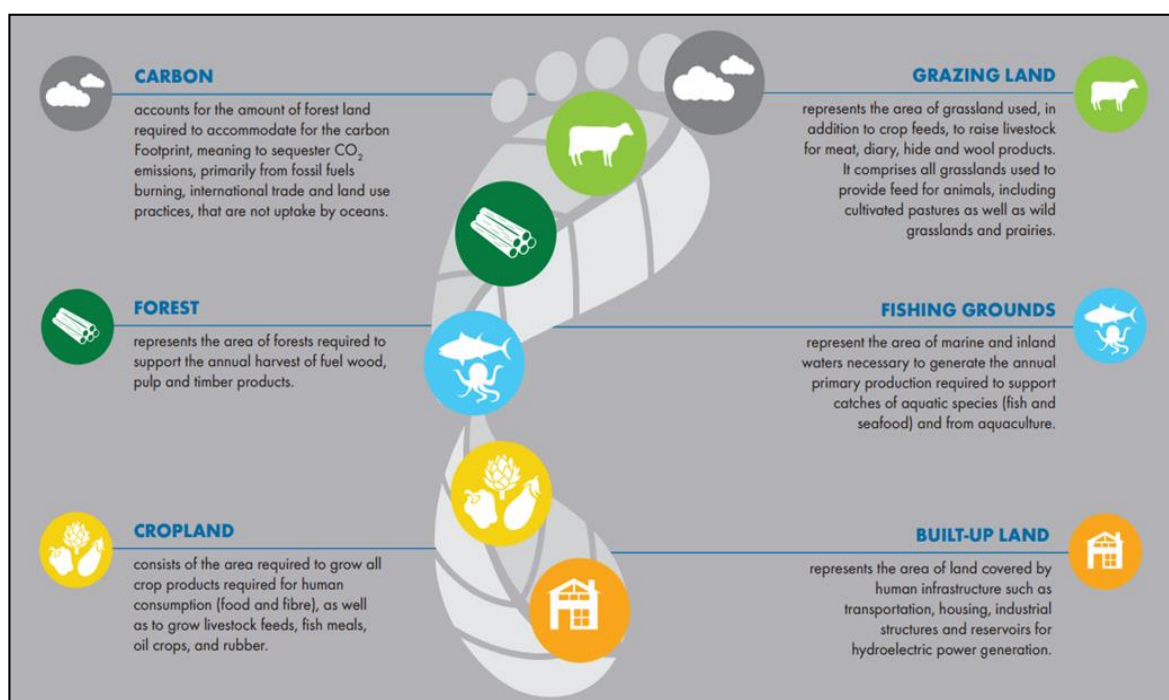
1.2.1 Lebanon's Ecological Footprint and Biocapacity: Indicators of Unsustainability

Ecological footprint and biocapacity are two concepts developed by the Global Footprint Network (GFN) to provide a common basis on which to compare the biological capability of the environment to provide food and other essential needs versus the demands placed by human communities on these ecological services.

Both ecological footprint and biocapacity are expressed in a globally comparable, standardized unit called a 'global hectare' (gha) which corresponds to a hectare of biologically

productive land or sea area with world average bioproductivity in a given year (Figure 1.5). If the ecological footprint of a human population exceeds the biocapacity of its environment, the situation is unsustainable. These two indicators show a clear trend over the past 50 years: more and more countries are becoming ecological debtors. In 2008, 83% of the world population lived in countries that demanded more than what their local ecosystems could renew (Global Footprint Network, 2011).

Figure 1.5 Ecological Footprint Components



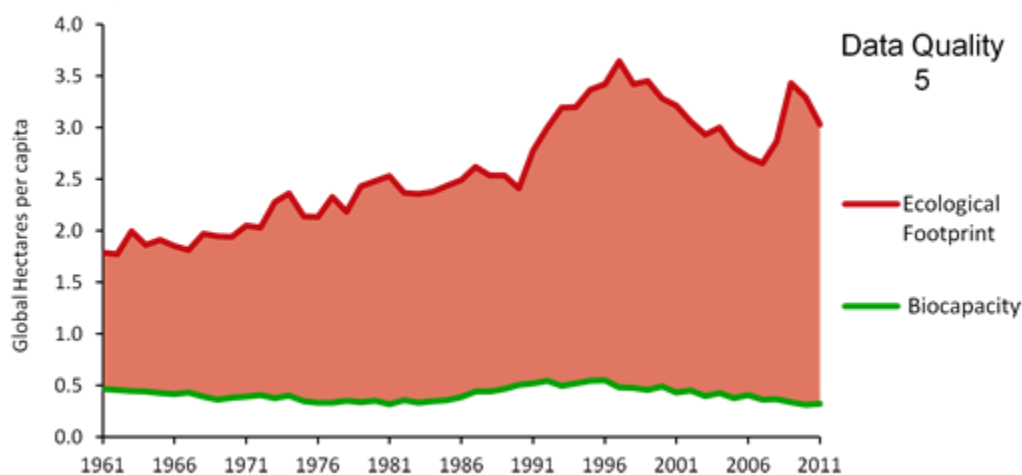
Source: Global Footprint Network (2011)

Based on variations between average regional yields for cropland, grazing land, forest and fisheries as compared with corresponding global yields; Lebanon's total biocapacity reached 1.6 million gha in 2008. This value is much less than its total ecological footprint of 11.9 million gha for the same year; showing an unsustainable use of natural resources.

Figure 1.6 shows Lebanon's ecological footprint and biocapacity per capita between 1961 and 2011. The red area indicates biocapacity deficit, in gha per capita, where the

demand for resources, in aggregate, exceeds Lebanon's ecological capacity to meet this demand. Nevertheless, the inequality in consumption patterns indicates that a large number of inhabitants fail to meet basic food, shelter, health and sanitation needs. For the purpose of achieving livelihood improvements, a larger number of Lebanon's population must have greater access to natural resources through a significant improvement of resource efficiency and expansion of biocapacity without resource intensive production.

Figure 1.6 Lebanon's Ecological Footprint and Biocapacity (per capita, 1961-2011)



Source: Global Footprint Network ³

1.2.2 Ecosystem Services

Figure 1.7 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.

³ This graph has been prepared by the Global Footprint Network based on UN statistical results with a data quality index 5 indicating "reasonably reliable" results.

Figure 1.7 Important Ecosystem Services in Lebanon

Regulating Services	Provisioning Services	Cultural Services	Supporting Services
<ul style="list-style-type: none"> • Protection against natural disasters (floods, storms, drought etc.) • Health (disturbances to ecosystem functioning can influence in various ways the transmission of diseases to humans) • Water filtration • Climate regulation 	<ul style="list-style-type: none"> • Food security (fish, crops and edible plants, livestock, etc.) • Health: medicines • Source of various kinds of revenue (agriculture, forestry, industrial processes, etc.) • Provision of shelter for humans • Energy sources • Provision of drinkable water • Building material • Ornamental 	<ul style="list-style-type: none"> • Recreation/ beach-resort • Water sports (diving, canoeing, rafting, etc.) • Spiritual well-being • Cultural identity • Intrinsic value/ aesthetic • Group activities (hiking, camping, etc.) 	<ul style="list-style-type: none"> • Nutrient cycles and crop pollination

1.2.2.1 Agricultural Lands

Agricultural lands provide resources for both agricultural and industrial crops and are used for grazing as well. 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 of 30 to 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 (primarily in Bekaa and recently in Batroun), seasonal fruits picking activities (mainly apple and cherry), and olive oil making tours (from picking to pressing) organized by ecotourism agents. In September 2014, the Rural Tourism Strategy for Lebanon⁴ 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.

⁴ 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)

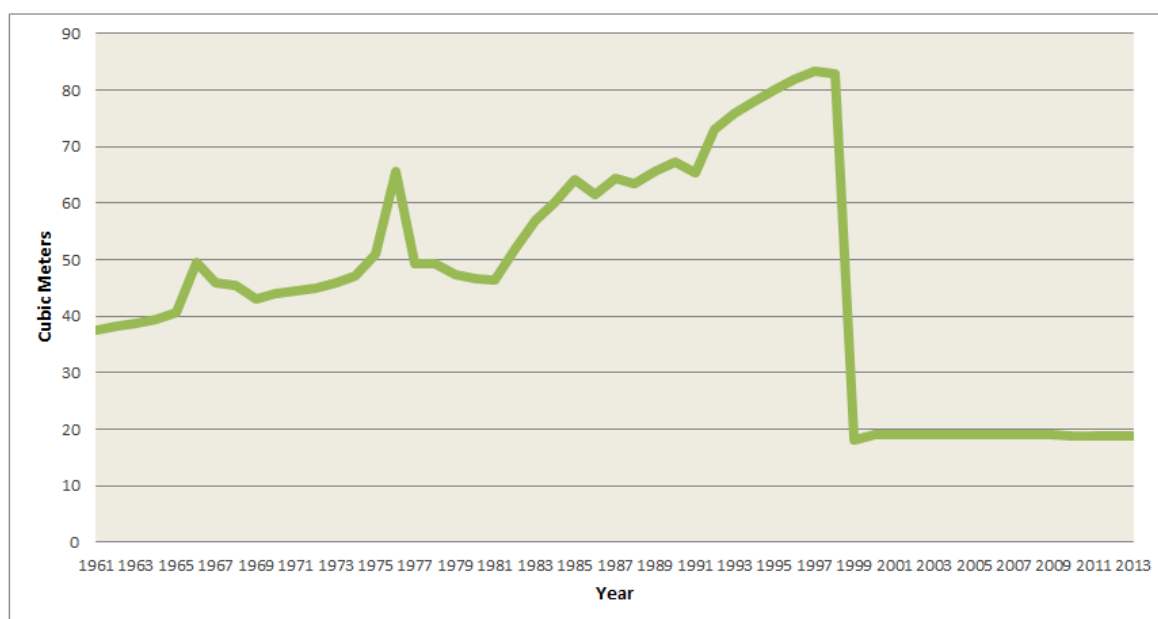
1.2.2.2 Wooded Lands

Wooded lands are considered to be forests that have energy, cultural, intrinsic, spiritual and aesthetic values. 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.

According to an online study⁵ 82m³ of wood fuel were produced in Lebanon in 2002 and totally

consumed in the country. As per the FAOSTAT, Lebanon's total wood fuel volume produced varied between 37.4m³ in 1961 and 18.8m³ in 2013 (Figure 1.8). Broadleaved trees are mainly chopped for fuel wood and charcoal production; which requires a permit from the MoA. Law number 85 of 1991 (Protection of Forest) prohibits the cutting and timber exploitation of conifer trees. Exemptions are possible through special license for tree cutting for public works, construction activities, and general safety. Yet, illegal wood harvesting is practiced in the country.

Figure 1.8 Total Volume of Wood Fuel Produced between 1961 and 2013⁶



In addition to energy, wooded lands provide food, medicine and grazing areas for ruminants,

while ecotourism and recreational activities are sometimes practiced in those areas.

⁵ <http://rainforests.mongabay.com/deforestation/archive/Lebanon.htm>

⁶ The commodities included are fuelwood, coniferous and non-coniferous and the roundwood equivalent of charcoal (using a factor of 6.0 to convert from weight (MT) to solid volume units (CUM))

1.2.2.3 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. 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.

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 in those lands.

1.2.2.4 Bare Lands and Rocky Areas

Mostly covered by sparse shrubby and spiny vegetation, these areas are often located in higher altitudes and suffer from overgrazing practices. 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.

1.2.2.5 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. Bnachie Lake) hydropower and/or irrigation purposes (e.g. Oyoum Samak Lake, Qaraoun Lake); and wetlands. Despite their 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:



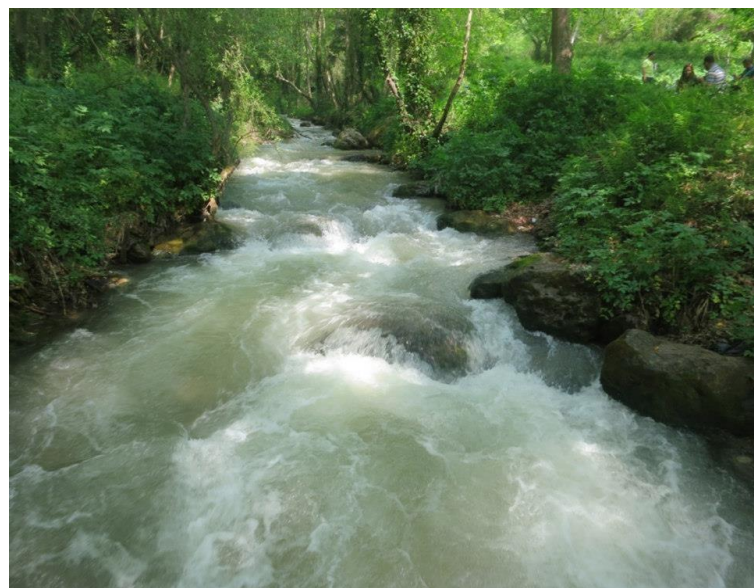
1. Aammiq wetland is the largest remaining wetland and the only studied one, a remnant of much more extensive marshes and lakes that once existed in the Bekaa Valley. It has been designated an IBA in the Middle East (Birdlife International, 1994), is included in the Directory of Wetlands in the Middle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

1.2.2.6 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 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 (MoEW, 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 % in certain predominantly agricultural regions. Estimates indicate that about 54.3% of the irrigation water comes from water courses (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.

1.2.2.7 Marine Water Bodies and Coastal Area

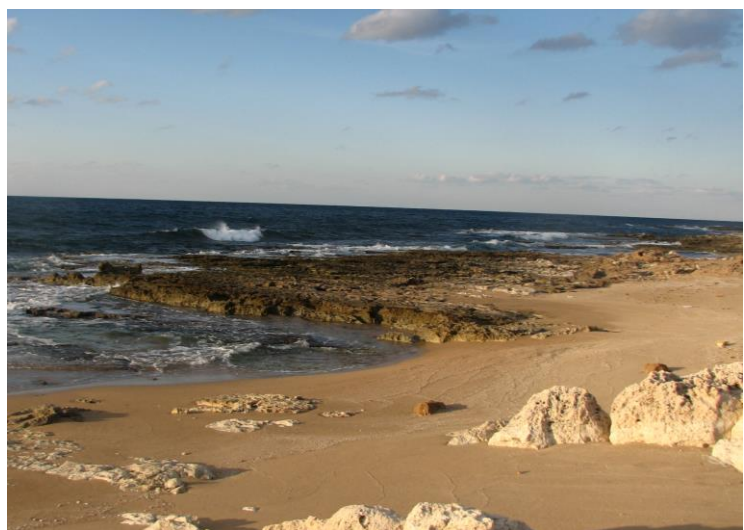
More than one third of the world's population lives in coastal areas, and people throughout the world depend intimately on the oceans and coasts, and the resources they provide, for survival and well-being (Duffy, 2006). The Lebanese shoreline extends about 250 km, where 2.6 million inhabitants live (70% of the total population). Lebanon's economic activity is concentrated in this zone which contributes about three quarters of the national income⁷.

The marine water bodies are important to the society and the economy. They represent 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 (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 national and international tourists, hence contributing 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.



⁷ Najib Saab: The Lebanese Coast, Environment and Development Magazine

1.3 Main Threats to Biodiversity - Causes and Consequences



The main threats to Lebanon's biodiversity were identified from literature reviews and working sessions with various experts and stakeholders. Five multi-stakeholder workshops were held as part of the NBSAP development. The first workshop addressed the threats to biodiversity and their causes.

The main identified threats are:

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

These threats to biodiversity are further described in this section.

1.3.1 Threats and Causes

1.3.1.1 Habitat loss and fragmentation

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.

In Lebanon, chaotic and anarchical urbanization is the main cause for the loss, fragmentation and destruction of terrestrial ecosystems and their habitats (SOER, 2011).

Various factors continue to contribute to haphazard urbanization namely:

- Increasing demographic pressure. Today, with the absence of adequate urban planning, a high number of illegal constructions and an increase in the number of Syrian refugees that reached a peak of 1,185,241 registered refugees in April 2015 (UNHCR, 2016), 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's speculation; and
- Lack of awareness.

Rangelands are primarily affected by urbanization followed by overgrazing. Some of these lands were fragmented from maquis⁸ to garrigue⁹ and then to batha.¹⁰ Further degradation of those areas makes them unable to support the biodiversity they initially sustained (SOER, 2011).

Forest fires are also responsible for the destruction of large areas that comprise many ecosystems and their habitats. Forest fires in Lebanon are often attributed to inadequate forest management, lack of fire prevention initiatives, poor law enforcement, insufficient resources of civil defense and the poor 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, 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 significantly affected owing to their dependence 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 and fragmentation is deforestation which is estimated to occur at a rate of 0.4% per year (MoE, 2012) and is largely attributed to lack of awareness and law enforcement, poverty (cutting trees for fuelwood during winter season due to high fuel prices), and lack of forest law

⁸ 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.

⁹ 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.

¹⁰ Batha is a degraded garrigue.

enforcement as well as 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 fuelwood, mainly destined for heating, was 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 production 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 a lower impact on wooded lands and forests.

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

Quarrying is also an important factor leading to habitat loss and fragmentation. While quarries are needed to support the construction sector, their encroachment on forests and agro-ecosystems is a major problem. Various initiatives have been started including the attempt to relocate quarries to the eastern mountain range (the Anti-Lebanon mountains) 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 small to large scale quarries feeding the cement and construction industries.

Quarrying activities accelerate the erosion processes and subsequent destruction of existing arable lands, modify ecosystems, change landscape patterns and integrity, destroy natural habitat and interrupt natural succession (Khater, 2003; Khater, 2004). 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, 2010). The causes behind extensive and unsustainable quarrying are the lack of awareness amongst quarry owners, the lack of law enforcement, urbanization that requires rocks from quarries to build houses, and socio-economic factors (income from rock selling).

In addition, growing timber in agricultural lands and extensive agricultural expansion are highly damaging 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 of such unsustainable activities are the low profit from forests and natural ecosystems, the lack of awareness at the decision-making level and the community level, the extension services, the absence of sustainable rural development and agro-forestry policies as well as poor agricultural planning.

Large-scale public works are often implemented without sufficient integration as a result of demographic growth, poor urban planning, 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 main factors that allow such activities.

Recreational pressure is an additional cause for habitat loss or fragmentation. 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 from the sea, for the creation of restaurants and outdoor activity areas;
- Expansion of ski resorts;
- Construction of mountain resorts and country clubs; and
- Camping and outdoor activities leading to forest fires and littering.

Causes of these activities are mainly attributed to the absence of adequate strategies to manage the development of resorts, a lack of enforcement of construction regulations, a lack of enforcement of EIA studies recommendations, and lack of awareness.

1.3.1.2 Unsustainable exploitation of natural resources

Hunting

Some people consider hunting wild species as a hobby and others as a sport, and they hunt regardless of the species' status or population size. Most hunters have no regards to the consequences of their actions mainly due to lack of awareness, disrespect and non-compliance of laws and regulations, competition among hunters, and economic profit (income from selling wild animals).

In terms of birds hunting, 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 Minister of Environment, specifying the type and number of game birds species allowed for hunting only in the hunting season, many violations are witnessed due to unsustainable hunting practices, consequently migratory birds are being killed in high numbers. Examples of the illegally hunted migratory birds include the White Stork, the White Pelican, the Common Crane, the Griffon Vulture, the Hobby, the Sparrow hawk, the Lesser Spotted Eagle, and the Steppe Eagle (species forbidden for hunting in Lebanon even when the hunting season is officially opened). The MoE is filing court cases against violators through designated Environmental Prosecutors in the relevant Governorates.

In order to organize hunting in Lebanon and promote sustainable and responsible hunting practices, the MoE issued in 2012 the following organizational decisions of the Hunting Law (Law No. 580/2004) after consultation with the Higher Council for Hunting (HCH):



- Procedures for obtaining hunting licenses (MoE Decision 245/1 of 2012);
- Procedures to grant the Nature Reserves rangers the authorization to control hunting violations in the surroundings of the nature reserves and to issue fines to the violators (MoE Decision 199/1 of 2012);
- Procedures for the private land owners/investors and the municipalities to submit a request to MoE to prohibit hunting in their lands (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);
- 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).

In addition to the above, the following decisions were issued by the Minister of Finance based on the proposal of the Minister of Environment and the Higher Council for Hunting (HCH):

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

On the other hand, based on the Hunting Law, a decree related to hunting insurance (which covers the damages that may occur to third party from the hunting practices) was issued on 24 May 2014 (Decree No. 11987/2014) based

on the proposals of both the Ministers of Environment and Economy and Trade.

Exploitation of Terrestrial Flora Resources

Poverty is a major factor that drives people to behave in an unsustainable manner in order to meet their needs for survival. People in mountainous rural areas illegally cut trees for heating purposes because they cannot afford buying fuel. Moreover, some people burn forests to gather and sell wood. Poverty rates in Lebanon are high; the population living in poverty is 28.6%. Of these, 20.6 % survive on less than US\$4/day, while 8% are extremely poor and live below the lower poverty line estimated at US\$2.40 per capita per day, and accordingly cannot meet their food and non-food basic needs (UNDP, 2008).

In addition to unsustainable tree cutting, substantial harvesting of medicinal plants that are used in rural areas for the treatment of diseases (burns, gastrointestinal diseases etc.) and aromatic plants which are extensively used in Lebanese cuisine, is also being observed, in addition to poor harvesting practices in general. The assessed market value of medicinal and aromatic plants produced by forests in Lebanon is \$29.6 million/year (SOER, 2011). 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, and biotic indicators of pollution).

Exploitation of Water Resources

With an increasing population, the pressure on water use is more and more accentuated which puts the freshwater ecosystem at risk and also depletes groundwater resources.

There is also an excessive use of groundwater for irrigation purposes and this 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).

Rangeland Management

Other causes of unsustainable exploitation of natural resources include rangeland management mainly due to lack of agricultural awareness and uncontrolled grazing. The absence of sufficient areas dedicated for grazing due to land use planning gaps is the main cause of uncontrolled grazing.

Exploitation of Marine Biodiversity Resources

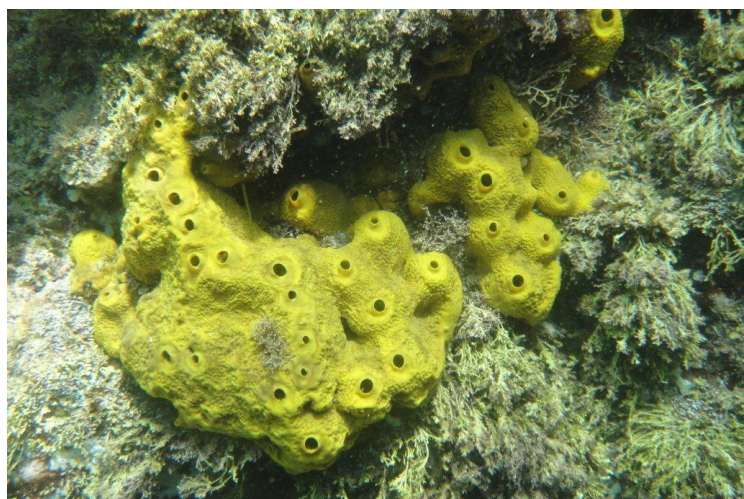
Another manifestation of unsustainable exploitation of natural resources is overexploitation of marine species. Marine species are being harmed by overfishing activities and illegal practices including the use of dynamites, small mesh size trawling nets and the massive collection of molluscs. Illegal fishing gear is driven by the insufficient education and cultural awareness as well as the non-compliance and respect of rules and regulations.

1.3.1.3 Pollution

Pollution from various sources particularly affects the terrestrial, marine and coastal, and freshwater ecosystems.

The main sources of pollution in terrestrial ecosystems are:

- The discharge of untreated municipal wastewater due to the lack of infrastructure and treatment plants, and the absence of adequate management policies;
- The discharge of untreated industrial effluents due to insufficient enforcement of environmental legislation and economic reasons;
- The improper solid waste disposal (municipal, industrial, healthcare and agricultural) due to lack of proper infrastructure, poor law enforcement and economic reasons;
- Agro-industries that use excessive quantities of pesticides, fertilizers and agrochemicals.
- Emissions from the power sector, industries, incineration processes, and transportation sector being important sources of air pollution.



The main sources of pollution in marine and coastal ecosystems are:

- Industrial waste discharge in the sea (liquid and solid) caused by the weak enforcement of legislative texts, lack of waste management, inadequate infrastructure, and economic reasons;
- Domestic wastewater discharge in the sea due to the absence of operational waste water treatment plants;
- Presence of open solid waste dumpsites in some coastal areas;
- Discharges from vessels including ballast water due to insufficient enforcement of maritime regulations; and
- Agricultural waste disposal (pesticides etc.) in the sea;

The main sources of pollution in freshwater ecosystems 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 and municipal authorities, outdated legal framework, poor enforcement of existing laws and low human capacity. Solid waste affects freshwater quality 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 control over the pesticides and fertilizers products and markets, the limited number of extension staff at 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, and limited 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; and
- Pollution caused by tourism activities resulting from tourists' indifference, the lack of awareness by tourist operators and law enforcement and the absence of environmental conditions attached to tourism activity permits.

1.3.1.4 Invasive alien species

Invasive alien species (IAS) are non-native species introduced by human activities and which 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", 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, shipping and the discharge of ballast water, 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, 2011). 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 technical expertise and researchers and more laboratories that are able to deliver the 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; and
 - MoA's regulation on 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)¹¹ through Law no. 223 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 risk assessments for these species in Lebanon even though it is considered to be a real threat;
- The lack of technical expertise and researchers in the field of IAS;
- 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.

It is useful to note also that Lebanon is a signatory of the Ballast Water Convention

¹¹ CITES regulates the trade of wild species and restricts the exchange of certain species

which aims at controlling the disposal of ballast water to avoid introduction of invasive species.

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.

1.3.1.5 Introduction of new improved varieties (agro-biodiversity)

As per the FAO, 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”.

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; and
- 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 agro-biodiversity; and the gene pool may eventually be affected and reduced.

1.3.1.6 Climate change

Ever since the industrial revolution, the concentration of Greenhouse Gases (GHGs) in the atmosphere is increasing, considerably affecting all forms of life on earth including biodiversity. While efforts on a global scale are being made to reduce GHG emissions, adaptation to climate change remains limited primarily due to lack of sufficient funds.

According to the report “Impact of Climate Change on Arab Countries” (AFED, 2009), it is expected that a temperature rise of 2°C will cause the extinction of up to 40% of all the species. This is due to the fact that Arab countries have unique formations that are especially vulnerable to climate change risk; namely the Cedar forest of Lebanon.

Lebanon’s high altitudes, which provide refuge for many specialized species and niche ecosystems, will undoubtedly witness distribution shifts and in some cases disappearance of species due to climate change. 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 population physiology, ecosystem phenology, and geographical distribution of species.

1.3.2 Consequences

The threats described in section 1.3.1 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 main consequences can be summarized as follows:

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, 2011). The arrival of numerous new semi-desertic bird species in Lebanon is expected to occur (SOER, 2011).

In addition, increased temperatures are considered to allow some plant species to become resistant to herbicides and pesticides (Farajallah, 2008).

1.3.1.7 Lack of data

Inadequate or insufficient data constitutes a major threat to biodiversity given that the gaps and issues concerning the current status of biodiversity and ecosystems cannot be effectively determined, and can have consequences on finding appropriate solutions.

- 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;

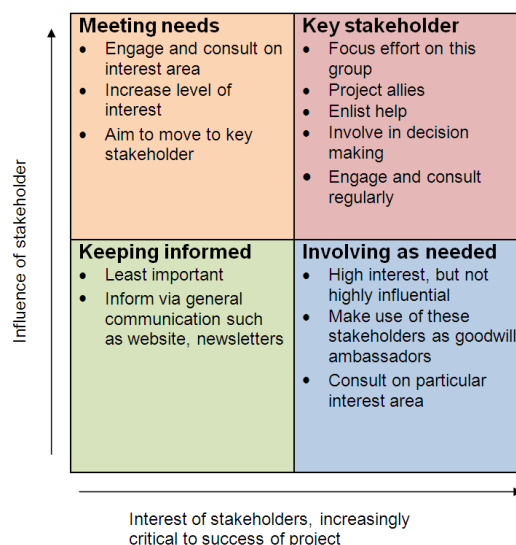
- Species extinction/ Increased risk of species extinction;
- Increase in invasive species which will compete with native and endemic species;
- Increased pest outbreak;
- Monoculture and replacement of local trade varieties with new improved ones;
- Increased resistance to some herbicides/ pesticides;
- Risk of gene pollution from GMOs (long-term consequence);
- Increase in natural hazards (flood, salinization and acid rain, etc.).

1.4 Methodology for the Revision of the NBSAP

The core element of the Strategy is the revision and update of Lebanon's first NBSAP; which was developed in 1998. The revised NBSAP was aligned with the new CBD strategic goals and integrated the 2020 Aichi Biodiversity Targets while taking into consideration both global and local needs and aspirations, as well as reflecting Lebanon's specific realm and the current existing professional capacities and awareness levels.

One of the main objectives of the NBSAP is to mainstream biodiversity into sectoral and cross-sectoral Strategies, Plans and Programmes. Mainstreaming means integrating or including actions related to conservation and sustainable use of biodiversity in strategies relating to production sectors, such as agriculture, fisheries, forestry, tourism and mining. Mainstreaming might also refer to including biodiversity considerations in poverty reduction plans and national sustainable development plans. By mainstreaming biodiversity into sectoral strategies, plans and programmes, we recognize the crucial role that biodiversity has for human well-being. Through mainstreaming, biodiversity concerns will be internalized into the way economic sectors, development

models, policies and programmes operate. Integrating biodiversity concerns into the way sectors operate can have immediate benefits in improving environmental quality and productivity, and can also serve as a long-term safeguard for sustainable development (CBD, 2007).



The main added-value of the process is the mobilization of stakeholders and the increase of the sense of ownership to the NBSAP. Partnerships between multiple stakeholders are key to achieving biodiversity goals at the national scale.

Updating Lebanon's NBSAP was conducted in tandem with the preparation of the 5th National Report (NR) of Lebanon to the Convention on Biological Diversity by the same team. This process was based on a common data collection mechanism, mobilization of the same stakeholders, and organization of joint consultation workshops. A common Steering Committee was established as described below to oversee both the development of the 5th NR and the updating of the NBSAP.

The stakeholder identification process was based on an "Influence Interest Matrix" where high interest and high influence stakeholders are the most critical ones and their support is sought.

Stakeholders deemed to have high influence and high interest have been identified by the MoE and invited to be part of the Steering Committee. The committee was formed by representatives of the concerned public institutions, research centers and academia, and was involved in the development of both the 5th NR and the updating of the NBSAP processes.

Steering Committee meetings were regularly held to follow-up on progress, review the workshops' results and prepare for the way forward.

The list of the steering committee members and their affiliations is provided in Appendix D.

Five workshops were organized in such a way as to facilitate and maximize the participation of key stakeholders. The results of these consultation sessions served for both the development of the 5th NR and the updating of the NBSAP.

The workshops' participants are presented in Appendix C. The objectives of the different workshops were the following:

Workshop 1: "Stocktaking and Assessment":

- Importance of biodiversity for Lebanon;
- Values of biodiversity and ecosystem services;
- Main threats to biodiversity and their causes;
- Consequences of biodiversity loss;
- Resource use;
- Sustainability of resources; and
- Introduction to Aichi Biodiversity Targets.

Workshop 2: "Targets and Indicators":

- Overview of the 1998 NBSAP, achievements, and obstacles;
- Lessons learnt from the implementation of the CBD in Lebanon;
- Progress towards Aichi Biodiversity Targets;
- Formulation of a vision;
- Definition of priority areas of actions;
- Drafting the national targets;
- Identifying indicators.

Workshop 3: "NBSAP: from Vision to Actions":

- Validation of the vision;
- Validation of the priority areas;
- Validation of the national targets; and
- Drafting national action plans allowing the achievement of the set targets.

Workshop 4: "Strategy, Action Plan Development and Monitoring":

- Validation of the action plans; and
- Development of implementation plans.

Workshop 5: "Restitution and Clearing-House Mechanism (CHM)":

- Restitution of works on NBSAP; and
- Clearing-House Mechanism.

1.5 Lessons Learnt from Previous NBSAP

Lebanon's first and only previous NBSAP was developed by the MoE in 1998 with the support of UNDP/GEF. This step was highly significant for the country 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 1998 NBSAP highlighted the country's main biodiversity themes, goals, and objectives; these components formed the start point of the NBSAP's update and were re-assessed. The achievements and obstacles that hindered the full achievement of Lebanon's 1998 NBSAP are provided in Table 1.5 as a summary of the areas of positive progress and the areas of deficiencies of the 1998 NBSAP.

Moreover, important lessons learnt from the 1998 NBSAP included the need to have

SMART targets, goals, and objectives. The assessment of the previous NBSAP achievements was judged very difficult by the stakeholders involved in the NBSAP update process and considered the NBSAP's components as "too broad". Other important lessons include the need for:

- The development of indicators to allow for a better tracking of the Strategy's implementation;
- The definition of the Strategy's implementation mechanism;
- The development of a resource mobilization framework to guide the Strategy's implementation by identifying technical, human, and financial needs; and
- The allocation of a timeframe for every developed action, thus allowing prioritization of actions and projects.

Table 1.5 Assessment of the 1998 NBSAP

Areas of Positive Progress	Areas of Deficiencies
<i>in-situ</i> conservation	Monitoring
Research	Invasive alien species management
Training	<i>Ex-situ</i> conservation
Awareness and education	Sustainable use
Environmental legislation	Incentive measures
International cooperation	Genetic resources
Mainstreaming biodiversity into SEA and EIA	Technology transfer
	Technical and scientific cooperation
	Information exchange



CHAPTER 2

WHAT IS OUR VISION

2.1 Lebanon's Vision for Biodiversity

*“By **2030**, Lebanon’s **biodiversity** is **valued** and **sustainably managed** for the **preservation and conservation** of its **ecosystems** and **habitats** and the **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**.”*

This Vision sets a significant challenge for Lebanon in taking the appropriate measures to halt the decline in our biodiversity. The measures Lebanon will take in the overall 2015-2030 NBSAP are presented under thirteen (13) Priority Areas.

The Priority Areas are explored in this Chapter along with a series of relevant national Targets and Actions.

The **priority areas** are designed to address: (i) the key biodiversity threats, gaps, and issues; (ii) supporting the achievement of the 20 Aichi Biodiversity Targets of the Strategic Plan for Biodiversity 2011–2020 (CBD, 2010); and (iii) the 2030 Agenda for Sustainable Development Goals. The national context, and past efforts and outcomes, including the experiences and lessons learned from implementation of Lebanon’s Biodiversity Strategy (1998) provided additional background to their formulation.

National targets are based on the issues, threats, gaps and opportunities identified through a series of stakeholder consultation workshops. They reflect the identified priority areas and are also based on the result of the review of the past NBSAP and guided by the

Aichi Biodiversity Targets as shown in Table 2.1. The national targets are all set to 2030 given that Lebanon is updating its NBSAP in 2016 and such a comprehensive strategy is developed to be the country’s main biodiversity policy document for the coming 15 years.

Progress towards the identified NBSAP national targets entails the development of specific **national actions**. Some actions will consist of a continuation of existing programs and practices and other actions will be new initiatives based on altering circumstances and evolving science.

In order to avoid “inertia”, the actions developed under each target have defined start and end dates reflecting their order of priority or need to be achieved in order to allow for another action to be launched.

The National Action Plan section provides details on the implementation of the Strategy and identifies a series of strategic actions (institutional, legislative, economic or other policy and institutional actions) that will allow the achievement of the identified national targets. These actions will be carried out at national, regional and local levels.

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.

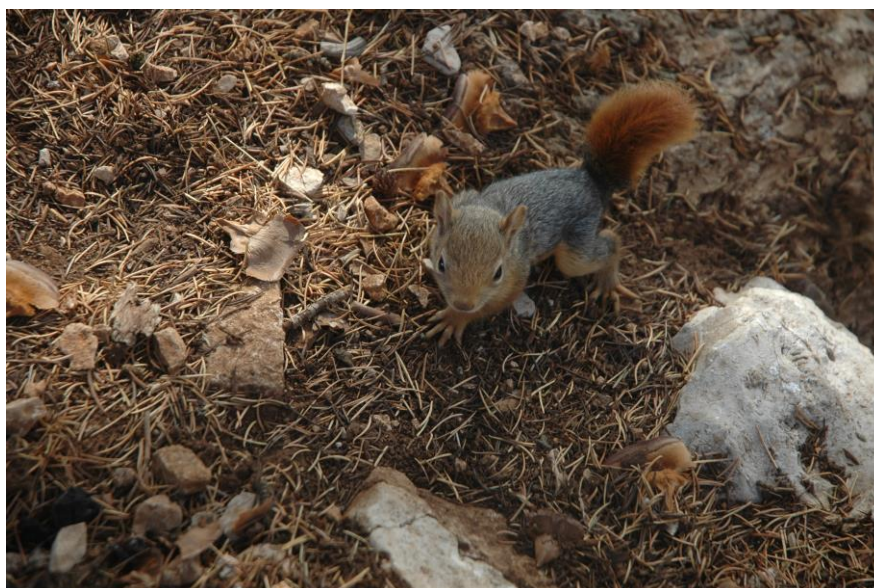



















Table 2.1 Priority Areas, National Targets, and the Aichi Targets

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 important native fauna and flora is conserved <i>in-situ</i> and <i>ex-situ</i> 3. By 2030, the implementation mechanism of the Cartagena Protocol on Biosafety is operational	
Protected Areas	4. By 2030, at least 20% of natural terrestrial and marine ecosystems are protected and all types of ecosystems are represented in the PA network 5. By 2030, the total percent coverage 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 spatial 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 from the use of natural resources	    
Ecosystem Restoration	9. By 2030, rehabilitation plans are implemented in at least 20% of degraded sites so that they can 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	

Priority Area	National Target	Relevant Aichi Target
Invasive Alien Species (IAS)	11. By 2030, effective measures are in place to control the introduction and diffusion of IAS into the environment	
Communication, Education & 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 and Sub-National Policies, Plans and Programs	13. By 2030, government entities mainstream biodiversity priorities (conservation, benefits sharing, pressure alleviation, sustainable management, sustainable use of natural resources) into 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 on biodiversity is improved in Lebanon, and research outputs and biodiversity related reports are shared through a centralized platform (from both public and private institutions), which is updated and made accessible to the public (CHM) 16. By 2030, traditional knowledge, uses, and practices of local communities relevant to biodiversity and sustainable use of resources are documented, preserved, and shared/published	
Institutional and Legal Framework	17. By 2030, the relevant institutional and legal framework and government policies are reviewed, updated and reinforced where necessary to ensure effective biodiversity conservation and sustainable use	<i>Cross cutting priority area & target serving all other targets</i>
Resource Mobilization	18. By 2030, Lebanon has developed and is implementing a robust resource mobilization strategy with a sustainable mechanism to finance biodiversity initiatives	

2.2 National Action Plan

PRIORITY AREA 1: THREATENED SPECIES

Threatened species is seen as priority area for the country and is intended to encompass all the IUCN Red List classifications: Near Threatened, Vulnerable, Endangered, and Critically

Endangered. As per the IUCN 2015 list, Lebanon includes 77 threatened species: 9 mammals, 12 birds, 8 reptiles, 27 fishes, 9 molluscs, 7 other invertebrates, and 5 plants.

NATIONAL TARGET 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



National Action 1.1

Update the 1996 biodiversity national inventory (BCS) prepared by the MoA based on field surveys of fauna and flora.

National Action 1.2

Develop criteria for the evaluation of conservation status for identified flora and fauna and evaluate the status of the species in the updated inventory.

National Action 1.3

Initiate a program for mapping and monitoring threatened species in key/ selected ecosystems.

National Action 1.4

Include threatened species in national conservation strategies and regulations; namely *in-situ* and *ex-situ* conservation programs.

National Action 1.5

Develop species-specific conservation legislation and conservation action plans to ensure conservation of important species, particularly endemic threatened species.

PRIORITY AREA 2: GENETIC DIVERSITY

In the absence of knowledge about genetic diversity, it can neither be protected nor sustainably used, which can lead to depletion and undetected losses. By conserving native species and their natural ranges in their natural habitats, the genetic diversity of these species and their potential as resources for future generations can be guaranteed in most cases. However, supplemental measures such as gene banks, reference stocks, botanical gardens etc. are required. In order to determine which species in Lebanon should be conserved, it is important to learn more about the genetic diversity of the country's native plants and animals.

Moreover, genetic diversity includes biosafety, the import, transfer and use of Living Modified Organisms (LMOs) in Lebanon should be regulated, studies and research on LMOs should be further developed and enhanced in order to prevent large-scale loss of biological integrity due to the risks that may emanate from LMOs on national biodiversity. These prevention mechanisms include the conduction of risk assessment, in laboratory, as well as strict guidelines to follow.

Lebanon developed its National Biosafety Framework in 2005 in relation to the Cartagena Protocol on Biosafety and ratified the Protocol afterwards in 2008. In order to put national legal measures for the implementation of the Biosafety Protocol at national level, MoE developed and

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.



NATIONAL TARGET 2: By 2030, the genetic diversity of 50% of important native fauna and flora is conserved in-situ and ex-situ



National Action 2.1

Build on the results of National Actions 1.1 and 1.2 to extract the list of endemic and economically important species (such as medicinal plants, aromatic plants, wild relatives, etc.) and their conservation status.

National Action 2.2

Conduct monetary valuations of endemic and economically important species.

National Action 2.3

Create a GIS database mapping existing endemic and economically important species geographical location and extent.

National Action 2.4

Include endemic and economically important species in national conservation strategies and regulations; namely *in-situ* and *ex-situ* conservation programs (gene banks and on farm).

National Action 2.5

Adopt the outcomes of the Mainstreaming Biodiversity Management into Medicinal and Aromatic Plants project and expand it to encompass other economically important species.

NATIONAL TARGET 3: By 2030, the implementation mechanism of the Cartagena Protocol on Biosafety is operational

National Action 3.1

Enforce and make operational national legislation on biosafety through issuance of implementation mechanisms.

National Action 3.2

Assess the risks related to LMOs and monitor the adequacy of equipment at certified laboratories.

PRIORITY AREA 3: PROTECTED AREAS

Efforts to maintain and sustain existing protected areas must continue, while new protected areas shall be created and connected. Lebanon currently has over 40 protected sites between nature reserves, natural sites protected by the MoE, Biosphere Reserves, Ramsar Sites, IBAs, and SPAs. Yet the country includes other types

of protected areas (section 1.1.2) which need to be better classified and identified in addition to a number of proposed sites which are in need of protection and not protected yet, such as the 27 sites listed in Table 1.4 and the 18 sites proposed as MPAs in the Marine Protected Areas Strategy.

NATIONAL TARGET 4: By 2030, at least 20% of natural terrestrial and marine ecosystems are protected and all types of ecosystems are represented in the PA network

National Action 4.1

Develop clear and standardized criteria for characterizing natural and semi-natural ecosystems found across the country.

National Action 4.2

Classify identified ecosystems based on clear criteria to help guide and orient the level of emergency for intervention and the intervention approach required (conservation, restoration, sustainable land management, sustainable use of natural resources).

National Action 4.3

Produce a national map of ecosystem types and classifications to serve as a decision making support tool and set timelines for repeating the surveys.

National Action 4.4

Identify areas of high biodiversity values (such as hotspots) among the identified natural ecosystems.

National Action 4.5

Include the newly identified areas of high biodiversity value in the PA network.

National Action 4.6

Identify areas that could potentially become ecological corridors (such as thalwegs, sea canyons, and mountain peaks) and start preparing them (e.g. plant native trees).

National Action 4.7

Develop landscaping guidelines promoting the use of local and native species and enforce their implementation at a minimum in government funded projects and mainstream them into SEAs and EIAs.

NATIONAL TARGET 5: By 2030, the total percent coverage of nature reserves is increased to reach at least 5% of Lebanon's total area



National Action 5.1

Take action to protect areas identified as “in need of protection” by the Sustainable Institutional Structure for Protected Areas Management (SISPAM) Project and other areas identified by MoE.

National Action 5.2

Identify further priority areas for conservation and establish ecological inventories for these areas.

National Action 5.3

Establish terrestrial nature reserves in the newly identified priority areas for conservation.

National Action 5.4

Implement the Marine Protected Area Strategy and establish the proposed marine nature reserves.

National Action 5.5

Endorse the revised protected areas category system, law and related decree.

PRIORITY AREA 4: SUSTAINABLE MANAGEMENT AND USE OF NATURAL ECOSYSTEMS AND RESOURCES

This priority area requires immediate and major attention given that resources are limited and are still uncontrollably and illegally exploited especially in the poor areas of the country. Legislations must be enforced to limit those unsustainable practices.



NATIONAL TARGET 6: By 2030, 50% of all natural ecosystems are sustainably managed and properly considered in spatial planning implementation

National Action 6.1

Extract, from Land Use /Land Cover database, a map on national ecosystems highlighting those in need for sustainable management.

National Action 6.2

Enforce regulations related to the management of nature reserves and increase the level of fines in relation with the nature of goods and services illegally harvested and extracted.

National Action 6.3

Include non-officially classified natural ecosystems of high ecological and biodiversity value in the Master Plans of each related village.

National Action 6.4

Establish a management plan for the natural areas of high ecological and biodiversity values (for those that are not classified as PAs).

National Action 6.5

Identify and map the extent and spatial distribution of areas under sustainable forestry, fisheries, grazing, agriculture, and water management; including information on safe ecological limits of these productive systems.

National Action 6.6

Organize capacity building and awareness campaigns on the value of biodiversity and the sustainable use of natural resources.

NATIONAL TARGET 7: By 2030, the gap between Lebanon's ecological footprint and bio-capacity is alleviated to reach an equal state

National Action 7.1

Reevaluate Lebanon's bio-capacity as per the Global Footprint approach (latest study was in 2011)

National Action 7.2

Assess the current ecological footprint on the identified natural ecosystems.

National Action 7.3

Carry out valuations of ecosystem goods and services at the national level (payable ecosystem services).

National Action 7.4

Disseminate the results of the studies related to the economic value of biodiversity to decision makers. Provide recommendations on appropriate policy responses.

NATIONAL TARGET 8: By 2030, the private sector has taken steps to implement plans for sustainable production and consumption to mitigate or prevent negative impacts on ecosystems from the use of natural resources



National Action 8.1

Create incentives and establish a legislative framework for the private sector's engagement in biodiversity actions.

National Action 8.2

Implement the developed incentives mechanism.

National Action 8.3

Conduct awareness campaigns on the need to endorse sustainable strategies (e.g. sustainable consumption targeting consumers etc.).

PRIORITY AREA 5: ECOSYSTEM RESTORATION

In order to improve biodiversity conservation and human livelihoods, empower local people and enhance ecosystem productivity, ecosystem restoration must be carried out. Ecosystem

restoration consists of renewing and restoring degraded, damaged, or destroyed ecosystems and habitats such as quarries and burned forests.

NATIONAL TARGET 9: By 2030, rehabilitation plans are implemented in at least 20% of degraded sites so that they can safeguard the sustained delivery of ecosystem services

National Action 9.1

Update and complete existing inventories to prepare a national inventory of degraded sites by type and location.

National Action 9.2

Develop technical guidelines for the rehabilitation of the different types of degraded sites and give them a legally binding status.

National Action 9.3

Develop a prioritization scheme based on socio-environmental criteria to specify sites in need of immediate intervention.

National Action 9.4

Review and adapt existing rehabilitation plans to comply with the newly developed guidelines.

National Action 9.5

Develop a master plan for the rehabilitation of different types of degraded sites that builds on existing master plans (i.e. quarry and dumpsite rehabilitation).

National Action 9.6

Secure funding, internally or from international donors¹², to enable the rehabilitation of priority sites.

National Action 9.7

Undertake pilot rehabilitation in key sites based on the developed prioritization scheme covering at least one of each type: quarries, dumpsites, degraded forest, rangeland, riverbed, old terraces, and coastal areas.

National Action 9.8

Designate selected degraded sites as pilot sites for research and development of effective rehabilitation methods.

¹² A list of donors is provided in the Resource Mobilization section in Chapter 3

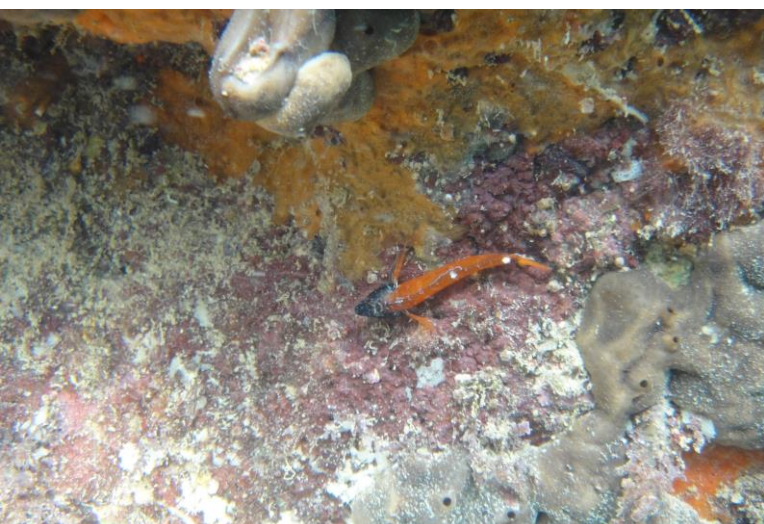
PRIORITY AREA 6: ACCESS AND BENEFIT SHARING

Lebanon signed the Nagoya Protocol on Access and Benefit Sharing (ABS) in 2012; later on the CoM submitted (through the Decree No. 206 on 10/07/2014) a draft law to the Parliament for the accession by the Government of Lebanon to the Protocol.

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

The Nagoya Protocol and the ABS national legislation must be endorsed and the needed capacities should be built for their proper implementation in order to regulate the access to Lebanon's biological and genetic resources, and to ensure the fair and equitable sharing of the benefits arising from their utilisation.

NATIONAL TARGET 10: By 2030, the national law on access and benefit sharing is endorsed, operational and enforced



National Action 10.1

Finalization of the MoE draft law on Access to Lebanese biological and genetic resources and sharing of the benefits arising from their utilization (in relation to Nagoya Protocol) in harmony with the MoA draft law on the Management of Lebanese Plant Genetic Resources in relation to the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA).

National Action 10.2

Development of implementation decrees for each Law.

National Action 10.3

Development of legal monitoring and compliance procedures with defined roles and responsibilities.

PRIORITY AREA 7: INVASIVE ALIEN SPECIES

Knowledge and research studies about Invasive Alien Species (IAS) and their threats to biodiversity remain very scarce in Lebanon due to the lack of sufficient specialists in this field and inadequate prioritization at the national level. As a result, limited work is being conducted to identify, control or track the introduction of IAS and no significant measures were taken except in protected areas. Yet, IAS represent a real threat, especially to marine ecosystems, and immediate actions needs to be implemented in that regard.



NATIONAL TARGET 11: By 2030, effective measures are in place to control the introduction and diffusion of Invasive Alien Species (IAS) into the environment



National Action 11.1

Support ongoing efforts for the establishment of a register of IAS reported in the Mediterranean basin. This register should be considered a live document to be updated when new IAS are identified.

National Action 11.2

Identify and map pathways of introduction/proliferation of IAS in Lebanon to allow for better management and monitoring.

National Action 11.3

Regulate the import of species for agricultural, landscape, recreational, and reforestation purposes to avoid genetic pollution of local species and genotypes.

National Action 11.4

Develop and implement an awareness strategy for the management of identified IAS.

PRIORITY AREA 8: COMMUNICATION, EDUCATION AND PUBLIC AWARENESS

Education and public awareness are considered to be a priority area, given that all the threats to biodiversity could result from people's lack of awareness and knowledge. People will develop a sense of responsibility once they learn the

importance of biodiversity and ecosystem services and their influence on their well-being. It is also important to engage the civil society in biodiversity issues so that they personally value biodiversity and know what they can do to help.

NATIONAL TARGET 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



National Action 12.1

Raise the awareness of decision makers on the importance of biodiversity and its conservation, sustainable management, and promoting related education (Deputies, Ministers, Directors Generals, Heads of Departments and Heads of Services).

National Action 12.2

Enhance the role of the awareness unit at the MoE to improve dissemination and public outreach through social media and direct public outreach (e.g. biodiversity related tips through SMS, a monthly or yearly scientific journal distributed to schools, universities, public institutions, etc.).

National Action 12.3

Build on the Central Administration of Statistics (CAS) services to assess and monitor people's awareness on biodiversity.

National Action 12.4

Further adopt and implement the existing National Strategy for Environmental Education developed by AFDC and adopted by the MoEHE. Implementation should be coupled with training and capacity building of school teachers.

National Action 12.5

Organize participatory events to raise students and public' awareness about biodiversity, i.e. national science fair, guided open-house events at the MoE.



PRIORITY AREA 9: MAINSTREAMING BIODIVERSITY INTO NATIONAL AND SUB-NATIONAL POLICIES AND PLANS

Mainstreaming biodiversity means integrating biodiversity into decision making through including actions related to its conservation and sustainable use into sectoral strategies, plans and programmes. Mainstreaming can be achieved once decision makers are aware of the multiple benefits of biodiversity and the crucial role it has for human well-being.

Mainstreaming includes engaging all sectors in biodiversity conservation and sustainable use that have either direct impacts (negative and positive) on biodiversity (e.g. the agriculture, fishing, forestry, construction, industrial sectors) or indirect impacts (e.g. the financial services sector). There is a need for these sectors to incorporate consideration of biodiversity into their decision-making processes, management activities and reporting.

NATIONAL TARGET 13: By 2030, government entities mainstream biodiversity priorities (conservation, benefits sharing, pressure alleviation, sustainable management, sustainable use of natural resources) into their policy making processes and their implementation

National Action 13.1

Promote the Strategic Environmental Assessment (SEA) Decree (number 8213/2012) in the public sector and institutions at both, the central and local levels.

National Action 13.2

Develop guidelines for the implementation of ecological impact assessments as part of the SEA, a planning process and training sessions.

National Action 13.3

Strengthen the capacity of MoE to implement the SEA process (including review) by creating a dedicated unit or expert groups within the ministry.

National Action 13.4

Strengthen the planning capacity in all sectors (similar to SISSAF project) and enhance environmental considerations.

National Action 13.5

Establish a mechanism to enforce the implementation of environmental measures in national and sectoral strategies and policies such as agriculture, fisheries, forestry, tourism, poverty reduction, sustainable development, land use, water, coastal management, climate change, and disaster risk reduction.



National Action 13.6

Hire the necessary technical permanent staff in the departments of the various concerned ministries (e.g. Department of Ecosystems at MoE).

National Action 13.7

Conduct training and capacity building to raise awareness and build technical skills in public

institutions concerned with biodiversity conservation; e.g. MoA, MoEHE, DGUP, CDR, MoEW, MoPWT, etc.

National Action 13.8

Raise the awareness of the internal security forces and the municipality police on biodiversity legislation.

PRIORITY AREA 10: CLIMATE CHANGE

Biodiversity in the Arab countries, already deteriorating, will be further damaged by intensifying climate change. The most vulnerable ecosystems in Lebanon are high altitudes Cedars, Sicilian fir and Juniperus which provide refuges for many specialized species and niche ecosystems.

Building ecosystem resilience to climate change is crucial for maintaining and re-establishing ecosystems functions, and reducing threats to biodiversity. Climate change is a promising area to work on in Lebanon given that consequences are being felt even at low degrees and prevention actions can be taken at such stages.

NATIONAL TARGET 14: By 2030, vulnerable ecosystems to climate change are identified and adaptation plans are developed and implemented

**National Action 14.1**

Identify key ecosystems vulnerable to climate change and their needs for adaptation.

National Action 14.2

Include a chapter dedicated to biodiversity and vulnerable ecosystems in Lebanon's National Communications to the United Nations Framework Convention on Climate Change (UNFCCC).

National Action 14.3

Define pilot national monitoring sites and species, representing the various ecosystems, to monitor medium and long term effects of climate change and implement pilot action to adapt natural ecosystems to climate change.

PRIORITY AREA 11: RESEARCH AND KNOWLEDGE TRANSFER

The lack of data related to biodiversity is a major issue in Lebanon since it reduces the ability to manage threats to biodiversity. Additional research must be carried out to gather missing information and establish a centralized database in which all study findings are included. This centralized database (CHM) must be made accessible to the public and must be continuously updated. Once knowledge is transferred to the public and between concerned entities (public sector, ministries and NGOs), biodiversity related issues become easier to handle. It is important to know that actions have already been taken regarding this subject. On February 27, 2012, the creation of a biodiversity monitoring center was launched as part of the O-Life observatory implemented under the Lebanese National Center for Scientific Research¹³. This center, still

under development, will gather and store information related to environment, including biodiversity, in an online library.



NATIONAL TARGET 15: By 2030, research on biodiversity is improved in Lebanon, and research outputs and biodiversity related reports are shared through a centralized platform (from both public and private institutions), which is updated and made accessible to the public (CHM)

National Action 15.1

Create a Biodiversity Research and Information Unit responsible for centralizing biodiversity related information and coordinating the works between the multiple stakeholders, mainly public, private, academics and NGOs.

National Action 15.2

Identify priority areas of research in the biodiversity field.

National Action 15.3

Update the national Science Technology and Innovation Policy (STIP) to include biodiversity as a priority and define the areas where research is needed within the biodiversity sector.

National Action 15.4

Allocate larger budgets for research on biodiversity valorization: conservation, sustainable management, and economic valuation.

¹³ http://www.cnrs.edu.lb/index.php?option=com_content&view=article&id=121

NATIONAL TARGET 16: By 2030, traditional knowledge, uses, and practices of local communities relevant to biodiversity and sustainable use of resources are documented, preserved, and shared/ published

National Action 16.1

Prepare a survey of assessment on the traditional use of folk medicine, herbals, food and feed, seed production and preservation, flora and fauna uses and agricultural practices. The survey will be published once completed.

National Action 16.2

Plan festivals exhibiting local and traditional practices in different localities of Lebanon. Those festivals could be expanded all over the country.



PRIORITY AREA 12: INSTITUTIONAL AND LEGAL FRAMEWORK

The institutional and legal framework is progressing in Lebanon especially regarding legislation related to biodiversity but the major problem in Lebanon remains the enforcement of

the legislation. Major steps are needed in terms of enacting new legislation where needed, enforcing existing ones and amending old legislation that may no longer be applicable.

NATIONAL TARGET 17: By 2030, the relevant institutional and legal framework and government policies are reviewed, updated and reinforced where necessary to ensure effective biodiversity conservation and sustainable use

National Action 17.1

Train ISF inspectors on environmental matters and create within the ISF a dedicated unit to control environmental violations until the establishment of an environmental police.

National Action 17.2

Establish the environmental police.

National Action 17.3

Raise the awareness of the ISF and the municipality police on biodiversity legislation.

National Action 17.4

Review the existing environmental legislation, make necessary amendments and prepare all

remaining implementation decrees, and draft new laws where needed.

National Action 17.5

Engage inspectors from other sectors (tourism, agriculture etc.) in the identification and reporting of environmental violations.

National Action 17.6

Provide the MoJ with all existing environmental legislation and train judges.

National Action 17.7

Integrate the biodiversity agenda in NCE to enhance coordination.



PRIORITY AREA 13: RESOURCE MOBILIZATION

The allocated budget to MoE by the Lebanese Government is rather low and the number of extension staff at MoA and MoE is very limited.

Additional efforts must be carried out to mobilize resources to ensure the success of any program/ project or strategy in Lebanon.

NATIONAL TARGET 18: By 2030, Lebanon has developed and is implementing a robust resource mobilization strategy with a sustainable mechanism to finance biodiversity initiatives

National Action 18.1

Adopt the decree on the National Environmental Fund and prioritize biodiversity for funding.

National Action 18.2

Study innovative sources of financing for biodiversity.

National Action 18.3

Engage donors in the implementation of the strategy.

National Action 18.4

Engage the private sector in resource mobilization.

National Action 18.5

Conduct an environmental valuation study to promote the mobilization of internal resources.

National Action 18.6

Explore opportunities for technical assistance.

National Action 18.7

Introduce biodiversity valuation in SEAs and EIAs to assess the economic value and potential loss resulting from the assessed project's impacts.

National Action 18.8

Develop a national framework enabling proper evaluation of the economics of ecosystems and biodiversity (TEEB, BIOFIN) in Lebanon. This can include payments for ecosystem services, reforming environmentally harmful subsidies or introducing fiscal incentives for conservation.

National Action 18.9

Conduct awareness campaigns and educational seminars to introduce the concept of biodiversity valuation and its importance to decision makers and concerned stakeholders (public sector, private sector, research institutions, NGOs, etc.).

National Action 18.10

Conduct economic valuation studies for all nature reserves and make use of it in decision making, seeking internal and external funding, and ecotourism promotion.



CHAPTER 3

IMPLEMENTING THE NBSAP

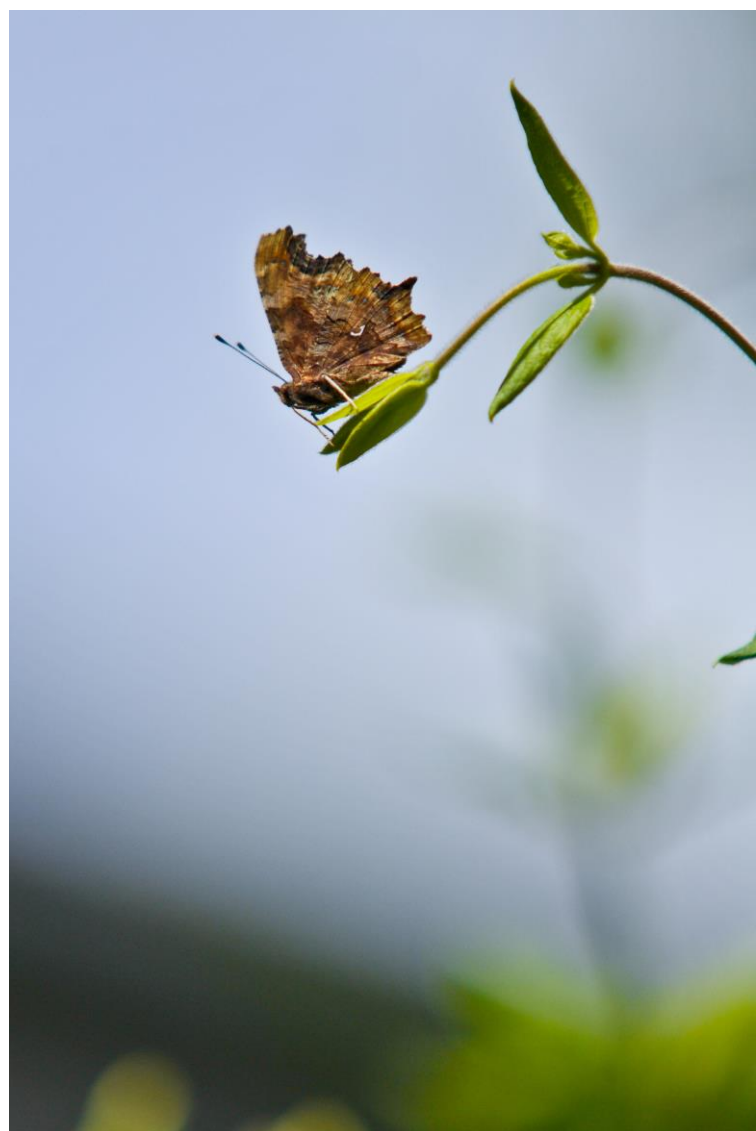
The first step before the implementation of the NBSAP is its adoption in the form of a Council of Ministers Decree. Once the Decree has been enacted, the implementation process of the NBSAP by various ministries with the support of a multitude of non-governmental stakeholders can be initiated.

Various challenges to the implementation of the NBSAP were identified as part of the development of the action plan; the main challenges being absence of funding, lack of coordination between the various concerned stakeholders, and limited data sharing. Addressing these challenges and providing solutions to the anticipated obstacles are included in the implementation plan.

Although the current CBD Strategic Plan ends in 2020, Lebanon has set its targets to 2030 given that the country is updating its NBSAP in 2016 and such a Strategy cannot span over only 4 years. The next round of global biodiversity targets is expected to be closely aligned with the Sustainable Development Goals (SDGs). Therefore, as part of the Strategy's implementation, the Targets and National Actions will be reviewed to ensure alignment with the national implementation of the SDGs in the country and with the new global biodiversity targets. The NBSAP is a live document that will be amended and adapted over the coming 14 years to cater for new international and local issues.

This chapter of the NBSAP provides the overarching principles for its effective implementation covering:

- *Enhancing the Enabling Environment for Strategy Implementation*
- *Capacity Development*
- *Resources Mobilization*
- *Communication & Outreach*
- *Monitoring & Evaluation*



3.1 Enhancing the Enabling Environment for Strategy Implementation

3.1.1 Legal Endorsement and NBSAP Implementation

The first step, before the implementation of the NBSAP, is its adoption in the form of a Council of Ministers Decree.

Following the Government's endorsement of the NBSAP, and given again the various stakeholders involved in its implementation, and to facilitate the MoE's role in leading the implementation of the NBSAP, the National

Council for Environment (NCE) has been identified as the most suitable entity to adopt the Strategy and urge its members to mainstream it into the work of their respective institutions where relevant.

The NCE was created by Decree 8157 of 2012, headed by the MoE and includes representatives of the following institutions:

- Ministry of Agriculture
- Ministry of Energy and Water
- Ministry of Interior and Municipalities
- Ministry of Transportation and Public Work
- Ministry of Industry
- Ministry of Finance
- Environmental NGOs
- Academic Sector
- Lebanese Order of Physicians
- Lebanese Order of Lawyers
- Lebanese Order of Engineers and Architects
- Association of Banks in Lebanon
- Association of Insurance Companies in Lebanon

The mandate and responsibilities of the NCE include 12 advisory tasks at the policy and planning, technical, legislative, administrative, and financial levels. The following tasks are the most important ones that will help in the implementation of the NBSAP:



Table 3.1 NCE Mandate Cross-Checked with NBSAP Priority Areas

NCE Tasks	Priority Areas of Intervention for the Implementation of the NBSAP
<p>1. At the public policy and planning level, provide suggestions for the following:</p> <p>1.1. Give an opinion on environmental policy and strategies developed by the Ministry of Environment.</p> <p>1.2. Integrate environmental concepts into policies of all development sectors in order to achieve sustainable development.</p> <p>1.3. Include environmental concepts in master plans.</p> <p>1.4. Follow-up on the treaties, international and regional conventions, and protocols that are in line with the general national environmental policy and the needs of the country.</p>	<p>Direct:</p> <ul style="list-style-type: none"> • Mainstreaming Biodiversity into National and Sub-National Policies, Plans and Programs <p>Indirect – through mainstreaming biodiversity:</p> <ul style="list-style-type: none"> • Sustainable Management and Use of Natural Ecosystems and Resources • Ecosystem Restoration (mainly through master plans) • Threatened Species • Genetic Diversity • Protected Areas • Invasive Alien Species • Communication, Education, and Public Awareness • Climate Change
<p>2. At the technical level, provide suggestions for the following:</p> <p>2.1. Assess environmental findings for every activity that is related to natural resources, and this after having implemented the activity, as a step to evaluate the effectiveness of EIA, IEE, or SEA studies (if any).</p> <p>2.2. Revise and update studies and books issued or to be issued by the Ministry of Environment; and suggest additions / amendments as seen fit by the council.</p>	<p>Direct:</p> <ul style="list-style-type: none"> • Mainstreaming Biodiversity into National and Sub-National Policies, Plans and Programs (mainly through SEA studies) • Sustainable Management and Use of Natural Ecosystems and Resources (reflected in EIA and IEE studies) • Ecosystem Restoration (through EIA, IEE, and SEA studies) <p>Indirect – through revision and updating of MoE studies and books:</p> <ul style="list-style-type: none"> • Threatened Species • Genetic Diversity • Protected Areas • Invasive Alien Species • Communication, Education, and Public Awareness • Climate Change
<p>3. At the legislative level, provide suggestions for the following:</p> <p>3.1. Prepare the necessary draft laws and systems to protect the environment and ensure the sustainability of its natural resources.</p> <p>3.2. Amend the laws and systems related to the protection of the environment and the sustainability of its natural resources to secure its comprehensiveness, progress, and applicability.</p> <p>3.3. Prepare plans, programs and projects necessary to improve respect for the obligations and requirements mentioned in international and regional treaties, conventions and protocols ratified by Lebanon.</p>	<p>Direct:</p> <ul style="list-style-type: none"> • Institutional and Legal Framework • Access and Benefit Sharing • Mainstreaming Biodiversity into National and Sub-National Policies, Plans and Programs • Climate Change <p>Indirect – through legislative texts:</p> <ul style="list-style-type: none"> • Threatened Species • Protected Areas • Genetic Diversity • Sustainable Management and Use of Natural Ecosystems and Resources • Ecosystem Restoration
<p>4. At the administrative level, provide suggestions for the following:</p> <p>4.1. Coordinate the orientations of institutions and relevant departments involved in environmental protection.</p>	<p>Direct:</p> <ul style="list-style-type: none"> • Institutional and Legal Framework • Research and Knowledge Transfer • Mainstreaming Biodiversity into National and Sub-National Policies, Plans and Programs
<p>5. At the financial level, provide suggestions for the following:</p> <p>5.1. Activate the National Environmental Fund described in articles 8 to 11 of law number 444/2002 (Environmental Protection Law).</p> <p>5.2. Develop financial incentives to facilitate environmental compliance by polluting sectors.</p>	<p>Direct:</p> <ul style="list-style-type: none"> • Resource Mobilization <p>Indirect – through environmental compliance and mobilization of the private sector:</p> <ul style="list-style-type: none"> • Sustainable Management and Use of Natural Ecosystems and Resources • Ecosystem Restoration

Moreover, in order to further ensure implementation of the NBSAP, the MoE will be taking the following steps:

- Giving priority to the NBSAP projects and activities when requesting funds from the Government for projects and programs;
- Giving priority to the NBSAP projects and activities when preparing financial proposals for donors;
- Coordinating with existing and 'in the pipeline' committees and councils (e.g.

Access and Benefit Sharing Committee, Biosafety Committee, Higher Hunting Council, and National Council for Quarries) to take the NBSAP into coordination in their works. The MoE will guide these committees and councils on the NBSAP areas where they work; and

- Including the communication and outreach plan and activities on the MoE's awareness agenda and giving it priority.

3.1.2 Capacity Development and Availing Technology Needs

The implementation of the NBSAP requires human and technological resources. These include the human capacity for the implementation of the strategy to ensure its continuity in terms of database production, monitoring and evaluation; and the technological needs to allow the execution of identified actions.

The current NBSAP revision identified key capacity building areas; which are listed below along with examples of specific actions based on the National Action Plan presented in Chapter 2 above.

Key Capacity Building Key Areas:

- Human resources in the Ministry of Environment, namely the Department of Ecosystems:
 - Employ adequate number of staff in the Department of Ecosystems;
 - Ensure continuous training of Department of Ecosystems staff, especially in new concepts of biodiversity conservation and management;

- Coordination between various ministries, especially the ones directly concerned with biodiversity:

- Sign a memorandum of understanding between MoE and each concerned ministry defining the communication and coordination procedures between the two ministries on biodiversity related matters and appoint focal points;

- Ecosystems and biodiversity valuation:

- Organize training and capacity building programs on how to perform studies on economic valuation of biodiversity and ecosystems services;

- Awareness, education, and public relations:

- Build capacity of local communities and the general public on good practices;
- Build capacity of municipalities to be able to ensure and promote biodiversity conservation at a local level;
- Promote individual upgrading at skills level for school and university teachers;

- Develop and restructure educational programs to respond to the needs in terms of threats to biodiversity and priorities.
- Environmental legislation and law enforcement:
 - Provide legal training and other human resource development programs in the field of environmental law, to enable the authorities and individuals dealing with these matters to discharge their functions with greater effectiveness and efficiency.
- Access and benefit sharing:
 - Build capacity for the proper implementation of the Nagoya Protocol and the ABS national legislation in order to regulate the access to Lebanon's biological and genetic resources and to ensure the fair and equitable sharing of the benefits arising from their utilization
- Ecosystem assessment and management including conservation, sustainable exploitation, and mapping:
 - Make the concept of "ecosystem services" well known to the public and concerned institutions so that sustainable exploitation can be ensured;
 - Develop capacities for the implementation of sustainability concepts adapted to national and local context;
 - Enhance GIS application in biodiversity assessment.

In order to ensure a holistic approach, capacity building should target the following three levels:

1. **Systemic capacity development:** includes interventions that create and improve enabling environment including policies, regulations and incentives to support individual and institutional capacity building. A systemic capacity development enhances coordination between various institutions.
2. **Institutional capacity development:** comprises the internal policies, arrangements, procedures, and human resources that allow an institution to operate and deliver on its mandate. Institutions with strengthened individual capacity will be able to develop good policies, regulations and incentives which enable implementation of interventions on the ground.
3. **Individual capacity development:** includes interventions that create and improve knowledge, skills and attitudes through training and workshops; on-the job professional development and continuing education; and/or mentoring, study tours and networking. Individual capacity development is necessary for the successful implementation of on-the ground interventions for biodiversity conservation. Strengthened individual capacities also determine an institution's capacity to perform.

3.2 Resource Mobilization

The implementation of the strategy will require financial resources; the estimated financial needs for the implementation of the overall NBSAP is in the order of 40 million USD.

A National Target on the development and implementation of a robust resource mobilization strategy with a sustainable mechanism to finance biodiversity initiatives by 2030 (Target 18) was developed along with ten (10) National Actions for its implementation:

- **National Action 18.1:** Adopt the Decree on the National Environmental Fund and prioritize biodiversity for funding
- **National Action 18.2:** Study innovative sources of financing for biodiversity
- **National Action 18.3:** Engage donors in the implementation of the strategy
- **National Action 18.4:** Engage the private sector in resource mobilization
- **National Action 18.5:** Conduct an environmental valuation study to promote the mobilization of internal resources
- **National Action 18.6:** Explore opportunities for technical assistance
- **National Action 18.7:** Introduce biodiversity valuation in SEAs and EIAs to assess the economic value and potential loss resulting from the assessed project's impacts
- **National Action 18.8:** Develop a national framework enabling proper evaluation of the economics of ecosystems and biodiversity (TEEB, BIOFIN) in Lebanon. This can include payments for ecosystem services, reforming environmentally harmful subsidies or introducing fiscal incentives for conservation
- **National Action 18.9:** Conduct awareness campaigns and educational seminars to introduce the concept of biodiversity valuation and its importance to decision makers and concerned stakeholders (public sector, private sector, research institutions, NGOs, etc.)
- **National Action 18.10:** Conduct economic valuation studies for all nature reserves and make use of it in decision making, seeking internal and external funding, and ecotourism promotion.

The NBSAP's developed financing strategy focuses on three main sources: (1) National Sources; (2) International Sources; and (3) New Funding Opportunities.

3.2.1 National Funding Sources

The Lebanese Central Treasury is the main source of national financing. However the Government does not allocate in its budget a share for biodiversity, but rather a share for the Ministry of Environment in general and funds specific programs or projects; an example is the national budget contribution to Protected Areas

committees which amounted to 1,972,133 USD from 2001 until 2015. Public financing was also allocated to reforestation with an allocation of about 16,600,000 USD out of which about 34% has been spent by the end of 2014.

A specific programme law should be issued to partly finance the NBSAP. This procedure has been followed recently as part of the implementation of the business plan to combat pollution in the Qaraoun. This plan was issued by decree, a coordination committee was officially formed, and a programme law was prepared. The law is however still pending endorsement by the Parliament.

In parallel, the NCE and the MoE shall lobby for the endorsement of the National Environmental Fund (NEF). The NEF would then serve as the perfect mechanism to channel financing for the NBSAP implementation. A draft NEF Decree has been prepared but awaits endorsement by the Council of Ministers.

3.2.2 International Funding Sources

Given the geopolitical situation of the country, Lebanon has always benefited from international funds; 7,503,447 USD have been allocated to biodiversity projects implemented through the Ministry of Environment since 2004. Implementation of the NBSAP would require significantly more resources and hence more efforts are needed in resource mobilization.

International financing for biodiversity-related projects is also obtained by other institutions to implement research and projects; these include the MoA, LARI, CNRS, OMSAR, academic institutions, NGOs, and municipalities.

Having the NBSAP as the guiding document for biodiversity-related interventions will facilitate international resource mobilization for biodiversity conservation. International financing in the form of Overseas Development Assistance (ODA) is more and more focused towards supporting programmes rather than individual projects. The NBSAP provides the framework for such programmatic approach to resource mobilization.

The international donors listed in Table 3.2 provide loans, grants, co-finance, or technical assistance for environmental projects in the Mediterranean, Middle East and Lebanon in specific, focusing mainly on governments, governmental agencies, private sector, public sector or NGOs. This forms a basis upon which the MoE and NCE can work towards mobilizing international financial resources for the implementation of the NBSAP. A number of these donors provided funds for Lebanon through implementing agencies such as:

- United Nations Environment Programme (UNEP)
- United Nations Educational, Scientific and Cultural Organization (UNESCO)
- United Nations Industrial Development Organization (UNIDO)
- United Nations Development Programme (UNDP)
- United Nations Economic and Social Commission for Western Asia (UN-ESCWA)

Table 3.2 Examples of Financing Sources

Multilateral Donors	Bilateral Donors	Funds and Foundations
<ul style="list-style-type: none"> • The Arab Fund for Economic and Social Development (AFESD) • Adaptation Fund (AF) • European Investment Bank (EIB) • Global Environmental Facility (GEF) • World Bank (WB) • Europe Aid– EC • Nordic Environment Finance Corporation (NEFCO) – Carbon Fund • Clean Technology Fund - World Bank Group • OPIC Fund for International Development (OFID) • Global Energy Efficiency and Renewable Energy Fund (GEEREF) • Special Climate Change Fund (SCCF) of GEF • Carbon Finance Unit (World Bank) • Climate Technology Initiative (CTI) • Private Financing Advisory Network (PFAN) • MDG Achievement Fund (MDG-F) • MDG Carbon Facility (UNDP) • Catastrophic Risk Management (World Bank) • International Finance Corporation (IFC) • Climate Finance Innovation Facility • Global Facility for Disaster Reduction and Recovery (GFDRR) • Mediterranean Investment Facility (MIF) • Small Grants Programme (UNDP) • Climate and Development Knowledge Network • International Climate Fund (UK-ICF) • Climate Change Technical Assistance Facility • Public Private Infrastructure Advisory Facility (PPIAF) 	<ul style="list-style-type: none"> • Japan • Kuwait • United States Agency for International Development (USAID) • Italian Cooperation • The Spanish agency for International Cooperation and Development (aecid) • Japan International Cooperation Agency (JICA) • Swedish International Development Cooperation Agency (SIDA) • Norwegian Agency for Development Cooperation (Norad) • Belgian Development Agency • Federal Ministry for Economic Cooperation and Development (BMZ) • Austrian NAMA Initiative • Development Bank of Austria • Global Methane Initiative (USEPA) • International Development Research Center CANADA (IDRC) • Fonds Francais pour l'Environnement Mondial (FFEM) • International Climate Initiative of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety • Belgian Investment Company for Developing Countries • Center for International Migration and Development • PROPARCO 	<ul style="list-style-type: none"> • Citibank/Citigroup Foundation • Critical Ecosystem Partnership Fund (CEPF) • Heinrich Boell Foundation • Aga Khan Development Foundation • Mosanto Fund • The Hatoyama Initiative • MAVA Foundation

An interesting international funding source is the Green Climate Fund (GCF) by linking biodiversity conservation to climate change. The GCF is a global initiative to respond to climate change by investing into low-emission and climate-resilient development. GCF was

established by 194 governments to limit or reduce greenhouse gas emissions in developing countries and support adaptation to climate change. The GCF is financing projects with up to 30 million USD.

3.2.3 New Funding Opportunities

New funding opportunities include innovative sources of financing such as:

- Implementation of the polluter pays principle through the establishment of punitive fees and fines that penalize and discourage environmentally harmful behavior in general and biodiversity-harmful behavior in particular.
- Commitment from the Government to allocate a share of the existing environment revenues to biodiversity conservation. Existing environment revenues include entrance fees to nature reserves, natural parks (when fully developed in Lebanon), hunting permit fees, and application fees for ABS and revenues from the ABS Agreements.
- Establishment of new areas of environment fiscal revenues, such as taxes on natural resources extraction.
- Encouraging the involvement of the private sector which can play an important role in mobilizing funds for biodiversity conservation. Engaging the private sector can be achieved through:
 - Public-Private Partnerships
 - Corporate Social Responsibility (CSR) activities
 - Environmental subsidies, provision of explicit or implicit financial support to private enterprises to promote sustainable activities (e.g. resource-efficient production and services). Explicit subsidies can be in the form of direct financial grants while implicit subsidies are indirect in the form of tax exemption, provision of public goods (power, water, etc.).

3.3 Communication and Outreach

Lack of public interest and lack of awareness in relation to biodiversity conservation have been repeatedly identified by various entities and stakeholders as challenges for the NBSAP's implementation. Therefore, as part of implementing this strategy, there is a need to improve access to knowledge through sharing and clear communication of data – putting power into the hands of people to act and hold others accountable. This has entailed the identification of “Communication, Education and Public Awareness” as one of the 13 priority areas of the NBSAP. Moreover, a target has been developed to specifically address

communication and outreach; “*Target 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.*” Through effective implementation of this enabling Target and its relevant National Actions, it is expected that such actions will support the achievement of the other Targets in the NBSAP.

The sections below detail the NBSAP's Communication and Outreach plan to be adopted.

3.3.1 Planning

The first step of communication and outreach would be a dissemination campaign informing key biodiversity stakeholders (*those interested in and those impacting biodiversity*) about the updated NBSAP, its priority areas, and action plan. This step shall be translated through a dissemination event to which all stakeholders shall be invited and where the updated NBSAP will be presented. This dissemination event will also target donors and funding agencies so that they can be informed of this new strategy. An exhaustive list of invitees will be prepared and copies of the NBSAP will be sent to bodies and institutions that will not be able to attend the dissemination event.

The second key step is identification of the “Partners in Communication and Outreach”. The MoE alone cannot undertake communication and outreach; the main partners are the relevant members of the NCE

in addition to pioneer biodiversity related NGOs and media in its various forms. Identification and engagement of available communication officers in partner agencies is essential.

The MoE is well positioned to directly address final users as well as to organize, synthesize and package information coming from multiple sources, which in turn can be used by NBSAP partner agencies and others in their direct interactions with users. The approach will therefore be to directly address final users and to assist partners in reaching out to users. MoE will facilitate communication activities of partners, seeking to coordinate and minimize competition for the attention of the same audiences, making the flow of information to end users as clear and strategic as possible, and ensuring that the information is generally perceived as highly credible and legitimate.

3.3.2 Target Groups

MoE will focus on both direct-outreach and assisting communication by partners to end users. The communication products generated will be designed to support outreach to the below listed target groups. The target groups emanate from the National Actions under Target 12; which includes awareness raising at the decision-making level (National Action 12.1), students (National Actions 12.4 and 12.5), and the general public (National Actions 12.2 and 12.5).

- **Government agencies**, such as those not directly involved in environmental management, but who can have either a positive or negative impact, namely;

- **National decision-makers:** for an efficient mainstreaming of biodiversity conservation at the national level as well as sectoral policies and plans; decision-makers need to be aware of the importance of biodiversity conservation whether for the environment in general, human health, and socio-economic factors. The key player in this step would be the MoE supported by the Ministry's staff. The Minister has the responsibility to put the NBSAP on the Council of Ministers' agenda to be legally and nationally endorsed and then promote the strategy within other ministries and push for including biodiversity conservation on their agendas as well. A different approach needs to be adopted based on the targeted ministry based on the mandate and interests of each ministry. The cost of economic

degradation, the economic valuation of ecosystems and biodiversity, as well as the associated health effects with biodiversity degradation constitute the main three drives to mobilize decision makers.

- **Local decision-makers:** Decision-makers are not only ministers and ministries, but municipalities as well. Municipalities represent the local government in Lebanon responsible for ensuring that development meets the needs of the population, are empowered to address priority needs, and are financially independent to a certain extent. Therefore, municipal councils should be informed of the NBSAP and guided as to where and how they can contribute within their jurisdictions.
- **Students:** Raising students' awareness towards the importance of biodiversity is a key element in biodiversity conservation; and the term students here encompasses all age ranges from kindergarten to university students. A crucial step is to



further adopt and implement the existing "National Strategy for Environmental Education" and "The Developed Curriculum of Environmental Education", which form the basis of environment mainstreaming in academic courses on school level. The implementation of the strategy and the curriculum should be coupled with training and capacity building of teachers.

- **Civil society organizations:** in particular national and international environmental NGOs and indigenous people organizations.
- **Business and industry:** especially natural resource-based industries (agriculture, fishing, etc.) and financial institutions.
- **General public:** The first step in mobilizing the public is to enhance the role of the awareness unit at the MoE to improve dissemination and public outreach. The media is currently the most powerful outreach and mobilization tool; media includes TV, radio, newspapers, poster campaigns (on climate change, waste, heritage, key species and habitats, etc.), magazines, and most importantly social media which allows people to easily share and exchange information, interests, ideas, pictures, and videos. A media communication and outreach detailed plan

should be prepared and implemented throughout the NBSAP's implementation period. The plan should define the tools (e.g. biodiversity related tips through SMS, a social media account/profile for biodiversity in Lebanon on different online platforms, short TV animations at peak hours, a monthly or yearly scientific journal distributed to schools, universities, public institutions, etc.), the information to be disseminated (facts and figures about biodiversity in Lebanon, NBSAP achievements, etc.), and the frequency of dissemination of each info (daily, weekly, monthly, yearly). Awareness efforts should as well be synchronized with the works of local NGOs for better outreach.



3.3.3 Goals and Expected Outcomes

The communication effort will be aimed at achieving substantive goal and a process goal:

- Position biodiversity and ecosystem services at the center of national policy making in Lebanon; and
- Catalyze the active engagement of entities that impact the natural environment in Lebanon through communicating to the target audiences. This would be achieved through National Target 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” and its National Actions:

- **National Action 12.1** Raising the awareness of decision makers on the importance of biodiversity and its conservation, sustainable management, and promoting related education (Deputies, Ministers, Directors Generals, Head of Departments and Head of Services);
- **National Action 12.2** Enhance the role of the awareness unit at the MoE to improve dissemination and public outreach through social media and direct public outreach (e.g. biodiversity related tips through SMS, a monthly or yearly scientific journal distributed to schools, universities, public institutions, etc.);

- **National Action 12.3** Build on the Central Administration of Statistics (CAS) services to assess and monitor people's awareness on biodiversity;
- **National Action 12.4** Further adopt and implement the existing “National Strategy for Environmental Education” developed by AFDC and adopted by the MoEHE. Implementation should be coupled with training and capacity building of school teachers; and
- **National Action 12.5** Organize participatory events to raise students and public' awareness about biodiversity, i.e. national science fair, guided open-house events at the MoE.

In the longer term, the communication strategy needs to result in changes in discourse, policy, behavior and biophysical and development trends, in order to meet the overall goal of the NBSAP. The NBSAP partner agencies' specific contribution to this goal is the facilitation of the flow of information needed to support decision-making. In the short run, over the duration of the project, the communication strategy is expected to result in:

- A demand from end users for information on biodiversity;
- The use of biodiversity-related information in documents, publications and news reports; and
- A growing number of entities actively engaged in conservation work, including effective and sustainable ecosystem management.

3.3.4 Activities

3.3.4.1 Coordination

MoE information will reach users directly through MoE campaigns and through each NBSAP partner agency, in particular key partners such as the Local Government Authorities (municipalities, cazas, and governorates), Ministry of Information (MoInf), and media council/associations, in accordance with their communication activities, and as requested by MoE with occasion of specific opportunities.



3.3.4.2 Interactions with users

MoE needs to regularly receive input from users to ensure that its communication is successful and to broaden its audience. For this:

- MoE will ensure that its awareness unit includes biodiversity on its agenda as per the communication and outreach plan of the NBSAP;
- MoE will follow guidance from the CBD's Programme of Work on Communication, Education and Public Awareness (CEPA) and will establish focal points and national implementation bodies for related activities. These bodies, when established, will be tasked with engaging national media,

educators, business, youth and the scientific community, and MoE will seek to coordinate a flow of information to and from these instances in order to achieve change in knowledge, attitude and behavior towards biodiversity conservation.

- The Clearing House Mechanism (CHM), an important tool serving the synchronized implementation of both the CEPA Strategy and National Target 12, will serve as the main instrument for periodic updates, including electronic alerts mailed out widely. Currently, Lebanon's CHM has been created under the international CHM website¹⁴, but the page's content is still under development. The CHM will be used as a platform to share information about biodiversity in Lebanon whether in the form of articles, events, news, pictures, and links to other websites and online libraries. The contributors to the platform have attended an initial training workshop hosted by the MoE and given by a regional trainer to introduce them to the platform's interface and get hands-on experience in sharing data. The contributors to the CHM will consist of representatives of public institutions (mainly ministries), academic institutions, and research centers. The MoE shall play the role of the CHM's administrator in charge of reviewing contributions before being publically posted and responsible for the platform's maintenance and update. The MoE also plays the role of contributor and is responsible for sharing information on the CHM.

¹⁴ <http://www.biodiv.be/liban>

3.3.4.3 Development of communication products

The MoE will produce materials that partners can use in their outreach activities, including products tailored for the five (5) main audiences (government agencies, students, civil society organizations, business/industry and general public). The products include:

- A collection of PowerPoint slides to be used by NBSAP partners to explain biodiversity and the objectives of the NBSAP. The presentations and slides should be tailored to the audience in question, e.g. a presentation to national decision-makers would have a very different content than a presentation to academic and research institutions or a presentation targeting schools students;
- Highly designed, user friendly maps, graphics and tables that can be used in multiple media. This could include animated visualizations of the data that can be used in audiovisual presentations;
- The CHM website will be the main platform for direct outreach, including periodic e-mailing to communicate updates as they become available;
- A periodic publication with a compilation of the information generated to date. The frequency of the publication needs to be determined in accordance with funds allocations and ongoing NBSAP projects and activities. The frequency will in turn determine its nature and size. For instance, a newsletter or leaflet format for the publication;
- Contacts for the press and press kits. MoE will keep an updated list of experts in the various topics to facilitate access by the media to the sources of information, as well

as a standard press pack that can be used and complemented by partners.

3.3.4.4 Delivery

In addition, MoE will:

- Liaise with partners to explore the use of its products in partners' periodic publications;
- Use existing television channels to regularly communicate the messages on biodiversity;
- Use website and electronic alerts. MoE will keep its website updated (www.moe.gov.lb) through which all its information can be accessed, and the use of social media supported (mainly the page of the Lebanese Ministry of Environment on Facebook);
- Produce press briefings and releases. Since MoE will not generate all specific media events (such as the release of findings), it will need to rely on predetermined junctures and opportunities;
- Provide biodiversity literacy training to local government staff;
- Include biodiversity literacy in the school and university curricula.



Throughout the year there are celebrations of various days associated with biodiversity and MoE partners will coordinate messaging and press releases on those dates – e.g. World Environment Day, International Day for Biodiversity, International Wetlands Day, National Protected Areas Day, National Marine Turtles Day, etc.

3.3.5 Messages

MoE will develop and propose to partners a positioning for the NBSAP partner agencies. Specific messaging will vary depending on a range of circumstances, intended audiences and events.

To frame its messages, MoE will use existing material and efforts to make biodiversity as less complex and more understandable and easier to relate to concrete policy issues. With clear

In addition, the MoE will coordinate with partners' actions to seize specific opportunities to organize press briefings and provide useful material to the press when opportunities arise (such as natural disasters or major international meetings).

articulation of the general case for biodiversity, the MoE will develop the content of its communication efforts around:

- A clear, compelling articulation of challenge/problem that MoE addresses, and its legitimacy;
- What is the NBSAP (goals, participating agencies, timeline, resources); and
- Why biodiversity is important.

3.3.6 Communication Monitoring

As part of the monitoring and evaluation of the NBSAP, a number of indicators were developed (Appendix B) including the following communication monitoring indicators:

- Number of students enrolled in higher education courses related to biodiversity and environment;
- Number of visitors to Nature Reserves (in particular schools/ universities);
- Number of environmental clubs in schools and universities, and number of club members;
- Share of school and university students and the public who are aware of the importance of biodiversity, its values, and the need for its conservation and

sustainable use to be assessed through surveys in collaboration with the CAS;

- Number of visitors to biodiversity related websites and the CHM website;
- Number of publications and media pieces related to biodiversity (example: MEA to include awareness about Lebanon's biodiversity and nature reserves in its in-flight advertisements); and
- Number of shows/documentaries about biodiversity and the environment.

Since communication will also rely on outreach by partners, it is important to establish a monitoring system early on that feeds back to MoE in order to assess the effectiveness of

communication activities and modify course accordingly.

MoE will monitor both the internal and external flow of communication. The former, to ensure that partners are well informed, engaged and able to perform the communication activities agreed. The latter, to ensure that biodiversity information is well received by end users.

For internal communication monitoring purposes, MoE will develop a tool to assess partners' levels of information, levels of

participation in the implementation of communication activities, and perception of benefits derived from MoE communication activities.

For external communication monitoring, MoE will develop, together with partners, a tool to assess progress towards achieving communication goals and results. Examples of indicators and means of verification that could be considered in this tool are presented in Table 3.3 below.

Table 3.3 Examples of Indicators and Means of Verification

Goal	Result	Indicator	Means of verification
Goal 1: Positioning	A demand from end users for the information generated by MoE and NBSAP partner agencies	<ul style="list-style-type: none"> - Number of downloads from website - Number of notes of request for material from users - Survey of users that receive materials directly from MoE and NBSAP partner agencies 	<ul style="list-style-type: none"> - Download records/statistics - Written notes received - Survey forms received
	The use of MoE and NBSAP partner agency information in documents, publications and news reports	<ul style="list-style-type: none"> - Number of citations / graphics used in publications and official reports - Media hits 	<ul style="list-style-type: none"> - Publication / reports clippings - Press clippings
Goal 2: Engagement	Formal recognition of the MoE and NBSAP partner agencies products by central legislative governmental bodies	<ul style="list-style-type: none"> - Number of decisions and resolutions adopted that make reference specifically to biodiversity - Number of information documents requested by organizations 	<ul style="list-style-type: none"> - Decisions and resolutions - Information documents
	A growing number of entities actively engaged with MoE and NBSAP partner agencies' work, both in the production of information and in its dissemination	<ul style="list-style-type: none"> - Number of requests to join in activities - Number of new members accepted 	<ul style="list-style-type: none"> - Letters from prospective members - Letters accepting inclusion in activities

3.4 Monitoring and Evaluation

In order to assess the delivery of this biodiversity strategy and identify further actions needed, the implementation of the NBSAP and progress towards the 2020 targets will be monitored and assessed using a set of indicators developed for each target. The list of developed indicators is presented in Appendix B.

The indicators will help in assessing the extent of implementation of the updated NBSAP, areas of success, and areas of failure or delay. Assessment of these indicators should be the basis for the next NBSAP update.



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Appendix A: National Targets, National Actions And Responsibilities

National Target	National Action (s)	Responsibility (ies)	Timeline	
			Start Date	End Date
Target 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	1.1 Update the 1996 biodiversity national inventory (Biodiversity Country Study) prepared by the MoA based on field surveys of fauna and flora	Lead: MoA Others: MoE, CNRS, LARI, Academic institutions , Research centers	2016	2025
	1.2 Develop criteria for the evaluation of conservation status for identified flora and fauna and evaluate the status of the species in the updated inventory	Lead: MoE Others: Research institutions, Academic institutions, Public and private sectors, IUCN, Other similar NGOs	<i>Criteria to be developed in 2017</i>	
	1.3 Initiate a program for mapping and monitoring threatened species in key/ selected ecosystems	Lead: MoE Others: MoA, Research institutions, Academic institutions, Private and public sectors	2017	2018
	1.4 Include threatened species in national conservation strategies and regulations; namely <i>in-situ</i> and <i>ex-situ</i> conservation programs	Lead: MoE, MoA Others: Research and academic institutions, National and international organizations	2019	2030
	1.5 Develop species-specific conservation legislation and conservation action plans to ensure conservation of important species, particularly endemic/ threatened species	Lead: MoE Others: Academic institutions, Experts with relevant technical and scientific background	2017	2019

National Target	National Action (s)	Responsibility (ies)	Timeline	
			Start Date	End Date
Target 2: By 2030, the genetic diversity of 50% of important native fauna and flora is conserved <i>in-situ</i> and <i>ex-situ</i>	2.1 Build on the results of National Actions 1.1 and 1.2 to extract the list of endemic and economically important species (such as medicinal plants, aromatic plants, wild relatives, etc.) and their conservation status	Lead: MoE Others: MoA, LARI, Research institutions, Public and private sectors	2020	2025
	2.2 Conduct monetary valuations of endemic and economically important species	Lead: MoA Others: MoE, LARI, Research institutions, Public and private sectors	2017	2025
	2.3 Create a GIS database mapping existing endemic and economically important species geographical location and extent	Lead: CNRS Others: MoA, MoE, LARI, Lebanese army	2025	2025
	2.4 Include endemic and economically important species in national conservation strategies and regulations; namely <i>in-situ</i> and <i>ex-situ</i> conservation programs (gene banks and on farm)	Lead: MoE, MoA Others: LARI, Research institutions, Academic institutions, National and international organizations	2016	2030
	2.5 Adopt the outcomes of the Mainstreaming Biodiversity Management into Medicinal and Aromatic Plants project and expand it to encompass other economically important species	Lead: MoA Others: MoE, LARI, Universities, Local NGOs	2016	2018
Target 3: By 2030, the implementation mechanism of the Cartagena Protocol on Biosafety is operational	3.1 Enforce and make operational national legislation on biosafety through issuance of implementation mechanisms	Lead: MoE Others: MoA, Other concerned ministries, Academic and Research institutions	2017	2020
	3.2 Assess the risks related to LMOs and monitor the adequacy of equipment at certified laboratories	Lead: MoA Others: LARI or other certified laboratories, research centers	2017	2020

National Target	National Action (s)	Responsibility (ies)	Timeline	
			Start Date	End Date
Target 4: By 2030, at least 20% of natural terrestrial and marine ecosystems are protected and all types of ecosystems are represented in the PA network	4.1 Develop clear and standardized criteria for characterizing natural and semi-natural ecosystems found across the country	Lead: MoE, MoA Others: Municipalities	2016	2017
	4.2 Classify identified ecosystems based on clear criteria to help guide and orient the level of emergency for intervention and the intervention approach required (conservation, restoration, sustainable land management, sustainable use of natural resources)	Lead: MoE, MoA Others: Municipalities	2017	2020
	4.3 Produce a national map of ecosystem types and classifications to serve as a decision making support tool and set timelines for repeating the surveys	Lead: CNRS Others: MoA, MoE, LARI, Lebanese army	2020	2020
	4.4 Identify areas of high biodiversity values (such as hotspots) among the identified natural ecosystems	Lead: CNRS Others: MoA, MoE, LARI, Lebanese army	2020	2020
	4.5 Include the newly identified areas of high biodiversity value in the PA network	Lead: MoE Others: MoA, Research centers, Academic institutions, Public and private sectors, IUCN, Other similar NGOs	2020	2030
	4.6 Identify areas that could potentially become ecological corridors (such as thalwegs, sea canyons, and mountain peaks) and start preparing them (e.g. plant native trees)	Lead: MoA, MoE Others: CDR, CNRS	2020	2020
	4.7 Develop landscaping guidelines promoting the use of local and native species and enforce their implementation at a minimum in government funded projects and mainstream them into SEAs and EIAs	Lead: MoA, MoE, Landscape architects (Syndicates) Others: CDR (implementation), Academic institutions (education)	2017	2018

National Target	National Action (s)	Responsibility (ies)	Timeline	
			Start Date	End Date
Target 5: By 2030, the total percent coverage of nature reserves is increased to reach at least 5% of Lebanon's area	5.1 Take action to protect areas identified as "in need of protection" by the Sustainable Institutional Structure for Protected Areas Management (SISPAM) Project and other areas identified by MoE	Lead: MoE Others: MoA, LARI, CNRS, NGOs, Municipalities, Academics, Research institutions	2016	2030
	5.2 Identify further priority areas for conservation and establish ecological inventories for these areas			
	5.3 Establish terrestrial nature reserves in the newly identified priority areas for conservation	Lead: MoE Others: Research institutions, Academic institutions, Public and private sectors, IUCN, Other similar NGOs	2016	2030
	5.4 Implement the Marine Protected Area Strategy and establish the proposed marine nature reserves	Lead: MoE Others: CNRS, Research institutions, Academic institutions, Public and private sectors, IUCN, Other similar NGOs	2016	2030
	5.5 Endorse the revised protected areas category system, law and related decree	Lead: MoE, CoM, Parliament	2016	2018
Target 6: By 2030, 50% of all natural ecosystems are sustainably managed and properly considered in spatial planning implementation	6.1 Extract, from Land Use/ Land Cover database, a map on national ecosystems highlighting those in need for sustainable management	Lead: MoE Others: MoA, CAS, CNRS, OMSAR, CDR	2016	2018 (for the Maps) 2019 (for the inventory)
	6.2 Enforce regulations related to the management of nature reserves and increase the level of fines in relation with the nature of goods and services illegally harvested and extracted	Lead: MoE Others: MoJ, IFS	2016	2022

National Target	National Action (s)	Responsibility (ies)	Timeline	
			Start Date	End Date
	6.3 Include non-officially classified natural ecosystems of high ecological and biodiversity value in the Master Plans of each related village	Lead: DGUP Others: Municipalities, MoE, MoA	2018	2030
	6.4 Establish a management plan for the natural areas of high ecological and biodiversity values (for those that are not classified as PAs)	Lead: MoA, Municipalities Others: CNRS, Universities	2020	2030
	6.5 Identify and map the extent and spatial distribution of area under sustainable forestry, fisheries, grazing, agriculture and water management, including information on safe ecological limits of these productive system	Lead: MoE Others: MoA, CNRS, DGUP	2018	2030
	6.6 Organize capacity building and awareness campaigns on the value of biodiversity and the sustainable use of natural resources	Lead: MoE Others: UN agencies, NGOs	2016	2030
Target 7: By 2030, the gap between Lebanon's ecological footprint and bio-capacity is alleviated to reach an equal state	7.1 Reevaluate Lebanon's bio-capacity as per the Global Footprint approach (<i>latest study was in 2011</i>)	Lead: MoE Others: CNRS	2017	2017
	7.2 Assess the current ecological footprint on the identified natural ecosystems	Lead: MoE Others: CNRS	2017	2018
	7.3 Carry out valuations of ecosystem goods and services at the national level (payable ecosystem services)	Lead: MoE Others: CNRS	2019	2025
	7.4 Disseminate the results of the studies related to the economic value of biodiversity to decision makers. Provide recommendations on appropriate policy responses	Lead: MoE Others: MoF, MoET	2020	2030

National Target	National Action (s)	Responsibility (ies)	Timeline		
			Start Date	End Date	
Target 8: By 2030, the private sector has taken steps to implement plans for sustainable production and consumption to mitigate or prevent negative impacts on ecosystems from the use of natural resources	8.1	Create incentives and establish a legislative framework for the private sector's engagement in biodiversity actions	Lead: MoF/MoE	2016	2018
	8.2	Implement the developed incentives mechanism	Lead: MoF/MoE	2016	2020
	8.3	Conduct awareness campaigns on the need to endorse sustainable strategies (e.g. sustainable consumption targeting consumers etc.)	Lead: MoE Others: UNDP, USAID, NGOs	2016	2030
Target 9: By 2030, rehabilitation plans are implemented in at least 20% of degraded sites so that they can safeguard the sustained delivery of ecosystem services	9.1	Update and complete existing inventories to prepare a national inventory of degraded sites by type and location	Lead: MoE Others: MoA, CAS, CNRS, CDR	2018	2020
	9.2	Develop technical guidelines for the rehabilitation of the different types of degraded sites and give them a legally binding status	Lead: MoE Others: MoA, CNRS, National Council for Quarries	2017	2018
	9.3	Develop a prioritization scheme based on socio-environmental criteria to specify sites in need of immediate intervention	Lead: MoE Others: MoA, CAS, CNRS, OMSAR, CDR	2018	2018
	9.4	Review and adapt existing rehabilitation plans to comply with the newly developed guidelines	Lead: MoE	2018	2022
	9.5	Develop a master plan for the rehabilitation of different types of degraded sites that builds on existing master plans (i.e. quarry and dumpsite rehabilitation)	Lead: MoE, MoA Others: CNRS, Universities	2018	2022

National Target	National Action (s)	Responsibility (ies)	Timeline	
			Start Date	End Date
	9.6 Secure funding, internally or from international donors, to enable the rehabilitation of priority sites	Lead: MoE, MoA Others: UN agencies, MoF, Private sector	2018	2030
	9.7 Undertake pilot rehabilitation in key sites based on the developed prioritization scheme covering at least one of each type: quarries, dumpsites, degraded forest, rangeland, riverbed, old terraces, and coastal areas	Lead: MoE Others: Municipalities, Universities, NGOs	2018	2022
	9.8 Designate selected degraded sites as pilot sites for research and development of effective rehabilitation methods	Lead: MoE Others: Universities, Research institutions, NGOs	2018	2030
Target 10: By 2030, the national law on access and benefit sharing is endorsed, operational and enforced	10.1 Finalization of the MoE draft law on Access to Lebanese biological and genetic resources and sharing of the benefits arising from their utilization (in relation to Nagoya Protocol) in harmony with the MoA draft law on the Management of Lebanese Plant Genetic Resources in relation to the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)	Lead: MoE, MoA Others: Relevant national committees	2016	2016
	10.2 Development of implementation decrees for each Law	Lead: MoE, MoA Others: Relevant national committees	2017	2018
	10.3 Development of legal monitoring and compliance procedures with defined roles and responsibilities	Lead: MoE, MoA	2016	2018

National Target	National Action (s)	Responsibility (ies)	Timeline	
			Start Date	End Date
Target 11: By 2030, effective measures are in place to control the introduction and diffusion of Invasive Alien Species (IAS) into the environment	11.1 Support ongoing efforts for the establishment of a register of IAS reported in the Mediterranean basin. This register should be considered a live document to be updated when new IAS are identified	Lead: MoE, MoA Others: CNRS, Research centers	2016	2030
	11.2 Identify and map pathways of introduction/proliferation of IAS in Lebanon to allow for better management and monitoring	Lead: MoE, MoA Others: CNRS, Research centers	2020	2030
	11.3 Regulate the import of species for agricultural, landscape, recreational, and reforestation purposes to avoid genetic pollution of local species and genotypes	Lead: MoE, MoA Others: MoJ	2016	<i>Continuous</i>
	11.4 Develop and implement an awareness strategy for the management of identified IAS	Lead: MoE, MoA Others: CNRS, Research centers	2016	<i>Continuous</i>
Target 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	12.1 Raise the awareness of decision makers on the importance of biodiversity and its conservation, sustainable management, and promoting related education (Deputies, Ministers, Directors General, Heads of Departments and Heads of Services)	Lead: NCE, MoE Others: CoM, MoA, MoEW, MoIM, MoEHE	2016	<i>Continuous</i>
	12.2 Enhance the role of the awareness unit at the MoE to improve dissemination and public outreach through social media and direct public outreach (e.g. biodiversity related tips through SMS, a monthly or yearly scientific journal distributed to schools, universities, public institutions, etc.)	Lead: MoE awareness unit	2016	<i>Continuous</i>
	12.3 Build on the Central Administration of Statistics (CAS) services to assess and monitor people's awareness on biodiversity	Lead: CAS, MoE Others: The public	Start in 2016 and every 3 years	

National Target	National Action (s)	Responsibility (ies)	Timeline	
			Start Date	End Date
	12.4 Further adopt and implement the existing National Strategy for Environmental Education developed by AFDC and adopted by the MoEHE. Implementation should be coupled with training and capacity building of school teachers.	Lead: MoEHE	2018	<i>Continuous</i>
	12.5 Organize participatory events to raise students and public' awareness about biodiversity, i.e. national science fair, guided open-house events at the MoE	Lead: MoEHE, Schools Others: MoE	2018	<i>Continuous</i>
Target 13: By 2030, government entities mainstream biodiversity priorities (conservation, benefits sharing, pressure alleviation, sustainable management, sustainable use of natural resources) into their policy making processes and their implementation	13.1 Promote the Strategic Environmental Assessment (SEA) Decree (number 8213/2012) in the public sector and institutions at both, the central and local levels	Lead: MoE	2017	<i>Continuous</i>
	13.2 Develop guidelines for the implementation of ecological impact assessments as part of the SEA, a planning process and training sessions	Lead: MoE	2017	2017
	13.3 Strengthen the capacity of MoE to implement the SEA process (including review) by creating a dedicated unit or expert groups within the ministry	Lead: MoE	2018	2020
	13.4 Strengthen the planning capacity in all sectors (similar to SISSAF project) and enhance environmental considerations	Lead: MoE Others: PCM, OMSAR	2017	2025
	13.5 Establish a mechanism to enforce the implementation of environmental measures in national and sectoral strategies and policies such as agriculture, fisheries, forestry, tourism, poverty reduction, sustainable development, land use, water, coastal management, climate change, and disaster risk reduction	Lead: PCM Others: MoE	2017	2018

National Target	National Action (s)	Responsibility (ies)	Timeline	
			Start Date	End Date
	13.6 Hire the necessary technical permanent staff in the departments of the various concerned ministries (e.g. Department of Ecosystems at MoE)	Lead: All concerned ministries (MoE, MoA, MoJ etc.)	2016	2018
	13.7 Conduct training and capacity building to raise awareness and build technical skills in public institutions concerned with biodiversity conservation; e.g. MoA, MoEHE, DGUP, CDR, MoEW, MoPWT, etc.	Lead: MoE	2017	<i>Continuous</i>
	13.8 Raise the awareness of the internal security forces and the municipality police on biodiversity legislation	Lead: MoE Others: NGOs	2017	<i>Continuous</i>
Target 14: By 2030, vulnerable ecosystems to climate change are identified and adaptation plans are developed and implemented	14.1 Identify key ecosystems vulnerable to climate change and their needs for adaptation	Lead: MoE (Climate Change Unit) Others: CNRS, Research centers	2017	2020
	14.2 Include a chapter dedicated to biodiversity and vulnerable ecosystems in Lebanon's National Communications to the United Nations Framework Convention on Climate Change (UNFCCC)	Lead: UNDP, MoE Others: University, research institutions, LARI, CNRS, MoEW	2016	<i>Continuous</i>
	14.3 Define pilot national monitoring sites and species, representing the various ecosystems, to monitor medium and long term effects of climate change and implement pilot action to adapt natural ecosystems to climate change	Lead: MoE Others: Nature reserves, MoA, Municipalities	2020	<i>Continuous</i>

National Target	National Action (s)	Responsibility (ies)	Timeline	
			Start Date	End Date
Target 15: By 2030, research on biodiversity is improved in Lebanon, and research outputs and biodiversity related reports are shared through a centralized platform (from both public and private institutions), which is updated and made accessible to the public (CHM)	15.1 Create a Research and Information Unit responsible for centralizing biodiversity related information and coordinating the works between the multiple stakeholders, mainly public, private, academics and NGOs	Lead: CNRS Others: Academic institutions	2020	<i>Continuous</i>
	15.2 Identify priority areas of research in the biodiversity field	Lead: MoE, CNRS, MoA Others: Academia, Research institutions (public and private)	2016	2018 – <i>should be continuously updated</i>
	15.3 Update the national Science Technology and Innovation Policy (STIP) to include biodiversity as a priority and define the areas where research is needed within the biodiversity sector	Lead: MoE, CNRS, MoA Others: Academia, Research institutions (public and private)	2018	2020
	15.4 Allocate larger budgets for research on biodiversity valorization: conservation, sustainable management, and economic valuation	Lead: CNRS Others: MoF, PCM	2020	<i>Continuous</i>
Target 16: By 2030, traditional knowledge, uses, and practices of local communities relevant to biodiversity and sustainable use of resources are documented, preserved, and shared/published	16.1 Prepare a survey of assessment on the traditional use of folk medicine, herbals, food and feed, seed production and preservation, flora and fauna uses and agricultural practices. The survey will be published once completed	Lead: MoSA, MoIM Others: Federations of Municipalities, Municipalities, NGOs, MoA, MoE, MoC, MoT, Media, Academic institutions, Research institutions, Local committees	2016	2025
	16.2 Plan festivals exhibiting local and traditional practices in different localities of Lebanon. Those festivals could be expanded all over the country	Lead: Festival Committee, NGOs, Municipalities Others: Associations	2020	<i>Continuous</i>

National Target	National Action (s)	Responsibility (ies)	Timeline	
			Start Date	End Date
Target 17: By 2030, the relevant institutional and legal framework and government policies are reviewed, updated and reinforced where necessary to ensure effective biodiversity conservation and sustainable use	17.1 Train ISF inspectors on environmental matters and create within the ISF a dedicated unit to control environmental violations until the establishment of an environmental police	Lead: MoE, MoIM	2016	2018
	17.2 Establish the environmental police	Lead: MoE Other: MoIM	2018	2019
	17.3 Raise the awareness of the ISF and the municipality police on biodiversity legislation	Lead: MoE, MoIM, MoJ Others: Environmental NGOs	2018	<i>Continuous</i>
	17.4 Review the existing environmental legislation, make necessary amendments and prepare all remaining implementation decrees, and draft new laws where needed	Lead: MoE	2019	<i>Continuous</i>
	17.5 Engage inspectors from other sectors (tourism, agriculture etc.) in the identification and reporting of environmental violations	Lead: MoE	2019	<i>Continuous</i>
	17.6 Provide the MoJ with all existing environmental legislation and train judges	Lead: MoE Others: MoJ	2017	<i>Continuous</i>
	17.7 Integrate the biodiversity agenda in NCE to enhance coordination	Lead: MoE's relevant department	2017	<i>Continuous</i>
Target 18: By 2030, Lebanon has developed and is implementing a robust resource mobilization strategy with a sustainable mechanism to finance biodiversity initiatives	18.1 Adopt the Decree on the National Environmental Fund and prioritize biodiversity for funding	Lead: MoE	2018	2018
	18.2 Study innovative sources of financing for biodiversity	Lead: MoE	2019	<i>Continuous</i>
	18.3 Engage donors in the implementation of the strategy	Others: MoF, Private sector, donors		

National Target	National Action (s)	Responsibility (ies)	Timeline	
			Start Date	End Date
	18.4 Engage the private sector in resource mobilization			
	18.5 Conduct an environmental valuation study to promote the mobilization of internal resources	Lead: MoE Others: PAs, MoF, academic institutions	2019	2020
	18.6 Explore opportunities for technical assistance	Lead: MoE	2018	2020
	18.7 Introduce biodiversity valuation in SEAs and EIAs to assess the economic value and potential loss resulting from the assessed project's impacts	Lead: MoE Others: PAs, MoF	2019	<i>Continuous</i>
	18.8 Develop a national framework enabling proper evaluation of the economics of ecosystems and biodiversity (TEEB, BIOFIN) in Lebanon. This can include payments for ecosystem services, reforming environmentally harmful subsidies or introducing fiscal incentives for conservation	Lead: MoE Others: MoF, Private sector, Donors	2020	2025
	18.9 Conduct awareness campaigns and educational seminars to introduce the concept of biodiversity valuation and its importance to decision makers and concerned stakeholders (public sector, private sector, research institutions, NGOs, etc.)	Lead: MoE Others: PAs, MoF	2019	<i>Continuous</i>
	18.10 Conduct economic valuation studies for all nature reserves and make use of it in decision making, seeking internal and external funding, and ecotourism promotion		2019	2030

Appendix B: Identified Indicators for Each National Target

National Target	Impact Indicator	Available	Need to be established	Frequency	Source of data
Target 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	1. Number of species (fauna and flora) listed in the IUCN Red List and national red list		<i>Partially available: Starting in plants, available to some birds, amphibians and reptiles</i>	5 to 10 years	Universities, CNRS, MoE
	2. Number of data points/records in the national inventory of species		✓	5 to 10 years	Universities, CNRS, MoE, MoA
	3. Number of species in the seed and gene banks databases	<i>Available for some plants only</i>	✓	Yearly	Universities, CNRS, MoE, MoA
	4. Number of related legislation and laws	Ongoing	✓	Continuous	Ministries, Parliament, Official gazette
	5. Percent of known flora identified and conservation status assessed		✓	3 to 5 years	Universities, CNRS, LARI, MoE, MoA
	6. Percent of known fauna identified and conservation status assessed		✓	3 to 5 years	Universities, CNRS, MoE, MoA
	7. Percent of threatened species with conservation actions implemented		<i>Available for some species</i>	✓	5 to 10 years

National Target	Impact Indicator	Available	Need to be established	Frequency	Source of data
Target 2: By 2030, the genetic diversity of 50% of important native fauna and flora is conserved <i>in-situ</i> and <i>ex-situ</i>	1. Number of species in the seed and gene bank databases	✓	✓	Yearly	Universities, CNRS, MoE, MoA
	2. Quantity of local species sold in local markets	✓		Yearly	MoA, MoE
	3. Number of revised policies and laws related to conservation of endemic and economically important species	✓		Continuous	MoA, MoE, Parliament, Official gazette
	4. Percent of economically important fauna with conservation of their genetic diversity ensured (through in-situ and ex-situ measures)	✓		3 to 5 years	Universities, CNRS, MoE, MoA
	5. Percent of economically important flora with conservation of their genetic diversity ensured (through in-situ and ex-situ measures)	✓		3 to 5 years	Universities, CNRS, MoE, MoA
	6. Percent of endemic fauna with conservation of their genetic diversity ensured (through in-situ and ex-situ measures)	✓		3 to 5 years	Universities, CNRS, MoE, MoA
	7. Percent of endemic flora with conservation of their genetic diversity ensured (through in-situ and ex-situ measures)	✓		3 to 5 years	Universities, CNRS, MoE, MoA

National Target	Impact Indicator	Available	Need to be established	Frequency	Source of data
Target 3: By 2030, the implementation mechanism of the Cartagena Protocol on Biosafety is operational	1. Number of implemented decisions and procedures related to the Decree on "National Measures on Biosafety" issued		✓	Continuous	MoE
	2. Number of applications related to the import and use of LMOs submitted		✓	Continuous	MoE
	3. Number of approval related to the import and use of LMOs issued		✓	Continuous	MoE
	4. Number of trained staff in place to administer the national biosafety system		✓	Yearly	MoE
	5. Number of adequately equipped and certified laboratories		✓	Yearly	MoE
	6. Number of "risk assessment" conducted		✓	Yearly	MoE, certified laboratories
	7. Ratio of risk assessment summary reports as against number of decisions on LMOs		✓	Yearly	MoE
	8. Number of submissions to the Biosafety Clearing House (BCH)		✓	Yearly	MoE
Target 4: By 2030, at least 20% of natural terrestrial and marine ecosystems are protected and all types of ecosystems are represented in the PA network	1. Percent area coverage of protected natural ecosystems		✓	Yearly	MoE, MoA
	2. Percent of all types of Lebanon's ecosystems represented in the PA network		✓	Yearly	MoE, MoA
	3. Number of management plans for different Pas	✓		3 years	MoE, MoA

National Target	Impact Indicator	Available	Need to be established	Frequency	Source of data
Target 5: By 2030, the total percent coverage of nature reserves is increased to reach at least 5% of Lebanon's area	1. Percent coverage of Lebanon's area by Nature Reserves	✓		Yearly	MoE
	2. Number of new laws establishing new nature reserves issued	✓		3 years	MoE, Parliament
Target 6: By 2030, 50% of all natural ecosystems are sustainably managed and properly considered in spatial planning implementation	1. Number of EIAs and SEAs that account for impacts on biodiversity and ecosystem services	✓		Yearly	MoE
	2. Number of Management Plans issued for the natural areas of high biodiversity values (other than the sites classified as "Protected Areas")		<i>Partially established</i>	Yearly	MoE, MoA
	3. Change in land use/land cover towards sustainable management over time		<i>Partially established</i> <i>Base maps are available at CNRS. Project initiated being partially implemented by CDR and DGUP</i>	5 to 10 years	MoE, MoA, CDR, CNRS, DGUP
	4. Number of times biodiversity is mentioned in national plans across all sectors		<i>Partially established (Initiated at AUB)</i>	5 years	MoE, MoA, Universities, CNRS, DGUP, CDR
	5. Number of and surface area of quarries and share of total quarries with biodiversity management/offset plans	✓		Yearly	MoE
	6. Amount of funds allocated for sustainable management			✓	Yearly

National Target	Impact Indicator	Available	Need to be established	Frequency	Source of data
	7. Number of Master Plans addressing biodiversity and ecosystems		✓	5 years	DGUP, MoE, MoA municipalities
	8. Percent area of all natural ecosystems under sustainable management		✓	5 years	MoE, MoA, municipalities
	9. Percent of terrestrial spatial plans that include natural ecosystems		✓	5 years	CDR, DGUP, MoE, MoA, municipalities
	10. Percent of marine spatial plans that include natural ecosystems		✓	5 years	CDR, DGUP, MoE, MoPWT, municipalities
Target 7: By 2030, the gap between Lebanon's ecological footprint and biocapacity is alleviated to reach an equal state	1. Change in Lebanon's footprint network	✓		Yearly	MoE
	2. Number and extent of Pas	✓		Yearly	MoE
	3. The gap between Lebanon's ecological footprint and biocapacity	<i>Available until the year 2011</i>	✓		5 years
Target 8: By 2030, the private sector has taken steps to implement plans for sustainable production and consumption to mitigate or prevent negative impacts on ecosystems from the use of natural resources	1. Number of businesses that have plans for sustainable production and consumption to mitigate or prevent negative impacts on ecosystem from the use of natural resources	<i>Data partially available through environmental audits</i>		Yearly	MoE, MoI, CDM
	2. Number of private establishments implementing sustainable production / consumption strategies	<i>Data partially available through environmental audits</i>		Yearly	MoE, MoI, CDM
	3. Percentage of the plans that are being implemented		✓	Yearly	MoE, MoI, CDM

National Target	Impact Indicator	Available	Need to be established	Frequency	Source of data
	4. Number of private sector establishments developing and/or implementing EIAs	<i>Data available but needs to be organized and analyzed</i>		Yearly	MoE
	5. Number of ISO 14000 accredited establishments	✓		Yearly	Accreditation bodies
Target 9: By 2030, rehabilitation plans are implemented in at least 20% of degraded sites so that they can safeguard the sustained delivery of ecosystem services	1. Amount of funds allocated for rehabilitation plans		✓	Yearly	MoE, CNRS
	2. Percent of degraded sites with implemented rehabilitation plans		✓	Yearly	MoE, CNRS
	3. Total number of sites requiring rehabilitation		✓	Yearly	MoE, CNRS
Target 10: By 2030, the national law on access and benefit sharing related to is endorsed, operational and enforced	1. National law on access and benefit sharing of biological and genetic resources is adopted	✓		Yearly	MoE, Parliament
	2. Number of applications for ABS submitted		✓	Yearly	MoE, MoA
	3. Number of prior informed consent (PIC) issued by Lebanon related to ABS		✓	Yearly	MoE, MoA
	4. Number of signed ABS agreements for exchange of biological resources		✓	Yearly	MoE, MoA
	5. Number of infringements		✓	Yearly	MoE, MoA

National Target	Impact Indicator	Available	Need to be established	Frequency	Source of data
Target 11: By 2030, effective measures are in place to control the introduction and diffusion of IAS into the environment	1. Number of revised policies and laws and legal texts issued that cover IAS	✓		Yearly	MoE, MoA, Parliament, Official gazette
	2. Number of measures in place to control the introduction and diffusion of IAS into the environment	✓	✓	Yearly	Universities, NGOs, Ministries
	3. Trends in number of invasive species		✓	5 years	MoA, MoE, Universities
	4. Number of trainings and capacity building seminars related to IAS	✓		3 years	MoA, MoE, Universities, Media, Journals
	5. Number of awareness, press, events, media releases, Google trends in Lebanon, related to the topic	✓		3 years	MoA, MoE, Universities, Media, Journals
Target 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	1. Number of students enrolled in higher education courses related to biodiversity and environment	✓		5 years	Universities, MoEHE, MoE
	2. Number of visitors to Nature Reserves (in particular schools/universities)		<i>Available, but data need to be compiled from various stakeholders</i>	Yearly	PAs Committees, MoE
	3. Number of environmental clubs in schools and universities, and number of club members		<i>Available, but data need to be compiled from various stakeholders</i>	5 years	Schools, Universities, MoE

National Target	Impact Indicator	Available	Need to be established	Frequency	Source of data
	4. Percent of school and university students and the public who are aware of the importance of biodiversity, its values, and the need for its conservation and sustainable use		✓	5 years	MoE, CAS
	5. Number of visitors to biodiversity related websites and CHM website		✓	Yearly	MoE, biodiversity websites operators (Universities)
	6. Number of publications and media posts related to biodiversity (example: MEA to include awareness about Lebanon's biodiversity and nature reserves in its in-flight advertisements)		✓	Yearly	MoE, Universities, Media, Journals
	7. Number of shows/documentaries about biodiversity and the environment		✓	Yearly	MoE, Universities, Media, Journals
Target 13: By 2030, government entities mainstream biodiversity priorities (conservation, benefits sharing, pressure alleviation, sustainable management, sustainable use of natural resources) into their policy making processes and their implementation	1. Number of SEAs completed and approved by MoE		✓	Yearly	MoE
	2. Number of sectoral policies, plans and strategies addressing biodiversity		✓	Yearly	CoM, MoE, MoA
	3. Number of staff dedicated to environmental management in sectoral ministries		✓	Yearly	MoE
	4. Number of government entities which have included biodiversity priorities into their policy making processes		✓	Yearly	MoE, Concerned ministries

National Target	Impact Indicator	Available	Need to be established	Frequency	Source of data
Target 14: By 2030, vulnerable ecosystems to climate change are identified and adaptation plans are developed and implemented	1. Percent of ecosystem types assessed for vulnerability to climate change		✓	5 years	CCCU, MoE, Universities
	2. Percent of ecosystems vulnerable to climate change with adaptation plans being implemented		✓	5 years	CCCU, MoE, Universities
	3. Percent of national plans and strategies that consider climate change adaptation	<i>Partially available as part of CCCU's works and database</i>		Yearly	CCCU, MoE
	4. Number of sectoral plans addressing climate change	<i>Partially available as part of CCCU's works and database</i>		Yearly	CCCU, MoE
Target 15: By 2030, research on biodiversity is improved in Lebanon, and research outputs and biodiversity related reports are shared through a centralized platform (from both public and private institutions), which is updated and made accessible to the public (CHM)	1. Number of publications related to biodiversity by type of publication: scientific publications, textbooks, general interest, children's books, etc.		<i>Available, but data need to be compiled from various stakeholders</i>	Yearly	MoE, Universities, Media, Journals, CHM
	2. Number of visitors to the CHM created platform		✓	Yearly	MoE
	3. Number of contributors to the CHM, posting biodiversity related research and publications		✓	Yearly	MoE
	4. Number of biodiversity related research, studies and publications posted in the CHM		✓	Yearly	MoE

National Target	Impact Indicator	Available	Need to be established	Frequency	Source of data
	5. Number of relevant posts/tweets/etc. on social media		✓	Yearly	MoE, social media
	6. Number of publications mentioned in local media		✓	Yearly	MoE, local media
	7. Amount of budget allocated for related research		✓	Yearly	MoE, CNRS, Universities
	8. Number of projects allocated for related research		✓	Yearly	MoE, CNRS, Universities
	9. Amount of budget allocated for scholarships and grants related to research studies (Number of announcements/ Number of grants etc.)		<i>Available, but data need to be compiled from various stakeholders</i>	Yearly	MoE, MoEHE, CNRS, Universities
	10. Number of downloads of the publications and various documents from the CHM		✓	Yearly	MoE
Target 16: By 2030, traditional knowledge, uses, and practices of local communities relevant to biodiversity and sustainable use of resources are documented, preserved, and shared/published	1. Number of actions taken to preserve traditional knowledge, uses, and practices of local communities		✓	Yearly	MoE, MoC, MoT, MoA, Universities, Municipalities, NGOs,
	2. Number of documents (articles/books) published on traditional knowledge, uses, and practices of local communities relevant to biodiversity and sustainable use of resources		<i>Partially available, data need to be compiled from various stakeholders</i>	Yearly	MoE, MoC, MoT, MoA, Universities, Municipalities, agents, Media, Publishing, NGOs,

National Target	Impact Indicator	Available	Need to be established	Frequency	Source of data
	3. Number of public conferences and number of documented public events on traditional knowledge, uses, and practices of local communities relevant to biodiversity and sustainable use of resources		<i>Partially available, data need to be compiled from various stakeholders</i>	Yearly	MoE, MoC, Universities, Municipalities, agents, Media MoT, MoA, NGOs, Publishing
	4. Number of documentaries relevant to traditional knowledge, uses, and practices of local communities relevant to biodiversity and sustainable use of resources		✓	Yearly	MoE, MoC, Universities, Municipalities, agents, Media MoT, MoA, NGOs, Publishing
	5. Amount of budget allocated for research on traditional knowledge, uses, and practices of local communities relevant to biodiversity and sustainable use of resources		<i>Partially available, data need to be compiled from various stakeholders</i>	Yearly	MoE, MoA, Universities, NGOs
Target 17: By 2030, the relevant institutional and legal framework and government policies are reviewed, updated and reinforced where necessary to ensure effective biodiversity conservation and sustainable use	1. Number of environmental infractions related to the sectoral plans leading to court-cases		✓	Yearly	MoJ, MoE, MoIM
	2. Number of relevant laws reviewed, updated and reinforced where necessary to ensure effective biodiversity conservation and sustainable use		✓	Yearly	MoE, MoA, Official gazette
	3. Number of government policies reviewed, updated and reinforced where necessary to ensure effective biodiversity conservation and sustainable use		✓	Yearly	MoE, MoA, CoM

National Target	Impact Indicator	Available	Need to be established	Frequency	Source of data
Target 18: By 2030, Lebanon has developed and is implementing a robust resource mobilization strategy with a sustainable mechanism to finance biodiversity initiatives	1. MoE budget dedicated to NBSAP	✓	✓	Yearly	MoE
	2. Budget of other ministries for the implementation of the NBSAP		✓	Yearly	MoE, concerned ministries
	3. Municipal budgets related to biodiversity conservation and sustainable use		✓	Yearly	MoIM, MoF, Municipalities
	4. Budget allocated to the NEF and to the NBSAP		✓	Yearly	MoE
	5. Financial contributions from international sources for the implementation of the NBSAP		✓	Yearly	MoE, MoA, LARI, CNRS and other involved ministries
	6. Financing of biodiversity initiatives by the private sector		✓	Yearly	MoE, MoA, LARI, CNRS and other involved ministries
	7. Percent increase in financial resources for biodiversity initiatives from 2015 baseline		✓	Yearly	MoE, MoA, LARI, CNRS and other involved ministries

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