United Nations Development Programme
Country: LEBANON
PROJECT DOCUMENT

Project Title: Sustainable Land Management in the Qaraoun Catchment, Lebanon

UNDP Strategic Plan Environment and Sustainable Development Primary Outcome:
Outcome 1: Growth and development are inclusive and sustainable, incorporating productive capacities that create employment and livelihoods for the poor and excluded.

Expected CPD Outcome(s): Environmental considerations are mainstreamed in sector/local-level strategies/plans

Executing Entity: Ministry of Environment

Implementing Entities/Responsible Partners: United Nations Development Programme

Brief Description

The project will set a goal of wise land use on a sustainable long-term basis for the Qaraoun Catchment by developing institutional tools upstream at national level which will provide the Ministry of the Environment and the Ministry of Agriculture as well as related agencies such as the ~~Commission~~ Council for Development and Reconstruction (CDR), the Ministry of Interior and Municipalities, the Bekaa Governorate, and District Administrations and Municipalities in West Bekaa, Zahle and Rachaya Districts with the know-how, means and mechanisms for promoting sustainable land use as in the best interest of the land owners, farmers and communities as well as the nation. Land-use plans at the landscape level will benefit from the project through the identification of land productivity values and ecosystem services and how they can be protected, and an effective monitoring system will be established to maintain all data up to date and discover any worrying trends before they become irreversible. At site-specific level, forests, rangelands and arable land that are currently weakly managed and poorly funded will benefit from comprehensive land use plans that will provide information and education as well as livelihoods and financial security.

The implementation of the proposed project will have an immediate global environmental benefit, albeit on a small scale, through the increased management efficiency of arable land and rangelands and the expansion of the area under forests through land use plans, buffer zones, and riparian strips. This will lead to the restoration of natural productivity and conservation of the habitats of a number of plant and animal species and valuable ecosystems and will secure migratory bird pathways. As a result, globally significant biodiversity will be conserved and valuable ecosystem services will be safeguarded.

As a result of the significant effort that the project will make on institutional capacity building and the mainstreaming of a sustainability ethic into land use. these benefits will be sustainable.

Programme Period:	2014-2017
Atlas Award ID:	00081592
Project ID:	00090788
PIMS #	4642
Start date:	June 2015
End Date	May 2019
Management Arrangements	Support to NIM
PAC Meeting Date	28 January 2015

Total resources required	21,237,671USD
Total allocated resources:	21,237,671USD
Contributions	*3,487,671USD*
○ GEF	3,187,671USD
○ UNDP as IA	300,000USD
Contributions (parallel)	*17,750,000USD*
○ Government	17,600,000USD
○ UNDP	150,000USD

Agreed by Council for Development and Reconstruction: Mr. Nabil el-Jisr, President — Date/Month/Year

REPUBLIC OF LEBANON • COUNCIL FOR DEVELOPMENT & RECONSTRUCTION • 28 JAN 2016

Agreed by Ministry of Environment: H.E. Mr. Mohamad Al Mashnouk, Minister — Date/Month/Year

Agreed by (UNDP): Mr. Luca Renda, Country Director — Date/Month/Year

CONTENTS

ANNEXES

ACRONYMS AND ABBREVIATIONS

AFDC	Association for Forests, Development and Conservation
APAC	Appointed Protected Area Committees
APIPNM	Asia-Pacific network on Integrated Plant Nutrient Management
APR/PIR	Annual Performance Report / Project Implementation Review
ARDP	Agriculture and Rural Development Project
BWE	Bekaa Water Establishment
CAS	Central Administration for Statistics
CBO	Community Based Organization
CC	Climate Change
CDR	Council for Development and Reconstruction
DDT	Dichlorodiphenyltrichloroethane
DGUP	Directorate General of Urban Planning
DRNDR	Directorate of Rural Development and Natural Resources
EA/IP	Executing Agency/Implementing Partner
EIA	Environmental Impact Assessment
EU	European Union
FAO	Food and Agriculture Organization (of the UN)
GDP	Gross Domestic Product
GEF	Global Environment Fund
GHG	Green House Gases
GIS	Geographic Information System
GIZ	Gesellschaft für Internationale Zusammenarbeit
ha	Hectare
HCUP	Higher Council of Urban Planning
IA	Implementing Agency (of the GEF)
IBA	Important Bird Area
IDAL	Investment Development Authority of Lebanon
ILUMP	Integrated Land Use Management Plan
INRM	Integrated Natural Resource Management
ISF	Internal Security Forces
IUCN	International Union for Conservation of Nature
LARI	Lebanese Agricultural Research Institute
LD	Land Degradation
LEPAP	Lebanon Pollution Abatement Project
LRA	Litani River Authority
LRI	Lebanon Reforestation Initiative
LTL	Local Team Leader
LUIMS	Land Use Information Management System
LUP	Land Use Plan
MAP	Medicinal and Aromatic Plants
M&E	Monitoring and Evaluation
MoA	Ministry of Agriculture
MoE	Ministry of Environment
MOEW	Ministry of Energy and Water
MOIM	Ministries of Interior and Municipalities
MOPWT	Ministry of Public Works and Transport
NAP	National Action Programme (to Combat Desertification)
NFP	National Focal Point
NGO	Non-Governmental Organization
NLUMP	National Land Use Master Plan
NRP	National Reforestation Plan
OWL	Other Wooded Lands
PEB	Project Executive Board

PIF	Project Identification Form
PM	Project Manager
PMU	Project Management Unit
RSCN	Royal Society for the Conservation of Nature
SEA	Strategic Environment Assessment
SLM	Sustainable Land Management
SMART	Specific, Measureable, Achievable, Relevant, Time-bound (of Indicators)
SPNL	Society for the Protection of Nature in Lebanon
TAG	Technical Advisory Group
UNCCD	United Nations Convention to Combat Desertification
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
UNESCO	United Nations Education Scientific and Cultural Organization
UN-HABITAT	United Nations Human Settlement Programme
UNHCR	United Nations High Commissioner for Refugees
USAID	United States Agency for International Development
USD	United State Dollar

1 SITUATION ANALYSIS

1.1 Introduction

The Government of Lebanon is requesting GEF funds to address the problem of land degradation in the Bekaa Valley, more specifically in the Qaraoun Catchment.

The catchment is a critical source of water for urban use and food production, an important source of ecosystem services and a habitat for threatened biodiversity. But notwithstanding this significance, the catchment suffers from accelerating land degradation, which is undermining ecosystem functions and derivative services. Land degradation is attributable to historic deforestation, excessive firewood collection, overgrazing, expansion of urban settlements, and inappropriate infrastructure placement.

As noted by the National Action Programme to Combat Desertification[1], development and productivity are essential but should not be at the expense of the environment and the project is designed to engineer a paradigm shift from unsustainable to sustainable land management in the Qaraoun Catchment. The project will promote an integrated approach towards fostering sustainable land management – seeking to balance environmental management with development needs. Amongst other things, it will set-up a multi-sector planning platform to balance competing environmental, social and economic objectives in district development plans and associated investments. In doing so, it will reduce conflicting land-uses and improve the sustainability of land management so as to maintain the flow of vital ecosystem services and sustain the livelihoods of local and downstream communities. Land use plans will be underpinned by a robust decision support system, including a Strategic Environmental Assessment, and a monitoring framework which will inform the planning process, development investments and enforcement. This will help determine where development should be avoided (in the most ecologically sensitive areas), where and how impacts should be reduced, and where and how land should be rehabilitated. The project will also adapt land use practices in different economic sectors – testing new land management measures to reduce environmental stress.

The project advances the strategic objectives of the UNCCD 10-year strategic plan namely: 1) To improve the living conditions of affected populations; 2) To improve the condition of affected ecosystems; 3) To generate global benefits through effective implementation of the UNCCD.

1.2 The Lebanese environment

1.2.1 The physical environment

Lebanon has a total land area of 10,452 km^2, and lies entirely within the Mediterranean Basin Ecoregion. It is situated east of the Mediterranean Sea and has a coastline of 210 km and stretches 50 km inland (Figure 1).

Jurassic, Cretaceous and Tertiary Karstic limestone, Cretaceous and Quaternary sandstone, and Conglomerate make up most of Lebanon's geology. Carbonated rock formations make up more than two-thirds of the territory. These make up most of the mountain ranges making them exposed to groundwater contamination. The agricultural plains of the Bekaa Valley contain Terra-Rossa and Rendzinas soils as the most prevalent. Soils in Lebanon are young and shallow and have a poor consistency. Soil degradation and soil erosion may result from natural and anthropogenic factors that hamper soil fertility[2].

[1] Ministry of Agriculture, Lebanon (2003) *National Action Programme to Combat Desertification*.
[2] UNDP / MOE / ECODIT (2011) State and Trends of the Lebanese Environment

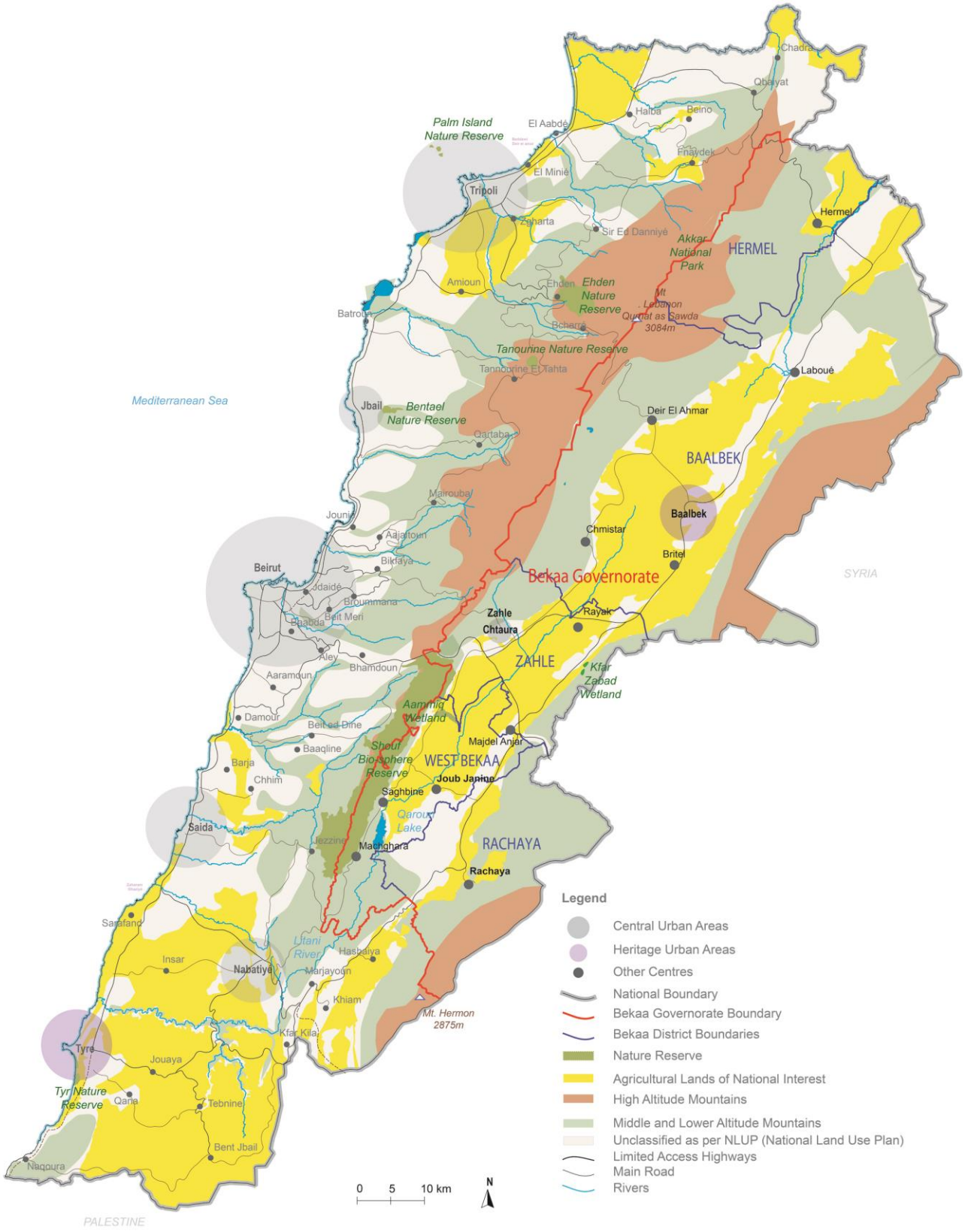

Figure 1 Map of Lebanon

The lands bordering the Mediterranean Sea in southern Europe, North Africa, and western Asia constitute the Mediterranean Basin Eco-region and share a climate characterized by generally mild, rainy winters and hot, dry summers. Lebanon has a Mediterranean climate influenced by the Asian monsoon, with rainy winters and long hot dry summers. In the western areas of Lebanon, the climate is typical maritime coastal whereas the eastern side exhibits continental characteristics[3].

Precipitation averages 840 mm/year, an amount that may appear relatively large in comparison to neighbouring countries but which masks high temporal and spatial disparities. Temporally, precipitation occurs during a short period (about 80 rainy days between September and May). Spatially, it is not evenly distributed – varying from 200 mm/year in the northern inland region to more than 1,500 mm/year on the peaks of Mount Lebanon. 40% of Lebanon is arid and semi-arid, 20% is dry-sub-humid and 40% is sub-humid and humid.

1.2.2 Ecosystems and biodiversity

The Mediterranean Basin is considered as one of 25 biodiversity global hotspots by Conservation International[4]. The mosaic of Mediterranean forests, woodlands and scrub are home to 25,000 vascular plant species of which 13,000 are endemic. In Lebanon, 9,119 species have been documented - 4,633 flora and 4,486 fauna. Of these species, 96 are considered rare or threatened. Eleven tree species are on the IUCN red list at low risk levels while *Arbutus*, *Ceratonia*, *Pistacia*, *Pinus*, *Quercus* and *Laurus* are among the surviving remnants of ancient forests[5].

Of the 61 mammal species recorded in Lebanon, 10 are already extinct while the wild cat, the mongoose, and the squirrel are close to becoming extinct. Out of 395 species of birds, three have vanished, 25 are threatened, 126 are rare, eight are vulnerable, 17 are nearly threatened, two are endangered, and one is critically endangered. There are seven amphibian and 55 reptile species, of which two and seven respectively are threatened. Of the 25 freshwater fish species one is considered vulnerable, three are endangered, and two are critically endangered[6].

The country makes up only 0.007% of the world land surface area but is home to 1.11% of world plant species and 2.63% of reptile, bird and mammal species. Lebanon's floral diversity is one of the highest in the Mediterranean, a region which is considered to be one of the most biologically diverse in the world. About 12% of plant species in Lebanon are endemic and this is considered a high rate of endemism. Lebanon is also home to nine nature reserves, three biosphere reserves, one UNESCO World Heritage Site and 15 Important Bird Areas (IBAs) recognized by Birdlife International[7].

The Mediterranean Eco-region containing Lebanon counts as one of the world's most endangered with only 4% of the original vegetation remaining intact. Human induced pressures, including overgrazing, deforestation and conversion of land for pasture, agriculture, or urban settlement have resulted in widespread land degradation. Formerly, these lands were largely cloaked by forests and woodlands, but human actions have reduced much of the area to sclerophyll shrublands.

Most of the country's forests are located in two mountain ranges, Mount Lebanon and the Anti-Lebanon massif. These ranges are considered as the 'water towers' of Lebanon as they provide crucial water provisioning services and quality regulation services vital to the economy[8].

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[3] MOE / GEF / UNDP (2011) Lebanon's Second National Communication to the UNFCCC
[4] Myers, N, et. al. (2000) Biodiversity Hotspots for Conservation Priorities. *Nature*, Vol403, 24 February 2000. See also http://www.conservation.org/where/priority_areas/hotspots/europe_central_asia/Mediterranean-Basin/Pages/default.aspx
[5] MOE / GEF / UNDP (2011) Lebanon's Second National Communication to the UNFCCC
[6] Ibid
[7] UNDP / MOE / ECODIT (2011) State and Trends of the Lebanese Environment
[8] Beydoun, Genane Younes (FAO) and Estephan, Jean (MOA) (Undated) National Forest Assessment Program

There are four Ramsar Wetlands of International Importance in Lebanon: Tyre Coast Nature Reserve (380 ha), Aammiq wetland (280 ha), Raas El Chaqaa, and Palm Islands Nature Reserve (420 ha). Due to excessive abstraction, groundwater levels have decreased, risking the drying up of wetlands including these important ones[9].

1.2.3 The socio-political environment

The population of Lebanon increased from 2.6 million in 1980 to 4.3 million in 2010. It is expected that the population will keep increasing and may reach 5.3 million by 2050. The annual population growth rate of Lebanon during 1980-2010 fluctuated between 0.2% and 4.18%. Urban population increased from 73.7% to 87.1% between 1980 and 2010. This percentage is expected to increase to 91.2% by 2050[10].

As a result of the civil war in Syria, the past two years have seen a massive influx of refugees into Lebanon. According to UNHCR, there are currently over one million registered refugees in Lebanon, almost 25% of the Lebanese population. Around 280,000 of these refugees are currently residing in the Bekaa, many in informal settlements and lacking basic services.

Lebanon is a service-based economy, the service sector accounting for almost 70% of GDP and industry for 18%. Agriculture in Lebanon is the third most important sector in the country. It contributes 7% to the country's GDP and employs 15% of the population.

Around 300,000 people in Lebanon (8% of the population) are considered to be living under conditions of extreme poverty; while 28.5% are considered relatively poor. The poverty rate of the Bekaa Valley is almost equal to the national rate at 29%. The Gini coefficient of Lebanon is estimated at 0.36 for real consumption; while it stands at 0.336 in the Bekaa. The Theil index of Lebanon is estimated at 0.215; and that of the Bekaa is 0.1887[11].

The land under agriculture production amounts to 248,000 ha (25% of the country) and 144,000 ha of this are irrigated. The following table shows the most traditional common crops grown in Lebanon.

Table 1. Crop Production in Lebanon[12]

Crop	Production (Tons/Year)	Varieties
Olive	117,330	12+
Cereals	116,200	10+
Barley	33,100	
Potato	514,600	5+
Citrus	3,451,000	24+
Grapes	106,000	30+
Apples	125,200	2+
Cherry	30,000	5+
Apricot	32,000	5+
Almond	29,400	2+
Banana	89,700	2+

[9] Karam, Fadi (undated) Climate Change and Variability in Lebanon: Impact on Land Use and Sustainable Agriculture Development
[10] ESCWA 2012 (Undated) The Demographic Profile of Lebanon
[11] UNDP (Undated), Poverty, Growth and Income Distribution in Lebanon
[12] UNDP / MOE / ECODIT (2011) State and Trends of the Lebanese Environment

Newly introduced crops such as kiwi fruit, avocado, and custard apple have been replacing citrus plantations and are reaching local and international markets. There are other crops that can be easily adapted to the Lebanese climate but the lack of exploitation and mechanization has prevented them from being a reliable export. Such crops include wild almond, pear, plums, pistachio, fig, walnut, pomegranate, carob and apple[13].

Forests cover 137,000 ha (13%) of land, down from a historic coverage of 74%, while other woodlands make up 160,000 ha. Rangeland makes up 52% (645,160 ha) of land cover in total. Of this, 400,000 ha are considered prime rangeland[14].

Although there has been little change in forest cover over the past ten years (reforestation measures have balanced out illegal logging, reconstruction and forest fires), urbanization, infrastructure development, human intervention, and overgrazing have contributed to the degradation and fragmentation of forests. High density forests have decreased by 0.4% annually while annual reforestation is estimated at 0.83% leading to a small net gain annually[15].

The majority of livestock production is located in the Bekaa where the lack of permanent pastures has resulted in shepherds letting their livestock graze in forests, wooded lands, and agriculture areas. This is a major factor contributing to the degradation of vegetation cover, particularly in mountainous ecosystems. The depletion of vegetation cover has jeopardized the possibility for self-regeneration[16]

Development all over Lebanon, but mainly in and around forested areas, also threatens green cover. Pine forests are shrinking rapidly to make way for buildings and resorts that are paradoxically marketed and advertised for being located in a green oasis or surrounded by forests. Despite the fact that building projects try to restore the lost greenery through landscaping, they usually use imported or introduced species that are not well suited for Lebanon[17].

1.2.4 The Qaraoun Catchment

The Qaraoun Catchment (described fully in Annex 1) lies within the Bekaa Valley and spans parts of four districts – Baalbek, Zahle, West Bekaa and Rachaya. It includes the eastern slopes of the Mount Lebanon Range, part of the Bekaa Valley and the western slopes of the Anti-Lebanon Range.[18] It comprises the headwaters and main catchment area of the Litani River, the country's largest and longest river, up to where it discharges into the man-made Qaraoun Lake. The Litani River and Qaraoun Lake are considered to be the most important sources of fresh water in Lebanon with 350,000 people in 161 communities being dependent on the surface and groundwater resources of the river basin for drinking water.[19] The Catchment straddles an altitudinal range between 800 m and 2,615 m and extends over an area of 1,468 km^2. Average rainfall is about 800 mm a year with precipitation being the highest in the western mountains with an annual rainfall of about 1,500 mm[20].

The Catchment has limited forest cover with 18,756 ha of natural forests, wetlands and associated ecosystems (12% of the catchment), 77,908 ha of agricultural land (50%), 55,585 ha of rangelands (35%), and 4,751 ha are built-up areas (3%). Calliprine Oak (*Quercus calliprinos*) forests and

[13] *Ibid*
[14] Darwish, T. and Faour, G. (2008) Rangeland Degradation in Two Watersheds of Lebanon, Lebanese Science Journal V. 9, No. 1, 2008, 71-80
[15] UNDP / MOE / ECODIT (2011) State and Trends of the Lebanese Environment
[16] MOE / GEF / UNDP (2011) Lebanon's Second National Communication to the UNFCCC
[17] UNDP / MOE / ECODIT (2011) State and Trends of the Lebanese Environment
[18] *Ibid*
[19] Ramadan, Hamzeh (2012) Climate Effects on the Litani Basin Watershed in Lebanon. PhD Thesis Concordia University
[20] Forward Program (2003) Water Quality Assessment of the Upper Litani River Basin and Lake Qaraoun Lebanon

Gregian Juniper (*Juniperus excels*) forests are found on the eastern slopes of Mount Lebanon with Calliprine Oak forest predominating on the western slopes of the Anti-Lebanon range.

Sheep and goats constitute the main livestock in the area and 75% of their diet is provided through grazing on the rangelands. Lands dedicated to grazing or which could potentially be used as grazing lands make up a high percentage of the Bekaa Governorate. Goat and sheep shepherds graze their flocks in rangelands, forests, especially open woodlands, and on agricultural lands (fallow lands and consumption of agricultural remains). Key products related to rangelands management include dairy and meat.

The population of the Bekaa Valley is estimated to be 533,305 (13.5% of the total Lebanese population) with an average population density of 110 person/km^2. According to the latest national survey in 2004, males comprised 50.7% of the population of Bekaa, some 28% of the population was under the age of 15 and the average household size was 4.6 persons.

Economic activity rate for Bekaa residents is 37.7% - 64.2% for males and 10.9% for females. The service sector attracts the highest percentage of the local labour force. The average literacy rate of the Bekaa is 85.4% - 90.5% for males and 80.2 % for females.

The Qaraoun Catchment rangelands are stressed and overgrazed, especially in the West Bekaa and Zahle districts. The continuous irrational use of these rangelands impacts the services they provide, some of which, such as milk, meat and honey production are the main income for hundreds of families within the Catchment. In addition, healthy rangelands preserve soils and affect the groundwater recharge capacities.

1.2.5 Ecosystem functions and services in the Qaraoun Catchment

According to TEEB[21] ecosystem services are the direct and indirect contributions of ecosystems to human well-being which support human survival and quality of life. The Qaraoun Catchment landscape and ecosystems provide a number of services and these are summarized in the following Figure.

Figure 2. Ecosystem services in the Qaraoun Catchment

SUPPORTING **Nutrient cycling:** Natural processes, especially water, serve as agents for nutrient cycling; plants capture and store nutrients temporarily **Soil formation:** Ecosystem processes generate and preserve soils and renew their fertility **Primary production:** Forests and rangeland grasslands serve as the basis of the food chain		
PROVISIONING	**REGULATING**	**CULTURAL**
Food: Rangelands provide food for stock and in turn serve as food for humans; insects serve as pollination agents **Fresh water:** Numerous freshwater springs, including those that give rise to the Litani River **Wood and fibre:** Forests managed for sustainability, provide wood **Fuel:** Forests managed for sustainability, provide fuelwood **Medicine:** Forests and rangelands provide medicinal herbs and potions **Habitat:** Wetlands provide habitat for migratory species **Biodiversity:** natural ecosystems maintain the viability of gene-pools, and biological diversity; natural agents disperse seeds	**Climate regulation:** Forests and grasslands sequester CO_2, moderate weather extremes and impacts, and contribute to climate stability **Flood regulation:** Vegetative land cover soaks up rainwater and mitigates flood events **Water purification:** Riparian vegetation filters nutrients and other impurities from run-off water, providing waste management and detoxification **Erosion control:** Forests and grasslands bind soil and prevent erosion **Pest control:** Birds control insect pests; some plants inhibit plant pests; natural systems regulate disease-carrying organisms	**Aesthetic:** Forests, rangelands, wetlands and other natural ecosystems provide a pleasing and appealing environment **Spiritual:** Natural landscapes are mystical and inspirational **Educational:** Natural ecosystems serve as outdoor teaching laboratories; they provide for intellectual development **Recreational:** Forests and highlands provide opportunities for hiking, horse trekking and other outdoor pursuits

[21] The Economics of Ecosystems and Biodiversity (TEEB). See http://www.teebweb.org/resources/ecosystem-services/

1.3 Threats and root causes

1.3.1 The risks and impacts of land degradation

According to the NAP[22] for Lebanon, there are serious signs of land degradation and loss of biodiversity in the Bekaa Valley and current land use practices are unsustainable. The natural and socio-economic resources and values identified above in section 1.2 are at severe risk. The percentage of territory that is at moderate or high risk of desertification in the Qaraoun Catchment is 97.4% in Rachaya, 90.4% in West Bekaa, 83.3% in Zahle and 73.2% in Baalbek.

The UNCCD[23] defines desertification as "*land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities*". This includes erosion and the loss of topsoil, the loss of vegetation, decreased soil fertility and increasing pollution of soil and water resources.

Unsustainable use of water in Lebanon is mirrored by the unsustainable use of land. Across much of the country, landscapes face moderate to severe deforestation and overgrazing pressures, correspondingly high rates of erosion and loss of topsoil, pollution of both soil and water and increase in soil salinity, lowered soil fertility and loss of productive land, loss of biodiversity, reduction in ecosystem services and reduced incomes. The increasing use of agricultural chemicals is also having a severe impact on water quality and soil fertility. These trends are linked to unsustainable production practices.

Amongst the areas of Lebanon suffering from these pressures, the Qaraoun Catchment stands out because of the adverse implications that land degradation in the Catchment has for the national economy and development and people's livelihoods.

Degradation is undermining ecosystem functions and services and is affecting the welfare of rural people dependent upon these services for their subsistence and for their livelihoods. More specifically, if left unchecked, these consequences of land degradation and unsustainable land use could have four serious impacts, namely:

- Welfare and livelihoods depressed
- Economic downturn
- Loss of biodiversity
- Poverty

1.3.2 Proximate causes of land degradation

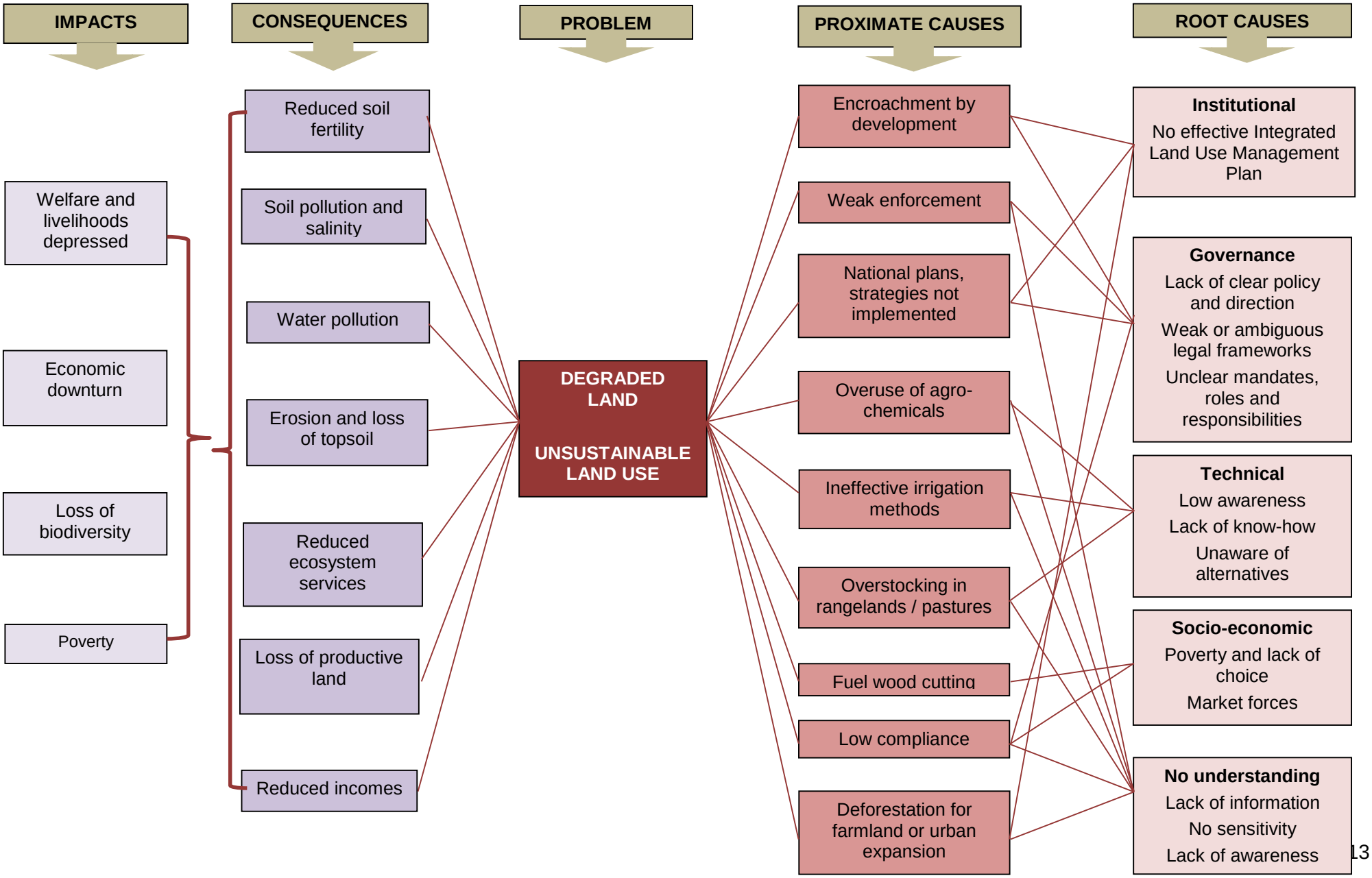
The causes of land degradation are many and complex, and the PIF identified four clusters of proximate causes of land degradation in the Qaraoun Catchment, namely:

- Overstocking with livestock in rangelands and pastures
- Deforestation from forest fires, excessive gathering of fuel wood and land conversion
- Unplanned land development
- Inappropriate application of pesticides and fertiliser

These are extended and more detail is provided in the causal chain analysis illustrated in the diagram on the next page. The analysis confirmed these causes and extended the list further to also include weak Governance as a further cause of land degradation in the Qaraoun Catchment.

[22] Ministry of Agriculture, Lebanon (2003) *National Action Programme to Combat Desertification*. Arising from Lebanon's ratification of the UN Convention on Combating Desertification.
[23] see for example, http://www.unccd.int/Lists/SiteDocumentLibrary/10YearStrategy/Strategy-leaflet-eng.pdf

Figure 3. Causal chain analysis for land degradation in the Qaraoun Catchment



Each of the proximate causes clusters is considered in some more detail below.

Overstocking with livestock. This is a cause of degradation across the country, where sheep and goat numbers have increased from 500,000 in the 1970s to 700,000 in the 1990s, with even higher numbers currently. It is putting pressure on available pastures, leading to the compaction of soil, soil erosion, and a loss in soil permeability reducing water infiltration and storage capacities. This affects the ecosystem's hydrological provisioning and regulation functions. The situation is most pronounced in the Baalbek District, where the number of small ruminants has exceeded carrying capacity especially during the late winter and spring months. This overgrazing and misuse of rangelands has caused the disappearance of useful species (legumes) and the dominance of unpalatable species. Experiments conducted in the Baalbek District showed that partial protection from grazing, more than doubled the legume seeds in the seed bank[24].

Deforestation has resulted from excessive gathering of fuel wood by local people, forest fires due to weak management, and logging and forest clearance for farm, industry and urban development. Forest cover has been reduced to a fraction of the former area and this degradation of forests has exposed the already fragile soils of the catchment to wind and water erosion. The issue is complex because local people are dependent on the forest resources for fuel in a region where poverty levels are high. Another challenge has been the complexity that exists in roles and responsibilities for forests which lie with MoA according to legislation but also with MoE according to a Government decision. Deficiencies in maintaining the forests are not only due to shortage of MoA guards but also to the inefficiency in managing them.

Direct planting has been carried out by municipalities. However, politicians tend to use plantings as a show of their achievements and this could lead to the use of inappropriate species such as the non-native and potentially invasive *Paulownia tomentosa* which, like the Eucalyptus, tends to grow fast but uses tremendous amounts of water while doing so.

The issue of land ownership regarding forests must also be addressed. Forests on public lands are under the responsibility of both the municipality and the MoA, creating an overlap. In addition, there are other types of land, such as Amiri lands where neither MoA nor municipalities have any jurisdiction.

The **unplanned development** of industry, quarries, urban settlements and infrastructure such as solid waste dumping sites are further undermining ecosystem integrity. Land conversion often takes place illegally (with no application being submitted to the authorities, or with proponents not abiding by all the necessary permit conditions). Without proper monitoring and enforcement, offenders are not penalised, regulatory processes are undermined, and land continues to be degraded and lost. Apart from leading to the loss of productive agricultural land and forest resources, unplanned conversion of land is having an impact on biodiversity and ecosystem services. In addition, natural phenomena such as heavy/intense rainfall are accentuating these processes and the region is becoming increasingly vulnerable to natural disasters including land-slides and floods.

Overuse of agricultural chemicals. Farmers are over-fertilising their crops and doses are being applied without proper soil and water analysis and interpretation. Nutrient demands are being exceeded and crop yields are comparatively low with respect to the input of fertilisers. The inappropriate application of pesticides and fertiliser leads to land degradation in the form of soil and water pollution, and reduced soil fertility. The analysis of surface water and sediments indicated high levels of agricultural pollution in the Qaraoun Catchment; while field surveys and data collection in the catchment showed high levels of pesticide use. Many pesticides, and to a lesser extent herbicides, are being applied at almost twice the recommended rates, and the number of successive applications in one season ranges from three to five hence increasing pesticide resistance. Many banned pesticides,

[24] Osman, A. E., Nassar, A. & Hassar, S. H. (1999) *Grassland Improvement by reseeding native legume and protection from grazing in the Bekaa Valley, Lebanon.*

e.g. DDT and Azinphos-methyl, were detected in surveys of the water and sediment in 2011. Analysis of the data on fertiliser use in the Qaraoun Catchment revealed the following:

- The number of N and P-units added by farmers to lettuce, tomatoes, melon, and other vegetables averaged at least 1.4 times the recommended doses.
- Fertilisers applied to potato and grapes, considered as cash crops in the region, exceeded three times the N-unit recommended doses, while those of P-units averaged almost twice the recommended doses.
- Data for fruit trees were not found to be consistent due to the different practices among farmers, and variation between regions according to water availability. However, stone fruits were found to receive at least 1.5 times more than the recommended rates needed for the N-unit and almost three times more for the P-unit[25].

The relatively high levels of land degradation within the Qaraoun Catchment are leading to a reduction in the biological and economic productivity of land and significant changes in ecosystem functions. This is causing an increasing drift to the cities, disrupting the social structure of communities.

Weak Governance is another cause of land degradation and unsustainable land use in the Qaraoun Catchment and it is displayed in a number of ways. As will be discussed in the following section, many national plans and strategies have been adopted by the government, however, they are not implemented, or at least not as fully as intended. Legislation exists but the level of enforcement at local level is low and inconsistent. There is a low level of compliance with regulatory provisions. As already noted above, this is due in large part to the fragmentation and complexity that exists among implementing agencies. Their mandates, roles and responsibilities are often unclear and overlapping and at times conflicting.

1.3.3 Root causes of land degradation

The above proximate causes of land degradation may well be the ones that are readily visible, however, as the causal chain analysis (Figure 3 above) illustrates, these causes arise from more fundamental ones. The analysis identified five root causes or clusters of causes which the project will attempt to address.

Institutional
A key root cause of land degradation and unsustainable land use in the Qaraoun Catchment is the lack of an effective Integrated Land Use Management Plan. This is the root cause for encroachment and loss of productive land. It is also the reason why national policies, plans and strategies are not applied at local level, and this in turn, makes enforcement exceedingly difficult.

Governance
Closely allied to the Institutional root cause, is the lack of clear national land use policy and direction. Legal frameworks are weak or ambiguous; institutional mandates, roles and responsibilities are unclear and at times conflicting.

Technical
There is a low level of awareness and understanding of the vulnerability of land, biodiversity and ecosystem services. There is also a low level of farming know-how and farmers have all but abandoned traditional methodologies in favour of more recent technical solutions (such as artificial

[25] Earth Link and Advanced Resources Development (2011) *Business Plan for Combating Pollution of the Qaraoun Lake.* United Nations Development Programme

chemicals) which they over-use and mis-use. They are also unaware of other, more economically and environmentally attractive technologies and approaches.

Socio-economic
There is poverty and lack of choice and people often damage the environment because they do not have an alternative. Examples of this include the cutting of wood for fuel and the low level of compliance. Furthermore, market forces are influencing decisions targeted at a higher, but unsustainable return.

No Understanding
Lack of information is a root cause of a number of identified proximate causes of land degradation. These include weak enforcement, overuse of agricultural chemicals, ineffective irrigation methods, overstocking of rangeland pastures, low level of compliance and deforestation. Lack of information has created low levels of awareness and a lack of sensitivity to natural values and vulnerability. It has also denied landowners, farmers and residents of the Qaraoun Catchment the ability of making informed choices.

1.4 The Government's response – the Baseline Project

1.4.1 The policy and regulatory response

Despite the various obstacles and instability troubling Lebanon in the last few decades, the Government has achieved much progress in environmental protection by issuing laws and decrees aimed mainly at safeguarding natural resources in the country. Although these legal instruments do not yet have an overarching policy framework to connect them, they can be considered significant steps towards achieving sustainable land use and environmental management practices in the country. This section addresses the policy and regulatory response to environmental and natural resource issues in Lebanon, while the institutional response will be described in Section 1.4.2 and land use management will be described in more detail in Section 1.4.3.

1.4.1.1 Environmental Management

The overarching instrument for environmental protection and management in Lebanon is defined by Law 444/2002, the Environmental Protection Law, which is considered a major milestone in Lebanese environmental legislation. It sets the legal framework needed to protect the national environment against all forms of degradation and pollution, and the promotion of sustainable use of natural resources.

In 2012, the Government enacted the Strategic Environment Assessment (SEA) Decree No. 8213/2012 (the first of its kind in the Middle East and North Africa Region). The purpose of the SEA is to take into account environmental issues at an early stage in the decision-making process of policies, programmes and plans. During the same year, it also enacted the Environmental Impact Assessment (EIA) Decree No. 8633/2012 requiring any development to undergo an EIA process whereby the MoE's approval should be obtained.

In September 2013, the Parliament's joint committees passed a draft law to employ full-time environment public prosecutors who will work alongside investigative magistrates for environmental issues. According to this law, any direct or indirect assault on natural resources would be considered an environmental crime and its perpetrators prosecuted under its provisions. The law also covers crimes

targeting antiquities and cultural and natural heritage. However, it still awaits Parliament endorsement[26].

1.4.1.2 Biodiversity and Protected Areas

In 1994, and through Law 360/94, Lebanon ratified on the Convention on Biological Diversity and in 1998 developed its first National Biodiversity Strategy and Action Plan. The MoE updated and adopted the plan in 2005.

Article 23 of Law 690/2005 designates the MoE as the responsible body to determine potential protected areas in Lebanon. According to MoE, Lebanon currently has eight Nature Reserves, eight protected Forests and Landscapes and eight protected River Streams. Many of these sites also have international designations including four Ramsar Sites, three Biosphere Reserves, two Special Protected Areas of Mediterranean Importance, 15 Important Bird Areas and five World Heritage Sites.

The responsibility for management of protected areas in Lebanon is shared between the MoE, Appointed Protected Area Committees (APAC), and the management teams in the field. APAC consists of representatives of NGOs, municipalities, conservationists and scientists.

In addition to MoE designated protected areas, MoA also declares areas as Hima, which can be described as a system for organizing, maintaining, regulating, and utilizing natural pasture and rangelands in a sustainable manner. There are five MoA designated Hima in Lebanon.

In 1949, the first piece of legislation addressing forestry issues was passed. It was called the Forest Code and it designated the MoA as the responsible entity for setting up a national programme of forest management and reforestation. In 1951, another law was passed on conservation of soil and protection of forests from grazing. Law 85/1991 and its amendment Law 558/1996 identified cedar, fir, cypress, oak, and juniper as protected forests in Lebanon. The MoA was empowered to designate reforestation areas through decree 5246/1994.

1.4.1.3 Agriculture

Although Lebanon does not have an officially adopted national subsidy policy, the Lebanese Government provides agricultural subsidies to farmers in the form of high producer prices. These subsidies benefit tobacco and wheat producers.

The Office of Cereals and Beetroot, which was later renamed the Directorate General of Cereals and Beetroot when its activities were expanded, was established by Legislative Decree 143 of 12 June 1959 to encourage the production of cereals and beetroot and to ensure that the quantities produced are sold at subsidized prices. In addition to the development of the agricultural sector, one of its key prerogatives is to preserve the stability of the wheat supply. It is therefore allowed to import wheat and sell it at subsidized prices, following the approval of the Council of Ministers[27].

To support the agriculture sector in Lebanon, the government provides the following incentives:

- Farms (provided they do not display farm products in sales outlets or sell products after processing) are exempt from income tax

[26] Draft law to create new environmental prosecutors, The Daily Star, September 26, 2013 http://dailystar.com.lb/News/Lebanon-News/2013/Sep-26/232606-draft-law-to-create-new-environmental-prosecutors.ashx#ixzz2r351vsV1

[27] Ministry of Finance / UNDP (2012), Wheat and Bread Subsidies (2007-2011): Thematic Report

- Equipment and raw material imported for the agricultural sector are subject to only 2% customs duty
- Wages of agricultural labour are exempt from payroll taxes
- Agriculture products are exempt from VAT

1.4.2 The institutional response

In response to the situation in the Qaraoun Catchment, the Prime Minister of Lebanon assigned in 2006 an inter-ministerial committee, to propose measures that would alleviate pollution of the Litani River and Qaraoun Lake. The committee is headed by the Minister of Environment with representatives from the Ministry of Interior and Municipalities, Ministry of Energy and Water, Ministry of Agriculture, Ministry of Industry, Council for Development and Reconstruction, Bekaa Water Establishment, Litani River Authority and Ministry of Health.

The following sections describe the roles and responsibilities of these entities, and others, as they relate to the government's response to the problems in Qaraoun Catchment.

Ministry of Environment (MoE)

The Ministry of the Environment is the environmental regulatory arm of the country. The mandate of the MoE is defined in Law 690/2005 as follows:

- Formulate laws, regulations, standards and guidelines
- Prepare environment policies and strategies
- Monitor, control and ensure water, air, and soil quality
- Provide environmental conditions for issuing permits and licenses for development projects
- Specify protected areas and sites and develop criteria and guidelines for PA management
- Implement environmental projects related to biodiversity and natural resources, climate change, ozone-depleting substances and hazardous chemicals.

The MoE was tasked with leading the effort on preparation of a Business Plan for combating pollution of the Qaraoun Lake which it completed with UNDP support.

The following seven divisions are under the Directorate General of Environment in the MoE:

- Service of Regional Departments and Environmental Police
- Service of Planning and Programming
- Service of Environmental Technology
- Service of Natural Resources
- Service of Urban environment
- Service of Environmental Guidance
- Registrar

The divisions are staffed with 70 administrative/technical positions, with an additional 30 staff working in internationally funded/managed projects[28]. The MoE chairs the National Executive and Technical Committee and was delegated by the Council of Ministers through Decision 52 to prepare a national Strategy for Forest Fire Management.

In 2001, Lebanese Parliament approved a Programme Law 326/2001 allocating LBP25 billion (USD16.7 million) to the MoE over a 5-year period to implement large-scale reforestation activities. The

[28] Government of Lebanon/GIZ (2013) Environmental and Social Assessment (ESA) of the Lebanon Pollution Abatement Project (LEPAP), prepared by El Ard and GFA

MoE subsequently formulated a National Reforestation Plan (NRP) and implemented Phase 1 (2002-2004) and Phase 2 (2004-2006) of the plan by contracting private nurseries. During this period, MoE replanted 305 ha on 23 sites mostly located on municipal lands. The plan was suspended in 2006 as a result of the war and the long-term sustainability of the plan remains in question[29].

Ministry of Agriculture (MoA)

The Department of Forest and Natural Resources is under the Directorate of Rural Development and Natural Resources (DRDNR) at MoA. The DRDNR is responsible for forestry legislation and enforcement. It also designates protected forests and regulates grazing permits and agreements on municipal lands.

The DRDNR has the sole responsibility for recruiting forest personnel and operating "forest stations". The Directorate currently operates about 20 forest stations and employs 186 forest personnel (152 forest guards, 13 inspectors and 21 observers). The forest guards are meant to enforce forest legislation and apprehend offenders. However, as the guards are underequipped and underpaid (they earn about USD430/month plus benefits), little enforcement is noted on the ground. The Directorate has received donations including water trucks and utility vehicles but such equipment ends up in graveyards and parking lots after a few years in service due to lack of spare parts, resources to ensure preventive maintenance or even fuel[30].

Traditionally, the MoA has been the entity in charge of the management of forests in Lebanon. However, between 1997 and 2008, the MoA did not completely fulfil its obligations in designating forest areas. It was during this period that the MoE became a more prominent actor in this field by establishing and managing natural reserves (some of which included forests) and reforestation efforts as described in the section above[31].

The Lebanese Agriculture Research Institute (LARI), which comes under the supervision of the MoA, is the governmental organization that conducts applied and basic scientific research for the development and advancement of the agricultural sector in Lebanon. In addition, the Institute keeps close ties with farmers and tries to develop research activities aiming at solving their problems.

The MoA also hosts the Lebanese National Observatory for Agricultural Development. The aim of the Observatory is to develop synergies for private and professional initiatives that enable better participation, dialogue, and coordination between all the stakeholders involved in the agricultural and rural sector. They are also involved in capacity strengthening for policy formulation, implementation and mentoring in support of agricultural development[32].

Ministry of Public Works and Transport (MoPWT)

The Directorate General of Urban Planning (DGUP) is under the authority of the MoPWT and it is designated with developing urban regulations. It is involved in issuing building permits, as well as preparing and reviewing urban master plans for most urban areas of Lebanon (excluding Beirut, Tripoli, Jbail, Kesrouan, and Metn). The DGUP is also responsible for the implementation of the National Physical Land Use Plan prepared by the Council for Development and Reconstruction, which is discussed in Section 1.4.3 below. The DGUP cooperates with various ministries in implementing the plan as some of its components fall under the jurisdiction of other ministries.

[29] USAID (2009), Lebanon Forest and Biodiversity Conservation Assessment
[30] Ibid
[31] UNDP / MOE / ECODIT (2011), State and Trends of the Lebanese Environment
[32] Asmar, Fady (2012) Preparation of the 2012-2013 National Reporting Cycle and the Review of the UNCCD

Regional Departments of Urban Planning under the Ministry of Public Works were established in every governorate (caza) to assess construction permits and ensure that there are no violations to the urban planning regulations.

The Higher Council of Urban Planning (HCUP) under the MoPW was established in 1962 by Decree 69. Decree 69/1983 organized the Council into 12 members, namely, the Director General of Urban Planning, the Ministers of Justice, Interior and Municipalities, Public Works and Transport, Housing and Environment, the Director of Programmes at the Council for Development and Reconstruction, the President of the Order of Engineers and Architects in Beirut and Tripoli and three experts (sociologist, environmental urban planning, and architecture). The role of the HCUP is to:

1. Review and approve urban master plans and large sized projects greater than 3,000 m^2 in Beirut and 10,000 m^2 and outside Beirut
2. Draft decrees in relation to the creation of real estate companies, land expropriation, and land parcelling
3. Review decisions related to licenses for construction and parcelling
4. Review proposed changes to urban planning and construction legislation

Once issued by a municipality, a construction permit needs approval from the DGUP's regional office, the federation of municipalities and the HCUP.

Ministry of Energy and Water (MoEW)

The MoEW is responsible for the water sector under Law 221 of 2000. One of their main responsibilities is to protect water resources from pollution. In relation to land resources, the ministry provides advice on the licensing of mines and quarries that could have an impact on water resources.

The MoEW has developed a national plan on water stocks. The objective of the plan is to increase water stocks across the whole country by constructing dams on most of the main rivers. The dams would reduce the impact of droughts and help local communities cope with desertification and drought.

Council of Development and Reconstruction (CDR)

Article 3 of Decree No. 5 of 1977 established CDR and authorized it to institute a general framework for urban planning in Lebanon. CDR thus developed the National Physical Master Plan (NLUMP) of the Lebanese Territories in collaboration with the General Directorate of Urban Planning in 2005. Details on this plan are described in Section 1.4.3 below.

The CDR's major functions are to prepare investment plans for Lebanon, design, plan and implement programmes and projects for reconstruction and development and mobilize external financing from development partners. CDR is also responsible for selecting, in cooperation with line ministries, the institutions for the implementation of programmes and projects.

The Litani River Authority (LRA)

The LRA was established in 1954 to develop the necessary domestic, irrigation and hydropower schemes for the Litani, develop a national interconnected power grid, and build electrical power stations and distribution networks in all Lebanese territory. The LRA was thus given the technical and the financial power for operating and exploiting all Litani River Basin related projects. In 1962 the LRA responsibilities were expanded to include a water development plan for all the Litani/Awali basins and the area between the international Beirut-Damascus road and the southern Lebanese border.

The LRA conducts monthly water quality monitoring with the aim of preventing pollution in the River. Until September 2013, it was assisted by the USAID-funded Litani River Basin Management Support Program aimed at a more efficient and sustainable river basin management. Despite the establishment of the regional water establishments as per Water Law 221, LRA has maintained responsibility to develop and manage the irrigation water scheme and associated works in the Southern Bekaa and South Lebanon.

Municipalities

Under the tutelage of the Ministry of the Interior and Municipalities (MOIM), Municipalities in Lebanon (994 in total) are responsible for preparing general land use plans as well as programmes for water, sanitation and solid waste projects. They are also in charge of operations and maintenance of municipal solid waste collection, in addition to general matters concerning protection of the environment and pollution control. Construction permits in Lebanon are only issued by the President of the relevant municipality. Many municipalities in Lebanon form municipal unions with the aim of pooling their resources and fund regional development projects.

Municipalities in Lebanon are also involved in reforestation efforts. Every year, the DRDNR distributes seedlings to municipalities, with the aim of planting them alongside roads or on communal plots. Municipalities have also cooperated with the MoE and NGOs to implement reforestation activities. They have on occasion donated common land (Mashaa) for the purpose of establishing forests[33].

It is the responsibility of the Municipal Police (smaller cases) and the Internal Security Forces (larger cases) to enforce decisions and court case rulings regarding environmental abuses. Although the MoA is responsible for the enforcement of forestry regulations, this is usually orchestrated through the Municipal Police.

Non-governmental Organizations

In addition to government efforts, NGOs also played a prominent role in reforestation campaigns in the past 15 years in Lebanon. With support from local and international donors, and in partnership with government agencies, NGOs worked on various reforestation projects throughout Lebanon. The impacts of these campaigns are uncertain due to the lack of reliable information. AFDC's State of Lebanon Forests report claimed that the survival rate of transplanted trees varies between 10 and 40 percent. Many factors contributed to this low performance, for example, poor plant production conditions, poor plantation techniques, and a major deficiency in following up, monitoring, and maintenance. Most NGOs implement reforestation projects as a means to achieve their nature conservation and sustainable rural development objectives. Only a handful of NGOs aim at fighting land degradation issues through reforestation.

The reforestation sites are not chosen according to any set of criteria, and their determination is heavily influenced by the municipalities. Finding available land for reforestation projects has been problematic for MoE, MoA, and NGOs. This leads to reforestation projects in areas that do not really need it which limits the achievements and undermines the objectives of such projects (land degradation reduction, biodiversity conservation, etc.) [34].

Investment Development Authority of Lebanon

[33] Association for Forests, Development and Conservation (2007), The State of Lebanon's Forests
[34] Asmar, Fady (2012) Preparation of the 2012-2013 National Reporting Cycle and the Review of the UNCCD

The Investment Development Authority of Lebanon (IDAL) is the national investment promotion agency that was established in 1994. IDAL enjoys financial and administrative autonomy and reports to the President of the Council of Ministers who exercises a tutorial authority over it.

Investment Law 360/2001 reinforced IDAL's mission and identified a set of priority sectors that showed the most promising opportunities in terms of their investment potential and impact on socio-economic growth. The identified sectors include Industry, Agriculture, Agro-Industry, Tourism, Information, Communication, Technology, and Media.

Agri Plus

Established in 2012, the Agri Plus programme supports the competitiveness of Lebanese agricultural products, particularly through improving the production, packaging, promotion and distribution of such products. In 2013, Agri Plus provided agricultural export subsidies for 519,000 tonnes, constituting an increase of 14.1% from 455,000 tonnes in 2012 and compared to 400,000 tonnes in 2011.[35]

1.4.3 Land use planning and management

Lebanon has four spheres of government: National, Governorate (Mohafazat), District (Cazas) and Municipal. Some powers and functions are located to one sphere of government, while others are shared. Land use and natural resource regulation are largely national and governorate competencies, while land use planning and enforcement are national, district and municipal competencies.

Decree 69/1983 is the main tool regulating Lebanon's urban planning activities. The law covers the following:

1. Organization and structure of the HCUP
2. Urban master plans and planning regulations for villages and cities
3. Implementation or regulations and urban master plans in villages and towns
4. Construction permits
5. Regulations for quarries and rushers
6. Land parcelling
7. Various provisions and applications

Land tenure in Lebanon is based on five principles that were issued in a Ministry of Finance decision in 1930:

1. Mulk: private ownership
2. Amiria: State owned and managed by the MoF
3. Matrouka/machaa: State owned and managed by the municipalities
4. Matrouka Mahmiya: Pubic properties managed by the MoF but can be owned by the state or municipalities
5. Khaliya moubaha: Similar to amiria lands but they have not been identified.

In 2005, a National Land Use Master Plan (NLUMP) was prepared by CDR in collaboration with the DGUP, and subsequently approved in 2009. A managerial committee consisting of members from different ministries and headed by the head of the DGUP is responsible for following up on implementation of the NLUMP. The Master Plan describes the land use pattern of the country as well as future land management challenges, lays out sustainable land use principles, sets out alternative

[35] iloubnan Website http://www.iloubnan.info/business/78560/Subsidized-agricultural-exports-up-14percent-in-2013

scenarios for land use and development, and provides guidance for sectoral land management (transport, tourism, etc.). The plan delineates areas of ecological and cultural importance slated for protection and areas where higher environmental management standards are prescribed. The entire territory of Lebanon is zoned into Urban, Rural, Agricultural and Natural land use categories and the NLUMP specifies regulations governing land use for each category. It is important to note that land degradation was not taken into consideration for the NLUMP[36]. In addition, the plan is criticized for only designating general orientations for land use, but does not specify the procedural mechanisms that facilitate its use at the level of line ministries and public administrations[37].

Districts are responsible for developing master plans for their territories in consultation with national Ministries and the Governorate, in conformity with the provisions of the NLUMP. The district master plan is legally enforceable and indicates both to the district, municipalities within the district and to the public (developers, land owners, etc.) where certain types of land use and associated developments are permissible, and where certain activities are unlikely to be permitted. As such, it forms the basis for land use management and serves as a guideline to inform Municipalities in its decisions on new developments and changes to existing land uses in its area of jurisdiction. The District Master Plan also functions as a framework for public and private sector investment in different types or levels of development in those areas of the municipalities that are identified as appropriate or suited to such development. It acts as a more detailed representation of the NLUMP and can be used for the updating/adjustment of the NLUMP if such actions are justified. Final District Master Plans need the DGUP's final approval. Lebanon is in the process of developing District Master (Land Use) Plans, but due to funding constraints, emphasis has been placed on developing urban plans for municipalities and larger towns. The Directorate of Urban Planning at MOPWT, prepares and reviews urban master plans in conformity with the provisions of the NLUMP and District Master Plans. As a result, Districts and Governorates are thus far excluded from the land use planning process. The political decision-making process is hence replaced by the technical expertise of the DGUP[38].

The NLUMP's Natural and Agricultural zones, as well as District Master (Land Use) Plans (where they exist) are further regulated through the development of enforceable management plans for designated grazing and forested areas. These management plans are developed by the DRDNR, the respective Municipalities and local stakeholders.

While NLUMP, District Master Plans and Municipal Urban Plans set out the desired future patterns of land use and development within district and municipal boundaries and provide a framework for land use permitting which depends on the nature of proposed development activities, land use permitting processes within district and municipal boundaries can involve several regulatory authorities across all spheres of government. Upon receipt of an application for land conversion, regulatory authorities review the application and issue permits. They have several options: (a) refuse to grant the permit/license (b) grant it unconditionally or (c) issue a permit with conditions to mitigate and minimize impacts and offset unavoidable impacts on land. However, land conversion often takes place illegally (with no application being submitted to the authorities, or with proponents not abiding by all the necessary permitting conditions). Without proper monitoring and enforcement, the offenders are not penalised, regulatory processes are undermined, and land continues to be degraded and lost.

The main cause of these infractions can be explained in the nature of the detailed urban plans, which are in fact mainly "zoning maps with tables of construction conditions and regulations". Some of these were prepared over forty years ago, and despite all the changes that have occurred on the ground since, are still enforceable and legally binding. This reinforces the idea that the right to build is paramount and is used as justification for infraction on the grounds of economic and demographic needs.

[36] Asmar, Fady (2012) Preparation of the 2012-2013 National Reporting Cycle and the Review of the UNCCD
[37] UN-Habitat (2014) Draft Findings of the Research/Assessment for Reforming Urban Planning System in Lebanon
[38] Ibid

It is also important to note that Urban Plans have never been legally binding on public administrations. In fact, infrastructure projects in Lebanon are approved and implemented by line ministries independently from these plans. Public investment programming is usually based on projects and activities already proposed by the various sector ministries as well as other relevant public entities. Their implementation in reality is only dependent on available financing, while plans and programmes are regularly postponed[39].

The following table presents the entities with a mandate relating to land management in Lebanon and summarizes their roles and responsibilities.

Table 2. Distribution of responsibilities related to land management[40]

RESPONSIBILITY	MoPWT (DGUP)	MoE	MoA	MoC (DGA)	MoEW	MoIM	CDR	RELIGI-OUS ORDERS
National land use master planning	X						X	
Protected area management		X	X					
Forest management		X	X					
Urban planning regulations	X							
Public maritime domain (coastal zone)	X							
Protection of cultural heritage				X				X
Protection of rivers and waterways	X	X			X			
Management of religious estates								X
Quarry sector		X			X	X		

1.4.4 Value of measures committed

In response to the current situation, the Government of Lebanon has made a commitment to natural resources management in the Qaraoun Catchment by issuing a draft programme law (currently awaiting Parliament endorsement) regarding the cost of activities recommended by a Business Plan that was prepared with support from UNDP and which specifies potential funding through loans or grants as well as tapping into the national budget when necessary. However, due to current political instability in Lebanon and difficulty in holding new parliamentary elections, it is unclear when this law will be passed.

The identifiable value of the measures committed is estimated to be around USD150 million, however, in effect, the investment in environmental protection is expected to be closer to USD250 million over the project period. The actions can be loosely divided into four areas, namely, regulation, planning, enforcement and changing the production practices of sectors which are driving land degradation, and each is discussed further below.

[39] UN-Habitat (2014) Draft Findings of the Research/Assessment for Reforming Urban Planning System in Lebanon
[40] UNDP / MOE / ECODIT (2011) State and Trends of the Lebanese Environment

1.4.4.1 Investments

The Ministry of Agriculture will invest in excess of USD3 million over the project period for regulation and compliance monitoring of forestry resources in the catchment. DRDNR has in recent years been successful in advancing forest conservation with no loss in forest cover registered since 2003. The focus of this investment will be on managing tree felling for timber and fire-fighting. A further investment of USD1 million will be made by the Ministry of Environment towards the development of national environmental standards, specifications and guidelines and undertaking. The Ministry of Energy and Water will spend USD3 million during the project period on regulation and compliance monitoring to protect water from pollution.

At the Governorate level, the National Treasury allocates around USD1 million annually for land management regulation. The four districts of the Catchment will invest in excess of USD1.5 million over the project period in land management regulation.

A World Bank loan for USD50 million is expected to commence in 2015 to fund investments aimed at addressing the wastewater problem in the Qaraoun Catchment. This will include improvement or installation of Wastewater Treatment Plants in Zahle, Ferzol and possibly other locations in the Upper Litani Basin and reducing effluent discharges from private enterprises.

The Lebanon Pollution Abatement Project (LEPAP), funded by a USD3 million Italian Government grant and a USD15 million World Bank loan, is planned for 2014. The objective of LEPAP is "to reduce industrial pollution in targeted industrial enterprises and strengthen the monitoring and enforcement capabilities of the MoE through technical assistance and through establishing a financial mechanism for supporting pollution abatement investments". Relevant positive impacts of the LEPAP project include:

- Improvement of surface water and groundwater quality therefore making it a reliable source of water supply to famers and local communities
- Protection of biodiversity from wastewater disposal
- Low cost method for sanitary disposal of municipal wastewater.[41]

The Government of Italy has approved a technical assistance grant of 2.3 million Euros to support the LEPAP and provide the needed technical know-how to identify appropriate environmental solutions to industries located in the Qaraoun Watershed.

1.4.4.2 Land Use Planning

An estimated USD500,000 will be spent in the Catchment by the Ministry of Public Works and Transport on the preparation and review of urban master plans. Whereas the Ministries of Agriculture and Environment will invest in excess of USD2 million over the project period in assistance to district land use planning, forest management, planning and rangeland management planning.

At the district level, the national treasury will allocate approximately USD1 million to the various ministerial departments to support the district land use planning process.

At the municipal level, approximately USD2.5 million will be spent in the Catchment for assistance with the development of district land use plans, urban plans and rangeland management plans.

[41] Government of Lebanon/GIZ (2013) Environmental and Social Assessment (ESA) of the Lebanon Pollution Abatement Project (LEPAP), prepared by Elard and GFA

1.4.4.3 Enforcement

Municipalities in the Catchment will invest approximately USD1.5 million in their police force which will, among other duties, perform environmental protection enforcement. The Internal Security Force will spend in excess of USD3 million in applying law and order in the region. The Ministry of Agriculture will allocate USD4 million a year over the project period for the enforcement of forestry legislation nationally.

The Support to Reform and Environmental Governance (St-REG) programme funded by the European Union for the amount of €8.0 million (USD10 million) in partnership with the MoE focuses on environmental governance reforms. The general objective is to improve the environmental performance of the Lebanese public sector. Specific objectives are to improve MoE's capability of planning and executing environmental policy by building effective capacity within the Ministry.

1.4.4.4 Production Practices

An USD7 million investment will be made in forest management that will be targeted towards reforestation. This includes the funds earmarked for the Qaraoun Catchment under the National Reforestation Plan (NRP) as well as the funds from the USD12 million Lebanon Reforestation Initiative (funded by the International Programme of the US Forest Service). The goals of the initiative are to strengthen Lebanon's forest seedling nurseries and oversee the implementation of large-scale reforestation activities in the country, in line with the NRP. Of this amount, an estimated USD2 million is earmarked for the Qaraoun Catchment over the project period.

In December 2012, the Lebanese Government launched the 40 million trees programme, a national initiative steered by the MoA to plant 40 million forest trees in public lands within the next 20 years (covering 70,000 ha). The inter-ministerial committee, which was set up to oversee the programme development and implementation, initiated the preparation of a roadmap for this long-term reforestation programme, which proposes ways of sharing responsibilities and coordination mechanism like partnerships between the different stakeholders. The overall indicative amount secured from the European Union is €1 million.

A further USD1 million can be considered as baseline from the Green Plan in the Qaraoun Catchment. This will contribute to addressing Land Degradation in that it provides grants to farmers to repair and/or build stone terraces and retaining walls, build hill lakes and install irrigation networks. An estimated USD2 million is earmarked for increasing the agricultural productivity and incomes of farmers (the Hilly Area Sustainable Agriculture Development Programme 2010 – 2016) through the improvements in soil and water harvesting structures and soil and water conservation measures leading to increased agricultural productivity. The Programme will also address better market access for small farmers through the provision of technical support services and strengthened capacity of project implementing agencies and farmers' organizations.

The World Bank loan for USD50 million planned to fund investments from the Qaraoun Business Plan has an agriculture component with a budget of around USD1.5 million. Proposed investments in the agriculture sector include an Integrated Pest Management (IPM) scheme for farmers in the West Bekaa area, and potentially expanded to the entire Upper Litani Basin.

The national programme law awaiting parliament endorsement includes about USD2.6 million for pollution abatement in the agricultural sector in Bekaa, Baalback and Hermel areas. It addresses pesticide use, irrigation, soil protection, salinization and capacity building.

The Agricultural and Rural Development Programme (ARDP) is currently being implemented by the MoA and funded by the European Union for the amount of €14 million. The project will run until 2015 with the objective of "improving the overall performance of the agriculture sector in order to achieve sustainable food security and to improve the livelihood of rural farming communities." The programme's objectives are to:

1. Strengthen the capacity of national institutions to work on a coherent agricultural/rural development vision and to better implement agriculture strategic orientations.
2. Support and empower local rural actors (farmers and cooperatives) by increasing access to credit and infrastructure.

One of the ARDP components focuses on forestry and rehabilitating forest nurseries implemented by the MoA. The project aims to improve land management capacities, working with municipalities and cooperatives towards reforestation. The project also works with local actors to maintain and irrigate seedlings[42].

As can be seen from the summary table below, the baseline of activities is of significant proportions both in terms of the extent of interventions and the investment. However, the identified barriers and remaining challenges and gaps are hindering the full achievement of benefits and in particular they are not resulting in sustainable land use.

Table 3. Summary of key baseline core functions and projects over the five-year project period and relevance to the project (co-financing elements highlighted)

BASELINE ACTIVITY	COORDINATION / IMPLEMENTATION	FUNDING SOURCE	BUDGET (in USD)	NOTES ON RELEVANCE TO THE PROJECT
Regulation and compliance monitoring of forestry resources in the catchment	Ministry of Agriculture	National budget	3,000,000	The project will cooperate with the MoA in its work on forests (Output 1.1) and Land Use Planning (Output 2.2)
Development and implementation of national environmental standards, specifications and guidelines and the application of the EIA Process	Ministry of Environment	National budget	1,000,000	Significant core function of MoE and serves as Co-financing element of Outcome 3 in project
Regulation and compliance monitoring to protect water from pollution	Ministry of Energy and Water	National budget	3,000,000	Related to project but outside its scope since it does not deal directly with water
Land management regulation	District Councils in Qaraoun Catchment	National budget	1,500,000	The project will assist District Councils with land use plans formulation under Output 2.2 and this activity will ensure implementation
Addressing the wastewater problem in the Qaraoun Catchment, including Wastewater Treatment Plants in Zahle, Ferzol and possibly other locations in the Upper Litani Basin and reducing effluent discharges from private enterprises	Council for Development and Reconstruction	World Bank (loan)	50,000,000	This work is complementary to the project in that it addresses another source of land and water degradation that is outside the project's scope
The Lebanon Pollution Abatement Project (LEPAP) to reduce industrial pollution, strengthen the monitoring and enforcement capabilities of the MoE, establishing a financial mechanism for supporting pollution abatement investments	Ministry of Environment and Ministry of Finance	World Bank (loan) Italian Government	15,000,000 3,000,000	LEPAP is primarily addressing sources of water pollution in the catchment and as such it will complement the work of the project in general
Preparation and review of urban master plans.	Ministry of Public Works & Transport	National budget	500,000	MoPWT will be invited to work with the project so as to extend its urban planning to include other land
Assistance to district land use planning, forest management, planning and rangeland management planning	Ministry of Agriculture and Ministry of Environment	National budget	2,000,000	Complementary to the project and considered as Co-financing element of Outcome 2 in project

[42] ARDP Information Sheet http://eeas.europa.eu/delegations/lebanon/documents/news/20120113_1_en.pdf

Support the district land use planning process	District Councils, through various ministries	National budget	1,000,000	May provide a means for project work to be replicated to District Councils, other than those targeted by the project directly under Outcome 2
Assistance with the development of district land use plans, urban plans and rangeland management plans	Municipalities	National budget	2,500,000	These funds will complement the work of the project under Outputs 2.1 and 2.2 by assisting target Municipalities to apply LUP at municipal level
The Support to Reform and Environmental Governance (St-REG) programme focuses on environmental governance reforms; improve MoE's capability of planning and executing environmental	Ministry of Environment	EU	10,000,000	Major project of MoE which will provide the Co-financing element of Outcome 2 in project
Police force which will, among other duties, perform environmental protection enforcement	Municipalities	Municipal budget	1,500,000	The project will work with Municipal Police to extend their operations to LUP under Outcomes 2 and 3
Applying law and order in the region	Internal Security Force	National budget	3,000,000	The project will benefit from law and order upheld by the ISF
Enforcement of forestry legislation (nationally)	Ministry of Agriculture	National budget	20,000,000	This is a core function of MoA which can be seen as providing sustainability for project benefits particularly under Output 1.1
Forest management targeted towards reforestation; strengthen Lebanon's forest seedling nurseries and oversee the implementation of large-scale reforestation activities in the country, in line with the National Reforestation Programme	Ministry of Environment	National budget and LRI by US Forest Service	2,000,000	Close collaboration is expected between the project and the NRP and this will serve as a Co-financing element of Outcome 1 in project
40 million forest trees project partnerships between the different stakeholders (nationally, over 20 years)	Ministry of Agriculture	European Union	1,250,000	This MoA project is seen as a partner by the project in its work under Output 1.1
Green Plan for Qaraoun Catchment, providing grants to farmers to repair and/or build stone terraces and retaining walls, build hill lakes and install irrigation networks	Ministry of Agriculture	FAO	1,000,000	The project will collaborate and complement MoA in this work under Output 1.3
Hilly Area Sustainable Agriculture Development Programme –improvements in soil and water harvesting structures and soil and water conservation measures	Ministry of Agriculture	FAO	2,000,000	The project will collaborate and complement MoA in this work most likely under Outputs 1.1 and 1.2
Pollution abatement in the agricultural sector in Bekaa, Baalback and Hermel areas - pesticide use, irrigation, soil protection, salinization and capacity building	Ministry of Environment	National budget	2,600,000	This work by MoE will serve as a Co-financing element of Outcome 1 in project
The Agricultural and Rural Development Programme (ARDP) - improving the overall performance of the agriculture sector in order to achieve sustainable food security and to improve the livelihood of rural farming communities (ending 2015)	Ministry of Agriculture	European Union	17,600,000	The lessons from this project will be invaluable for the project, particularly under Output 1.3

1.5 Remaining challenges and outstanding gaps

In spite of the impressive baseline of mechanisms, activities and resources described above, land degradation remains a visible problem in the Qaraoun Catchment, and ecosystem services and livelihoods are being jeopardized, hence the Government's approach to UNDP/GEF for support.

The initiatives described above are not sufficiently coordinated and do not specifically take global environmental concerns into account. The substantial financial and human resources earmarked for the baseline programme related to agriculture, forestry and improvement of water quality in the Qaraoun Catchment are deployed and managed by sectoral departments working in silos. Authority for the regulation of land and natural resource use is scattered among different entities. Coordination among these regulatory authorities is weak and this often results in land use approval decisions either

taking too long, or land use changes and developments being approved without effective consultation. There is a need to harmonise and coordinate efforts across sectors, and spearhead innovative ways and means of enhancing ecosystem functioning and resilience in an integrated and coordinated way that balances socio-economic and environmental objectives.

Many sectoral initiatives have a narrow focus. For instance, forestry activities focus solely on increasing tree cover, without addressing rangeland management and by failing to address livestock husbandry, they can actually undercut their own success, given that cattle and goats can damage seedlings. Moreover they do not necessarily use indigenous trees, nor take into account the effect of tree monocultures on biodiversity. Likewise, agriculture sector investments are focused on enhancing food security by increasing agricultural production through intensive use of fertilizer and pesticides and weak land husbandry. These can have adverse effects, including reduced water quality (surface and groundwater) and soil erosion where these parameters have not been taken into account in land use planning.

The lack of coordination is also evident at the institutional level where there are uncertain and overlapping mandates and responsibilities among the different government agencies. A glaring example is the case of reforestation activities and the roles of MoE and MoA discussed above. Government institutions also suffer from a lack of sustainable financing to provide human and other resources that ensure regular monitoring and enforcement.

Another evident gap is the lack of a much-needed, accurate and up-to-date database for information on land degradation in the Qaraoun Catchment. Decision-makers lack solid information on which to base decisions regarding land use allocation and management. Without a proper assessment, planning and monitoring regime for the maintenance of ecosystem services, managers and users have a difficult time evaluating and integrating land degradation risks effectively within decision-making. Information about socioeconomic conditions, especially for vulnerable groups, and physical characteristics of the environment in the districts is scarce and limited to ad hoc studies. This makes it difficult to plan properly for any intervention. In addition, and despite the efforts undertaken by CDR to develop a physical plan for Lebanon and the sporadic municipal-level zoning plans available, there are currently no comprehensive land use planning schemes at national, district and municipal levels that address land degradation-related issues.

Municipalities lack the capacity to generate, implement and enforce integrated land use management plans. Financial constraints present a further barrier to upscaling SLM across the landscape at the level required to successfully arrest land degradation and combat desertification. Ministries, governorates, districts and municipalities have a role in deciding where to channel baseline programme resources for supporting forestry, agriculture and livestock but this often focuses on production and technical efficiencies without weighing their negative impacts on land degradation processes. In part this is because there is a dearth of information on long-term costs of land degradation both in terms of loss in income and reduced ecosystem goods and services. Furthermore, there is a disconnect between public expenditure and environmental priorities and the result of this is land degradation.

Lebanon does not have operational, “on-the-ground” examples of integrated sustainable land management at the landscape scale (as opposed to more piece-meal management of specific problems such as forest fires). Without access to know-how, proven through demonstration, government decision-makers and resource users do not have the tools and knowledge necessary to decrease land degradation. There is a critical unmet need to infuse new management approaches into the management system focusing on the sectors that are driving land degradation.

Although the principles of forest management are well understood, the know-how needed to maintain the functional integrity of forests is lacking. The long-term resilience of the forests and their ability to provide important ecosystem services will require that certain areas (large forest blocks) are conserved rather than utilised for firewood and grazing and that connectivity is maintained between these

conserved areas by better managing these drivers of degradation, thus removing anthropogenic stressors that are impeding natural forest rehabilitation.

At the rangeland level, there is a need to reduce stocking levels in ecologically sensitive areas and promote new husbandry measures, such as rotational grazing.

In arable land, much still needs to be done although water pollution and land degradation from solid waste and wastewater is addressed through baseline activities. There is a clear lack in the baseline project to address pollution arising from unsustainable agriculture practices as in excessive use of fertilisers and pesticides. The mainstreaming of sustainable land use management into large-scale arable farming has not yet taken place in the Qaraoun Catchment. Practices are mainly influenced by short-term profitability and in many cases based on incomplete and incorrect knowledge bases. There are few examples of cultivation practices which are financially profitable but also environmentally sustainable.

2 STRATEGY

2.1 Project Rationale and Policy Conformity

2.1.1 Rationale and summary of the GEF Alternative

In the **business-as-usual scenario**, in spite of various policies and strategies, land-use plans will fail to be developed at the district level because of lack of financial resources, lack of capacity and lack of information; agricultural activity based on agro-chemicals will continue to intensify with little or no consideration for the impacts that it is having on soil, water and biodiversity; forest areas will remain inadequately managed and protected, and vulnerable to the livelihood needs of communities; rangelands will continue to be stressed and degraded by overstocking. Responsibility for compliance with and enforcement of plans and other protective measures will remain fragmented and citizens will remain unclear as to their responsibility and accountability. Locals will continue to be forced by necessity to encroach on to degraded rangelands for grazing; they will continue to cut trees for firewood for cooking and home heating; farmers will continue to use increasing amounts of agricultural chemicals in their search for higher yields, thus reducing soil fertility, increasing water pollution and threatening vulnerable biodiversity and fragile ecosystems. Globally significant biodiversity in and around the Bekaa Valley and its Qaraoun Catchment will continue to suffer impacts and ecosystem services will continue to decline.

The Government will continue to express concern about these impacts but it will also continue to aim for higher productivity from the Qaraoun Catchment as an increasingly valuable component of the economy. The MoE will continue to promote wise land use, and protection of forests and rangelands without providing alternative sources of income and livelihoods; any land-use plans produced by Municipalities will continue to be disowned by local communities and there will be little or no implementation. The long-term viability of food production and livelihoods in the Qaraoun Catchment will increasingly be jeopardized.

The **GEF alternative** will comprise relevant activities from the baseline and build upon them through the use of GEF resources to set a goal of wise land use on a sustainable long-term basis for the Qaraoun Catchment. It will do this by developing institutional tools upstream at national level which will provide the MoE and the MoA as well as related agencies such as the CDR, the Ministry of Interior and Municipalities, the Bekaa Governorate, and District Administrations and Municipalities in West Bekaa, Zahle and Rachaya Districts with the know-how, means and mechanisms for promoting sustainable land use as in the best interest of the land owners, farmers and communities as well as the nation.

Land-use plans at the landscape level will benefit from the project through the identification of land productivity values and ecosystem services and how they can be protected, and an effective monitoring system will be established to maintain all data up to date and discover any worrying trends before they become irreversible. At site-specific level, forests, rangelands and arable land that are currently weakly managed and poorly funded will benefit from comprehensive land use plans that will provide information and education as well as livelihoods and financial security.

The implementation of the proposed project will have an immediate global environmental benefit through the increased management efficiency of arable land and rangelands and the expansion of the area under forests through land use plans, buffer zones, and riparian strips. This will lead to the restoration of natural productivity and conservation of the habitats of a number of plant and animal species and valuable ecosystems and will secure migratory bird pathways. As a result, valuable ecosystem services will be safeguarded, production will become sustainable and globally significant biodiversity will be conserved.

In summary, as discussed in section 1.4 above, the baseline of activities in the Qaraoun Catchment is a significant USD150 million or more over the five years of the project. Of this, some USD23 million has been identified as of direct relevance to the project. Of this, USD17.6 million is under the responsibility of the MoE and, since the MoE is the EA for the project, it has been decided to focus on these relevant baseline activities that are being managed/coordinated/implemented by the MoE. These baseline activities, which are considered as Government co-financing for this project, provide considerable scope for upscaling and replication of project results. The Project will take a broad landscape approach and specifically address land degradation. It will balance objectives and build the necessary conducive environment for sustainable land management consisting of a comprehensive decision-making and monitoring and enforcement system at the district level, and mobilising the baseline programme to achieve a paradigm shift from unsustainable to sustainable land use while improving the livelihoods of the farming communities.

Table 5 on the next page provides the incremental logic of the project design. It starts with the activities making up the USD17.6 million baseline, namely - Changes in production practices USD4.6 million; Land use planning and enforcement USD12 million; and Regulatory basis improvements and institutional strengthening USD 1.0 million. It then identifies the gaps remaining and this leads to a description of what the GEF project will be doing in response together with the additional costs and the incremental benefits which will accrue from the project interventions.

In summary, funding dimensions of the project are as in the following table.[43]

Table 4. Baseline and GEF Trust Fund components of project Outcome budgets

OUTCOME	COFINANCE BASELINE	GEF TRUST FUND	TOTAL PROJECT COST
1. ***Landscape level uptake of SLM measures avoids and reduces land degradation, delivering ecosystem and development benefits in the Qaraoun Catchment***	4,600,000	1,869,700	6,469,700
2. ***Pressures on natural resources from competing land uses in the Qaraoun Catchment are reduced***	12,000,000	920,200	12,920,200
3. ***Institutional strengthening and capacity enhancement for promoting sustainable forest and land management in the Qaraoun Catchment through an INRM approach across the landscape***	1,000,000	248,080	1,248,080
TOTALS	**17,600,000**	**3,037,980**	**20,637,980**

[43] Project management costs are in addition to these figures.

Table 5. Project activities addressing remaining challenges incremental to the baseline

AREAS OF WORK	BASELINE ACTIVITIES BY MoE (and value)	GAPS REMAINING	INCREMENTAL ACTIVITIES (per Outcome and Outputs)	INCREMENTAL BENEFITS and TOTAL COSTS
Changes in production practices	Qaraoun Catchment component of the MoE National Reforestation Plan - Strengthen Lebanon's forest seedling nurseries and oversee the implementation of large-scale reforestation activities in the country, in line with the NRP. (USD2.0 million for Qaraoun component)	Forest areas remain inadequately managed and protected, and vulnerable to the livelihood needs of communities who continue to cut trees for firewood for cooking and home heating Rangelands continue to be stressed and degraded by overstocking and farmers continue to be forced by necessity to encroach onto degraded rangelands for grazing No consideration of LD and protection of ecosystem services when planting forests	**Outcome 1** comprises site level interventions – at different altitudinal levels in the catchment and in different land use types across broad landscapes (*i.e.* and in forests at high altitudes, along the transition to rangelands at a lower level and in the agricultural production areas of the valley floor). Under Output 1.1 surviving forests will have been identified under the Land Use Plans (Output 2.2) and will be protected and degraded forests will be rehabilitated both by planting as well as through natural regeneration following protective measures (e.g. fencing). The measures will be tested and validated for replication. Output 1.2 will seek a reduction in stocking rates, pasture area rotation and seasonal management in the degraded rangelands of West Bekaa and Rachaya Districts, with replication to the rest of the Bekaa Valley enforced by MoA, Districts and Municipalities. Output 1.3 will have a focus on arable land in the Bekaa Valley. It will test and promote conservation agriculture, organic farming, integrated crop management, drip-irrigation, recycling compost and other natural fertilizer, cover crops, soil enrichment, natural pest and predator controls, bio-intensive integrated pest management and other techniques which will arise from participatory brainstorming with community members, in Zahle, West Bekaa and southern Baalbek Districts. The approach will be evaluated and made available for replication nationwide.	Incremental Benefits include - Forest resources recover and managed on a sustainable basis to enhance ecosystem services. Rangelands / grasslands vegetative cover recovery, reduction in water run-off, water and wind erosion, and loss of topsoil. Recovery of soil structure, moisture retention, and natural fertility; improvement in run-off water quality; enhanced value of produce to discerning markets **The GEF alternative for Changes in Production Practice under Outcome 1 will cost USD6,469,700 of which USD1,869,700 is from GEF and USD4,600,000 is from co-financing.**
	MoE pollution abatement activities targeting specifically the agriculture production sector – pesticide use, soil protection, salinization, capacity building (USD2.6 million estimated over five years)	Agricultural activity based on agro-chemicals continues to intensify with little or no consideration for the impacts that it is having on soil, water and biodiversity; farmers continue to use increasing amounts of agricultural chemicals in their search for higher yields, thus reducing soil fertility, increasing water pollution and threatening vulnerable biodiversity and fragile ecosystems. Lack of comprehensive approach Focus on pollution and not on SLM The long-term viability of food production and livelihoods in the Qaraoun Catchment is increasingly being jeopardized		
Planning and enforcement	MoE and MoA assistance to district land use planning, forest management planning, rangeland management planning as part of core activities (estimated USD2.0 million over five years)	In spite of various policies and strategies, land-use plans are not developed at the district level because of lack of financial resources, lack of capacity and lack of information. Any land-use plans produced by Municipalities continue to be disowned by local communities and there is little or no implementation LUP as a process remains weak	**Outcome 2** seeks a reduction of pressures on natural resources from competing land uses. This will be achieved through an enabling planning framework modelled on an Integrated Natural Resource Management (INRM) approach comprising Integrated Land Use Management Plans built on a foundation provided by diagnostic studies comprising an extensive resources survey, and the data and information captured in an efficient database on a GIS platform. Formulation, adoption and implementation/enforcement of Land Use Plans in West Bekaa and Rachaya Districts will be carried	Incremental Benefits include - Increase in forest cover and health as well as rangeland integrity leading to the safeguarding of ecosystem services such as wood and fibre, medicinal herbs, carbon sequestration, climate stability, flood regulation, water purification, erosion control,

	Support to Reforms - Environmental Governance in Lebanon Project MoE (with EU support) improve environmental performance of the public sector in Environmental inspection and enforcement; administrative capacity; Environmental fiscal instruments; Environmental policy enhanced through updating of the National Environmental Action Plan; initiating the mainstreaming of environmental policies. (USD10 million project budget)	There is little or no consideration of SLM There is still a weak capacity for planning in general, especially at District and Municipality levels. Enforcement of any plans is weak	out under Output 2.2 and will have the capacity for upscaling to the rest of the Bekaa Valley. This will follow on an extensive programme of diagnostic studies including surveys leading to a Land Use Information Management System (under Output 2.1). Compliance and observation of the provisions of the Land Use Plans will be monitored through an effective monitoring system designed under Output 2.3. In parallel, compliance and enforcement capacities will be strengthened under Output 2.4, at both central government organizations and at District and Municipalities level. The diagnostic studies and land use plans will also inform the work under Output 1.1 for existing forests and rehabilitation of degraded forests; rehabilitation of stressed rangelands under Output 1.2; and land use for agricultural production under Output 1.3.	outdoor recreational pursuits. Reduction of urban and industrial encroachment on arable land. Integrated, holistic approach to land and water management with sustainability as a prime target **The GEF alternative for Planning and Enforcement under Outcome 2 will cost 12,920,200 of which USD920,200 is from GEF and USD12,000,000 is from co-financing.**
Regulatory basis improvements; institutional strengthening	MoE general operational activities for the development and implementation of national environmental standards, specifications and guidelines, and the application of the EIA Process (estimated USD1.0 million over five years)	Responsibility for compliance with and enforcement of plans and other protective measures remains fragmented and citizens remain unclear as to their responsibility and accountability There is little or no consideration of Land Degradation in legislation There is weak capacity for Land Use Planning and SLM No mainstreaming of SLM considerations	**Outcome 3** seeks a stronger institutional foundation and enhanced capacities among central and local level government functionaries. Institutional strengthening will be achieved through policy and regulatory reforms and capacities will be enhanced through the provision of expertise and know-how for land use planning and management for sustainability. Under Output 3.1 the project seeks the reform of policies, legislation and procedures to remove remaining barriers and facilitate SLM. Output 3.3 targets capacity building, institutional strengthening, and the clarification of mandates for MoE, MoA, Districts and Municipalities and other relevant institutions nationally and throughout the Qaraoun Catchment. Wise and sustainable land use practice mainstreamed into the operations of critical institutions such as Districts and Municipalities	Incremental Benefits include - Coordination among operational agencies, higher appreciation and sensitivity of the problem of LD and the benefits of SLM; clearer guidance; fairer and clearer legislation leading to a higher level of compliance **The GEF alternative for Regulatory Improvements and Institutional Strengthening under Outcome 3 will cost USD1,248,080 of which USD248,080 is from GEF and USD1,000,000 is from co-financing.**

2.1.2 Project localities

The project will operate at localities selected on the basis of set criteria[44] which reflect the aims of the project. These aims are to test and apply various approaches for sustainable land management in forests, rangelands and arable land environments, particularly examples of land in a degraded state, in the Qaraoun Catchment.

The PIF indicated that the project work will involve 10,000 ha of protection forest, 500 ha of degraded forest, 20,000 ha of rangeland pastures and 40,000 ha of agricultural land.

On the basis of the selection criteria, following expert advice, and bearing in mind the desired targets set in the PIF, the localities where the project will test its approaches to sustainable land management are to be found in three of the four Districts that make up the Catchment. It must be stressed that this reduction in scope does not affect the project Objective in any way. It should also be noted that project results will be applicable and upscalable to the rest of the Catchment and beyond, supported by co-funding but based on what has been demonstrated by the project. Furthermore, the project will take proactive steps to provide good foundations for upscaling.

The **West Bekaa District** is described fully in Annex 5, Section 2 which discusses its administrative set-up, its physical and ecological environment, its demographics, and current land use identifying forests, rangelands and agricultural productivity. The District will serve as a locality for land use planning, rangelands and pastures, forests and some arable lands activities. As such, it will be the main centre of activity for the project.

The West Bekaa district has a total surface area of about 470 km^2 stretching from the highlands of Mount Barouk at 1900 m of altitude in the west all the way down to the Bekaa plain and then up again to the highlands of the Anti-Lebanon mountain range[45]. Joub Jannine is the capital and urban centre of West Bekaa with an estimated population of 12,000 distributed in 4,200 households. It is considered as the economic and commercial hub for West Bekaa[46].

There are three areas of high biodiversity values within West Bekaa District, all of which are designated as IBAs. These are Al Shouf Cedar Nature Reserve (the majority of which lies within the Shouf District, but has an eastern flank within West Bekaa), Aammiq Wetland and Lake Qaraoun.

Agriculture is still a main activity in West Bekaa and has an important socio-economic impact on the mostly rural population of the district. There are 4,803 known farmers (users of agricultural land) in West Bekaa and these translate into 24,859 family members being involved in agriculture – an average of 5.175 family members for each agricultural user.

The lands of the West Bekaa are well known for producing top quality wines and wine-making is as ancient as history in Lebanon.

The **Zahle District** (418 km^2) is described fully in Annex 5, Section 3 in terms of its administrative set-up, its physical and ecological environment, its demographics, and current land use. The District will serve as the locality for arable lands activities and possibly for some forests activities by the project.

[44] See Annex 5 for a discussion of the selection criteria and a full description of the localities selected.
[45] Localiban website (http://www.localiban.org/spip.php?rubrique248)
[46] Jeb Jannine Website (http://www.jebjannineonline.com/jebjannine.php)

The district is strategically located between the Lebanese coastal region and the Lebanese interior but most importantly it is the primary gateway of Lebanon to the Arab World. As such, its economy is influential at the national level and is the most developed part of the Bekaa concentrating a great deal of its service industries such as schools, universities, hospitals and hotels[47]. Additionally, the district is home to many of the Litani River's tributaries, most prominently the Anjar, Berdawni, Chamsine, Chtoura, Qabb Elias and Jdita rivers and springs. Therefore, the district plays a major role in the water flow within the Upper Litani River Basin[48].

The poverty rate in Zahle is 22%, 6% less than the national poverty rate of 28%[49]. During the past three years of Syrian civil war, Zahle became host to the largest number of refugees in the Bekaa, with 140,151 registered refugees in 29,081 households, many of whom live in informal tented settlements on rented agricultural land[50].

The area most recognized for its biodiversity in Zahle is Hima Anjar-Kfar Zabad, a designated IBA as well as a Hima (protected area) by the municipalities of Anjar and Kfar Zabad. It occupies an area of 326 ha.

Of all the districts within the Qaraoun Catchment, Zahle is the least forested. Small ruminants such as sheep and goats comprise almost all of the grazing animals within the district. However, its number of cattle is the highest among all the districts of the Bekaa Governorate.

Agriculture is a main land use in Zahle District with a total area of 18,925 ha and 4,575 farmers, and this reflects the favourable conditions. The district has a favourable climate with a long growing season and deep rich soils within the central Bekaa plain. The soils of the plain are cropped with a wide assortment of field crops whereas its eastern and western highlands are cultivated with fruit crops, olives and vineyards. Additionally, many agricultural industries are concentrated within the district leveraging the area's position with respect to other districts of the Bekaa.

Zahlé District has the highest number of industries in the Bekaa Valley. There are an estimated 723 businesses and factories all over Zahle and most towns in the District have between two and 50, with the highest number, 322 businesses, located in Zahle-Maallaqa[51]. Unlike the other districts in the Bekaa that resort to open dumping, Zahle has a landfill that serves 15 towns within the district. In addition, Zahlé also has a health waste management treatment unit operated by Arc-en-Ciel which treats about 332 kg of waste per day[52].

The **Rachaya District** (545 km^2) is described fully in Annex 5, Section 4. In addition to discussing its administrative set-up, its physical and ecological environment, and its demographics, the Annex has a special focus on rangelands. In fact, the District will serve as the locality for land use planning, rangelands and pasture as well as forest activities for the project. Its capital, Rachaya el Wadi, is at an elevation of 1,250 m above sea level.

Pastures, rangelands or barren lands make up the majority of the Rachaya District which is home to Lebanon's second highest peak, Mount Hermon/Jabal Ec Cheikh at 2,800 m above sea level. The lands of the district are mostly mountainous with few flat plains cultivated with wheat and other agricultural crops irrigated by the many springs found within it. The annual rainfall in the district

[47] Localiban website (http://www.localiban.org/spip.php?rubrique247)
[48] UNDP / MOE (2011) Business Plan for Combating Pollution of the Qaraoun Lake, prepared by ELARD
[49] Laithy, H., Abu Ismail, K. and Hamdan, K. (2008) *Poverty, Growth and Income Distribution in Lebanon*. Published by International Poverty Center: Country Study No. 13
[50] UNHCR Website (http://data.unhcr.org/syrianrefugees/region.php?id=90&country=122)
[51] Localiban Website (http://www.localiban.org/spip.php?rubrique532)
[52] UNDP / MOE (2011) Business Plan for Combating Pollution of the Qaraoun Lake, prepared by ELARD

averages from 500 mm in northeastern parts to above 1,000 mm in the highlands of Mount Hermon which is snow covered for over 6 months of the year[53].

The registered population of Rachaya District is 73,000, however only 7,500 reside in Rachaya el Wadi in winter, increasing to about 10,000 in summer. A survey conducted in 2002 designated Rachaya as one of nine poverty prone areas within Lebanon[54].

The natural green cover of Rachaya is composed of forests and other wooded lands which exist in isolated pockets with low density and often degraded forests. The district is one of the most threatened by desertification at the national level with over 77 % of its lands being exposed to a high level of desertification[55].

Rachaya is the district with the highest level of rangeland pastures within the Qaraoun Catchment. In fact, around 75% of its lands are considered as rangelands. Sheep and goats account for virtually all the grazing animals within the district. The number of cattle is the lowest in the Catchment.

The Rachaya district produces quality olives and olive oil, exquisite grape molasses and excellent honey. Several villages in the district specialize in producing honey, especially Rachaya el Wadi which is the leading area in the Bekaa Governorate in terms of beekeeping with over 3,680 beehives[56]. In addition to honey, beekeeping leads to a wide range of other products such as wax, propolis, royal jelly, honey soaps and honey based medicines.

Field implementation in localities in the three selected Districts, together with national level outputs will inform replication in the entire catchment and elsewhere – these being then funded by co-financing. Up-scaling will be facilitated by the project's foundational work, supported by co-funding and based on what is demonstrated by the project.

2.1.3 Stakeholder analysis

Some stakeholders have been associated with the project from very early on and they form the core of implementation partners and their interest has been confirmed through various consultation meetings during project formulation. The original list from the PIF has been revised to reflect the better focus in project localities and changing circumstances. The list has also been augmented with the addition of other partners and now stands as in the following table which identifies the role that each partner will play in project implementation.

As can be seen from the table, a wide range of stakeholders will be involved in the implementation of the Project, including relevant ministries and other organizations upstream, District and Municipal administrations at the district level, local communities (farmers, livestock herders, forest communities and nomad pastoralists) and the private sector. In addition, relevant research organizations, academia, NGOs, and CBOs have acquired considerable experience and skills of working in the rural environment and are particularly specialized in land use, environmental protection, capacity building and raising awareness and sensitivity to the issues being addressed by the project. Because of this consideration, some of these organizations will be involved in the field implementation of project interventions in the selected districts.

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[53] APIPNM website (http://www.apipnm.org/swlwpnr/reports/y_nr/z_lb/lbmp131.htm)
[54] YMCA Lebanon (2005) *Environmental Impact Assessment Report: Wastewater treatment plant in Rashaya*. Prepared by CEE
[55] MoE (2003) National Action Programme to Combat Desertification.
[56] MoA (2010) Agriculutral Census 2010, website (http://www.agriculture.gov.lb/html/RESULTATS_RECENCEMENT_AGRICULTURE_2010/caza.html).

Detailed consultations with the primary stakeholders have been undertaken during the preparation of this Project Document through national and local level consultative meetings. The purpose of these consultations was to evolve consensus on the nature of the SLM interventions and the target districts for project activities.

The project follows a cross-sectoral and participatory approach, requiring the involvement of different stakeholders in implementation at national, district and local levels. At the Inception Phase of the project, a comprehensive "Stakeholders' Participation Plan" defining roles and responsibilities of the project partners will be formulated which will include: a mechanism for effective coordination among different stakeholders especially within particular districts; a strategy for mobilization and involvement of local administrators, landowners, workers and other residents in the preparation and implementation of site-specific land use plans; a mechanism for involvement of local groups of both men and women for participatory resource assessments and identification of local priorities to inform the land use planning process; a mechanism for providing technical assistance to land owners, individual farmers and shepherds and local communities through line agencies, district administrations, and contracted NGOs for replication of SLM interventions that have been tested successfully by the project; a system for participatory monitoring and evaluation of land use practice and the impact of project activities.

The following table comprises stakeholders identified in the PIF stages and augmented during the project formulation phase.

Table 6. Stakeholders and their roles and responsibilities in project implementation

STAKEHOLDER	ROLE AND/OR RELATIONSHIP WITH THE PROJECT	RELEVANT PROJECT COMPONENT
Ministry of Environment (MoE)	MoE will be the Executing Agency/Implementation Partner for the project as the national environment agency in Lebanon, responsible for all environmental protection issues. Its responsibilities are: (i) to strengthen environmental inspection and enforcement; (ii) to promote sustainable management of land and soil; (iii) to preserve and promote Lebanon's ecosystem capital (iv) to promote hazardous and non-hazardous waste management; (v) to control pollution and regulate activities that impact the environment. The Ministry will facilitate functioning of the Project Coordination Unit (PCU), especially in regard to liaison with government authorities from different sectors. MoE will take a lead in the upstream activities of the project as well as the SEA on which the LUPs will be founded. It will oversee the integration of conservation measures and monitoring system into the integrated land-use (management) plans and/or annual work plans and contribute to capacity building of stakeholders (public/private/community) in the Qaraoun Catchment project sites. MoE will ensure coordination with other relevant projects and initiatives and will be active in monitoring PCU performance.	As EA/IP for the project will be involved in work across all three Outcomes and most Outputs
Ministry of Agriculture (MoA)	The Ministry of Agriculture oversees the majority of land use in Lebanon. It is also the National Focal Point for the UNCCD. More specifically, it has responsibility for the management of forests, rangelands and agricultural activities. The MoA is therefore a key stakeholder and partner for the project. It will provide advice and expertise for project activities at the local level, facilitate forests activities, as well as lead in the development and implementation of rangeland management protocols.	Main input will be made to Outcome 1; but also Outcomes 2 and 3. More specifically, MoA will contribute to Outputs 1.1, 1.2, 1.3, 2.2, 3.1, 3.2 and 3.3
Lebanese Agricultural Research Institute (LARI)	The LARI is a public institution dedicated to research for the development and advancement of the agricultural sector in Lebanon. It falls under the aegis of the Ministry of Agriculture but continues to enjoy administrative and financial autonomy. LARI will be involved in the project agricultural activities and will provide advice and expertise for the innovative approaches and tools that the project will develop in its search for sustainable land management practices.	Main input will be related to Outcome 1, especially Output 1.3. Advice will also be sought

		under Outcome 2, specifically for Outputs 2.2, and 2.4.
Council for Development and Reconstruction (CDR)	The Council for Development and Reconstruction has three main tasks: compiling a plan and a time schedule for the resumption of reconstruction and development, guaranteeing the funding of projects, supervising their execution and utilization by contributing to the process of rehabilitation of public institutions, thus enabling it to assume responsibility for the execution of a number of projects under the supervision of the Council of Ministers. More recently, CDR has focused on land use and land use planning and as such will be a key stakeholder and partner for the project. It will provide advice and expertise for the LUP activities of the project and share ownership of the resulting plans.	Primarily work under Outcome 2, especially Output 2.2; but also involved in work under Outcome 3, Output 3.1
Qaraoun Catchment Districts, Municipal Unions and other Municipalities	The three Districts of interest to the project comprise a number of Municipalities many of which have combined to form Unions. These local administrations are charged with the day-to-day management of all public works within their area of jurisdiction including water and waste networks, waste disposal, internal roads, and urban planning. They are key stakeholders and partners for the project Land Use Planning activities for which they will provide local knowledge and collaboration. They will also adopt and implement the LUPs and as such are among the main beneficiaries of the project. Furthermore, they will cooperate with the project in its reforestation and related activities, as well as the coordination of rangeland management.	Primarily work under Outcome 2, all four Outputs ; but also involved in work under Outcome 3
UN-HABITAT	The United Nations Human Settlements Programme, UN-HABITAT, is the United Nations agency for human settlements. It is mandated by the UN General Assembly to promote socially and environmentally sustainable towns and cities with the goal of providing adequate shelter for all. The main objective of the UN-HABITAT Country Program for Lebanon is to focus on long term development strategies. Collaborating with the Government in coordination with other UN agencies operating in the country, UN-HABITAT expects to consolidate a comprehensive program to address governance and reform issues. Among its activities, UN-HABITAT is involved in training and capacity building for land use planning for which it has developed and delivered a successful course.	May contribute to training and capacity building under Outcome 3, Output 3.3.
Ministry of Public Works and Transport	The Directorate General for Urban Planning (DGUP) of the Ministry of Public Works and Transport has responsibility for land use planning in Lebanon although to date this has focussed on the urban environment. As the entity with legal responsibility for land use planning the DGUP will b e a major stakeholder for the project and will advise and assist the project with its LUP activities and provide the legal framework for their development, adoption and ultimate implementation.	Will contribute to Outcome 2 (especially Output 2.2) and serve as the avenue through which the results will be provided for government endorsement
Wider Public, Communities and the Private Sector	The involvement of the wider public and communities in ecosystem conservation is an important part of this project. Land owners and employers, other private sector exponents, farmers, shepherds, farmers associations and cooperatives, and other communities in the localities where the project is active, are the prime beneficiaries of the project. They will be involved fully in the design, testing, evaluating and eventually upscaling of project approaches and tools for Sustainable Land Management. They will be identified more specifically during the Inception Phase and brought in as appropriate during project implementation.	Opportunities will be provided for meaningful participation under Outcomes 2 and 1 – in particular Output 2.2, but also 1.2 and 1.3
Environmental NGOs and community groups	The environmental NGOs and community groups experienced in various aspects of the project will be involved as much as possible *e.g.* Forests activities (Jouzour Loubnan, Friends of the Cedars of Bcharre Committee, Association for Forests, Development and Conservation); Arable land activities such as organic farming and slow food (Greenline Association); Protected Areas designation and management (Al Shouf Cedars Society); Nature based tourism development (e.g. trail development – Lebanon Mountain Trail Association, Baldati, etc.). Others will be identified during the Inception Phase.	Mainly Outcomes 1 and 2, but possibly also Output 3.4
Academia	University staff and students from relevant institutions will be invited to participate in activities for which they are seen to have the necessary expertise, advice, knowledge and/or capabilities. These could include the survey work which will form part of the	Primarily Outcomes 1 and 2

	Strategic Environmental Assessment and which will underpin the Land Use Plans, as well as the subsequent environmental and land use monitoring which will follow.	
Professional organisations	Organizations such as Chamber of Commerce, Industry and Agriculture, Syndicate of Industrialists, Order of Engineers and Architects will be invited to participate in project activities as relevant to their areas of interest and expertise.	Outcome 2 and Outcome 3
The Litani River Authority (LRA)	The Litani River Authority (LRA) was formed in 1954 to facilitate the integrated development of the Litani River Basin. Its major achievement is the hydroelectric development project that has brought about major hydrological changes to the Litani River Basin. The project sees the LRA as a most important institution in the Qaraoun Catchment and is seen as a source of advice on hydrologic matters. The LRA is also a prospective beneficiary of the project as a result of its expected positive impact on lake water quality.	While not directly involved in project implementation, the LRA and MoEW will assist with evaluating the impacts of the project and may contribute specifically to Output 2.3.
Ministry of Energy and Water (MoEW)	The MoEW will collaborate with the project by monitoring water quality and quantity in the Litani River and the evaluation of the project success, as well as in the process of policy and legislation review.	
Central Administration of Statistics (CAS)	The CAS has published Environment statistics with data on water, the seabed, air pollution, soil, biodiversity, forests, wildlife and flora and waste. Some of this data is of interest to the project and CAS will be invited to collaborate in project activities such as surveys which will lead to the SEA and the LUPs. Statistics will also be helpful in evaluating the project's results and impacts.	CAS may be able to assist with the setting up and subsequent implementation of the Land Use Monitoring Programme (Output 2.3)

The above table which is the result of extensive discussions and presentations, serves as the draft Stakeholders' Participation Plan. The final Plan will be produced during the Inception Phase by the project team in consultation with stakeholders for approval by the Project Executive Board.

2.1.4 Fit with GEF Focal Area Strategy and Objectives

The project is in harmony with the GEF-5 Land Degradation Focal Area Strategy[57] which seeks the following global environmental benefits:

- Improved provision of agro-ecosystem and forest ecosystem goods and services
- Reduced GHG emissions from agriculture, deforestation and forest degradation and increased carbon sequestration
- Reduced vulnerability of agro-ecosystem and forest ecosystems to climate change and other human-induced impacts

It is also expected to produce the following national socio-economic benefits:

- Sustained livelihoods for people dependent on the use and management of natural resources (land, water, and biodiversity)
- Reduced vulnerability to impacts of CC of people dependent on the use and management of natural resources in agricultural and forest ecosystems

More specifically, the project will address each of the four GEF LD objectives, namely:

1 Maintain or improve flows of agro-ecosystem services to sustain the livelihoods of local communities;

[57] GEF (2013) GEF Focal Area Strategies - *Land Degradation (Desertification and Deforestation) Strategy*. Pages 55-69

2 Generate sustainable flows of forest ecosystem services in arid, semi-arid and sub-humid zones, including sustaining livelihoods of forest-dependent people;
3 Reduce pressures on natural resources from competing land uses in the wider landscape;
4 Increase capacity to apply adaptive management tools in SLM.

The project will promote an integrated approach towards fostering sustainable land management – seeking to balance environmental management with development needs. Amongst other things, it will set-up a multi-sector planning platform to balance competing environmental, social and economic objectives in district development plans and associated investments. In doing so, it will reduce conflicting land-uses and improve the sustainability of land management so as to maintain the flow of vital ecosystem services and sustain the livelihoods of local and downstream communities. The platform will be underpinned by a robust decision support system – including a Strategic Environmental Assessment and monitoring framework so as to inform the planning process, development investments and enforcement. This will provide a system for determining where development should be avoided (in the most ecologically sensitive areas), where and how impacts should be reduced, and where and how land should be rehabilitated. Further, the project will adapt land use practices in different economic sectors – testing new management measures, as needed to reduce environmental stress.

The project also advances the strategic objectives of the UNCCD 10-Year Strategic Plan[58] namely:

1) To improve the living conditions of affected populations
2) To improve the condition of affected ecosystems
3) To generate global benefits through effective implementation of the UNCCD

It also addresses the following operational objectives of the Plan:

1) Advocacy
2) Science, technology and knowledge
3) Capacity-building

2.1.5 Conformity with UNDP and UNDAF strategies

The project activities directly contribute to three outputs outlined in Lebanon's UNDAF for 2010 – 2014. They are:

- Output 1.2.5: Strengthened management and technical capacity of central and local authorities for policy and programme development, including decentralization policy and planning
- Output 5.1.3: National forest strategy is developed and integrated forest management is initiated
- Output 5.3.4: Enhanced ecosystem functioning of Litani River watershed

As for alignment with the UNDP Country Programme Document for Lebanon (2010-2014), the project also adds value to UNDP's plan to help "*mainstream environmental considerations into other line ministries*" through incorporating natural resources issues into the regional integrated land use plans. The project will aid in "*strengthening the institutional capacity of stakeholders to support sound environmental decision-making*" by working with central, regional and local government to improve their performance in protecting land and natural resources. The project also aims to "*improve the enforcement of environmental legislation*", another priority objective set out by UNDP.

UNDP also plans to "*strengthen its strategic relationship with the Ministry of Agriculture and the affiliated Lebanese Agriculture Research Institute (LARI) to promote sustainable land management to improve livelihoods, focusing on desertification-prone areas, which are usually the more impoverished regions of the country*". This will be partially achieved through this project.

[58] UNCCD, CoP-8 (2007) *The 10-year Strategic Plan and framework to enhance the implementation of the Convention*. Decision 3/COP.8

The project also conforms with UNDP's Biodiversity and Ecosystems Global Framework 2012-2020[59] which seeks to harness the positive opportunities provided by biodiversity and natural ecosystems, as a catalyst for sustainable development. The project recognizes the real value of biodiversity and ecosystems to society—in relation to secure livelihoods, food, water and health, enhanced resilience, conservation of threatened species and their habitats, and increased carbon storage and sequestration – and seeks innovative ways of addressing the problems of the Bekaa Valley so as to achieve a sustainable future and achieve multiple development dividends while striving towards the Aichi Targets.

2.1.6 Project strategic approach

The project is designed to achieve sustainable land management in the Qaraoun Catchment. More specifically, it is aiming to obtain alleviation of land degradation, maintenance of ecosystem services and an improvement in livelihoods as targeted by the Objective. It will obtain these impacts by working at three levels. Firstly, it will carry out local level interventions under Outcome 1 where specific SLM practices will be implemented in three Districts in specific farms, forests and rangeland areas within selected landscapes. Secondly, it will upscale its tested approaches to the district level through the formulation of land use plans under Outcome 2. Thirdly, the project will prepare for higher level replication across all four districts and beyond through the improvement of institutional capacities, an effective knowledge system and an attractive economic incentives scheme under Outcome 3. The project will achieve its ultimate impacts by feeding its results into the on-going co-financed interventions and influencing them into mainstreaming sustainable land management into their operations.

2.2 Project Objective, Outcomes and Outputs/Activities

2.2.1 Project Objective

The project Objective is: *Sustainable land and natural resource management alleviates land degradation, maintains ecosystem services, and improves livelihoods in the Qaraoun Catchment*

As such, the Objective seeks three results, namely:

- Alleviation of land degradation
- Maintenance of ecosystem services
- Improvement in livelihoods

and these are expected to arise through the management of land and natural resources in a sustainable manner. Confirmation that these results have been achieved may not be possible within the four year timescale of the project. However, progress towards the Objective will be assessed with the help of Indicators.

2.2.2 Project Outcomes

In order to achieve the project Objective, address the identified barriers, and strive for the targeted results, the project intervention comprises three Outcomes and these are pitched at different levels and in different land use types as described below.

[59] United Nations Development Programme (2012) *The Future We Want: Biodiversity and Ecosystems— Driving Sustainable Development*. *United Nations Development Programme Biodiversity and Ecosystems Global Framework 2012-2020*. New York.

Outcome 1: *Landscape level uptake of SLM measures avoids and reduces land degradation, delivering ecosystem and development benefits in the Qaraoun Catchment*
This Outcome seeks the development, testing, evaluating and promotion of tools, practices and measures which avoid and reduce land degradation – for example, comprehensive database as a platform for decision-making, land use plans, stock carrying capacity for rangelands, forest conservation, and conservation agriculture on the plain. In so doing, the Outcome addresses site level problems in three different land use types in the Catchment – high altitude forest lands, middle level rangelands/grasslands, and arable land on the valley floor – all on a landscape scale. The result will comprise ecosystem and development benefits over a quantifiable area arising from a spectrum of ecosystem services such as reduced water deficiency, increased clean water supply for human, animal and plant consumption, reduced soil erosion and increased productivity (increased net primary production in rangelands). These benefits will also be reflected in improved family incomes and livelihoods from SLM practices. The estimated costs of this Outcome are USD1,869,700 plus co-financing of USD4,600,000 making a total for this Outcome of USD6,469,700.

Outcome 2: *Pressures on natural resources from competing land uses in the Qaraoun Catchment are reduced*
This Outcome seeks a reduction of pressures on natural resources from competing land uses. This will be achieved through an enabling planning framework modelled on an Integrated Natural Resource Management (INRM) approach comprising Integrated Land Use Management Plans built on a foundation provided by an extensive resources survey with the data and information captured in an efficient database on a GIS platform. Success will be measured by the application of the LDPMAT (Land Degradation Focal Area - Portfolio Monitoring and Assessment Tool), at project start to establish the baseline, at project mid-term and at project closure. The scope of the work will focus on West Bekaa and Rachaya Districts. The project will also enhance the replication and upscaling of the tried and tested Land Use Management planning process to the rest of Bekaa Governorate bearing in mind the target of 157,000 hectares. The estimated costs of this Outcome are USD920,200 plus co-financing of USD12,000,000 making a total for this Outcome of USD12,920,200.

Outcome 3: *Institutional strengthening and capacity enhancement for promoting sustainable forest and land management in the Qaraoun Catchment through an INRM approach across the landscape*
This Outcome seeks a stronger institutional foundation and enhanced capacities among central and local level government functionaries. Institutional strengthening will be achieved through policy and regulatory reforms and capacities will be enhanced through the provision of expertise and know-how for land use planning and management for sustainability. The resulting forest and land management according to effective land use plans, on a sustainable basis, will be measured by the application of the UNDP-GEF Capacity Development Scorecard (focused on institutional collaboration), at project start to establish the baseline, at project mid-term and at project closure. The estimated costs of this Outcome are USD248,080 plus co-financing of USD1,000,000 making a total for this Outcome of USD1,248,080.

The project will work at the “upstream” level with central and local government to develop institutional tools and measures under Outcome 3. It will also work with local authorities and communities to enhance their capacities for land use planning and management so as to achieve wise land use and protection of ecosystem services – this will be under Outcome 2. More specific innovative approaches to sustainable land use practice will be trialled at the local level, including farmland, rangelands and forests, under Outcome 1.

Tools and measures will be tested, evaluated and made available for replication and upscaling. It is through this replication and upscaling that the project’s significant results will be obtained.

Between them, the three Outcomes address the first two results sought by the Objective, namely, alleviation of land degradation, and maintenance of ecosystem services. The third result, improved livelihoods, will accrue as a result of the other two results.

2.2.3 Indicators

The project indicators are contained in Section 3 - Strategic Results Framework, and include a number of 'SMART'[60] process and impact indicators and targets. The choice of indicators was based on three key criteria: (i) their pertinence to the assumption inherent in the Logframe[61]; (ii) the feasibility of obtaining / producing and updating the data necessary to monitor and evaluate the project through those indicators; and, (iii) their direct relevance to the Objective and Outcomes, more than for Outputs.

As will be noted from the LogFrame in Section 3, it has not always been possible to determine the baseline for each of the key indicators. This is because in Lebanon there is a dearth of data and information below the Governorate level and survey work is required at the project Inception Phase so as to establish baselines at the District level and departure points for some project activities. Even where baselines are provided these are often estimates or generic values and they need to be further verified during the Inception Phase.

The proposed Indicators together with baselines and targets are summarised in the Table below which also includes rationale and comments on each.

[60] SMART = Specific, Measurable, Achievable, Relevant and Time-bound

[61] The LogFrame is based on the general assumption that if (1) there is a strong enabling environment at national and district levels that supports SLM practice; and (2) there is an effective context for the implementation of SLM Land Use Plans; and (3) there is on-the-ground implementation of SLM pilot activities which can be replicated and up-scaled across landscapes; then these landscapes will be much less vulnerable to land degradation impacts, with significant benefits to local communities and broader ecosystem services.

Table 7. Indicators selected for the Objective and Outcomes

INDICATOR	BASELINE	TARGET	RATIONALE AND COMMENTS
The Objective seeks three results, namely: Alleviation of land degradation; Maintenance of ecosystem services; and, Improvement in livelihoods			
0.1 Alleviation of land degradation - Area of farmland in target districts managed according to SLM principles[62]	No explicit SLM practices in the 78,000 ha of agricultural loand in the Qaraoun Catchment	SLM principles applied in 5% of agricultural land (4,000 ha) by end of project, with potential for replication to 100%	This Indicator is specific to the Objective and can be measured regularly through the monitoring programme to be set up by the project. It is a Process Indicator.
0.2 Maintenance of ecosystem services – such as food and medicinal herbs from forests and rangelands, water quality (*e.g.* BOD, NH_3) and erosion control (*e.g.* Suspended Solids) at the entry point of Lake Qaraoun	Ecosystem services taken for granted and not recognized as dependent on wise land use. Data for pollutant entering Lake Qaraoun out of date and unreliable and project survey will establish baseline	Awareness and appreciation among 50% of surveyed residents of the dependence of ecosystem services on wise land use. Reduction in surveyed parameters by 10-20% at project localities	This Indicator is specific to the Objective. It is qualitatively measurable using a social survey approach which is repeated at pre-determined intervals; and quantitatively through the monitoring programme to be set up by the project. It is both a Process Indicator as well as an Impact Indicator.
0.3 Improvement in livelihoods - communities participating in SLM interventions have improved their quality of life (measured by income levels)	Baseline will be established by surveying representative selected communities, as an early activity of project inception	Quality of life indicators show 10% improvement by end of project	This Indicator is specific to the Objective. While participation is directly measurable, improvement in quality of life needs to be measured qualitatively or by proxy. This is both a Process and an Impact Indicator although the latter may not be entirely measureable in the comparatively short timescale for the project.
Outcome 1 seeks the development and promotion of measures which avoid and reduce land degradation			
1.1 Recovery trend in degraded forests and rangelands, particularly in Rachaya District - Area of degraded forests and rangelands benefiting from introduced SLM techniques	In target districts, up to 20,000 ha of rangelands and 500 ha of forests are badly degraded	Turnaround in 10,000 ha of rangelands and 300 ha of forests by end of project, and with potential for replication to 20,000 ha of rangelands and 500 ha of forests	This Indicator is specific to the Outcome; it is measurable in hectares recovered, possibly through remote sensing. It is an Impact Indicator, however, the impact may not be explicitly apparent until sometime after the project has ended. Specific indicative parameters will be determined during the Inception Phase and baselines set from which to measure progress.
1.2 Uptake of SLM measures in arable land especially in Zahle and West Bekaa Districts	Few if any farmers and other land users apply SLM measures knowingly. Exact level to be established by survey in target areas	>50% of all farmers and land users in project target areas apply SLM measures demonstrated by the project in Zahle and West Bekaa	This Indicator is specific and relevant to the Outcome. It is a Process indicator which requires a baseline to be established by survey during the Inception Phase, for subsequent surveys to measure the uptake of SLM Measures
1.3 Percentage of land users in	Current level in project	>25% implementation within project	While this is a Process Indicator in principle, it will also

[62] See for example - http://www.google.co.nz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0CCkQFjAB&url=http%3A%2F%2Fwww.seqcatchments.com.au%2F_literature_129372%2FPrinciples_for_Sustainable_Land_Management&ei=LZ8KVOe2K4aIuATepoDYBA&usg=AFQjCNHoyI_Y0FTr1QXwmryvBBDHQXxJUw&bvm=bv.74649129,d.c2E

project localities in each of the three Districts that are applying SLM approaches in upland forests, rangelands and valley arable land	target areas in the three Districts is very low (see Output 2.2)	target areas	signal positive impacts.
Outcome 2 seeks a reduction of pressures on natural resources from competing land uses			
2.1 Integrated and participatory district level land use plans in West Bekaa and Rachaya reflecting SLM principles developed and adopted	No land use plans reflecting SLM principles exist in project target districts – West Bekaa and Rachaya	Land Use Plans for West Bekaa and Rachaya Districts (91,000 ha) developed and available for replication to the rest of the Catchment (total of 157,000 ha)	This will be measured qualitatively and quantitatively by noting the coming into being of the District Land Use Plans and the start of Municipal Land Use Plans formulation. It is a Process Indicator but LUPs could also be seen as a result (impact).
2.2 Reduction in pressure on rangeland resources in the high country of West Bekaa and Rachaya Districts – as shown by species composition and productivity	51,400 ha of rangelands considered degraded. To be refined through first survey (see Output 2.2)	An improvement of 20% (>10,000 ha) when compared to control in Rachaya District	Can be measured quantitatively through the use of transects and/or quadrats. This is an Impact Indicator, albeit on a modest scale.
2.3 Reduction in pressure on forest resources in West Bekaa and Rachaya Districts – as shown by the level of regeneration and recruitment of seedlings	6,032 ha of forests estimated to be degraded. To be refined through survey (see Output 2.2)	An improvement of 8% (± 500 ha) when compared with control in West Bekaa and Rachaya Districts	Can be measured quantitatively through the use of transects and/or quadrats. This is an Impact Indicator, albeit on a modest scale. Specific indicative parameters will be determined during the Inception Phase and baselines set following the initial surveys from which to measure progress.
Outcome 3 seeks policy and regulatory reforms and enhanced institutional capacities			
3.1 Capacity development indicator score for Land Use Planning and Management in West Bekaa and Rachaya Districts	Current score for West Bekaa and Rachaya Districts in 33.3%	By end of project an overall score of > 50%	This Indicator is specific to the Outcome. It can be measured through repeat applications of the UNDP Capacity Assessment Scorecard. This is a Process Indicator which should lead to impact in the long-term.
3.2 Number of Municipalities in each of the three Districts with knowledge of the benefits of SLM in project target areas	Currently low or no appreciation of the benefits of SLM among Municipalities	50% of Municipalities in project target areas, by project end	This is a specific Indicator to the Outcome. This is a Process Indicator and impacts will accrue in the medium to long term.
3.3 Acceptance level by communities in Zahle, West Bekaa and Rachaya Districts, and individual farmers, shepherds, etc, of the value of SLM as a rational approach for land use	Current level in project target areas is very low (see Output 2.2)	Increased acceptance and implementation (20%) by land users illustrated by their level of compliance (requiring less enforcement effort)	This will be measurable qualitatively (although it could be quantitatively measured through a well-designed survey). It is a Process Indicator which can lead to long-term impact. Specific indicative parameters will be determined during the Inception Phase and baselines set through the initial survey.
3.4 Extent of mainstreaming of SLM principles into policy, regulatory framework, strategy, planning, management, accountability, reporting and institutional capacity of key central government agencies, districts and municipalities	Currently there is no evidence of SLM principles in the policies, planning and operations of key government agencies, districts and municipalities	SLM principles evident in the policies, regulations, strategies, planning, management and reporting of MoA, MoE, CDR, and other key agencies, as well as West Bekaa, Zahle and Rachaya District administrations and municipalities	This Indicator requires a baseline to be set during the Inception Phase. It is measurable mainly qualitatively but also quantitatively by recording the occurrence of SLM principles. It is an Impact Indicator and could be achieved by the end of project.

2.2.4 Project Outputs and Activities

Output 1.1: *Measures to restore and rehabilitate degraded forests identified, demonstrated and integrated into existing FMPs*

Remnant forests and forest blocks in the Qaraoun Catchment have become insular and patchy, reducing their ecosystem services such as soil protection, erosion control, provision of habitat for species at risk, non-timber forest products, etc. Building on the information available through the LUIMS (Output 2.1), this Output will consolidate and improve the remaining forest resources in the Catchment. It will focus on the forests in the higher altitudes of the West Bekaa District, as a model for the approach to be upscaled throughout the Catchment eventually. Activities will also target remnant patches of degraded forest in the higher altitudes of Rachaya District where the work will be coordinated with the rangelands activities outlined under Output 1.2 below. It is also possible that after further investigation, the work will be extended to Zahle District especially the land above Kfar Zabad Wetland. The project will seek the improved management of forests, the recognition of ecological corridors, and the rehabilitation and restored integrity of degraded forests, as a means of reversing land degradation trends, protect and enhance ecosystem services and improve productivity. The aim is to cover up to 10,500 ha of forests (including rehabilitation of 500 ha of degraded land) directly or through replication. More specifically, activities will include a review and updating of existing Forest Management Plans to integrate measures for rehabilitating degraded forest ecosystems (including measures to enhance forest ecosystem services such as through improved forest connectivity; enrichment planting and protecting reforested areas; protection for natural regeneration of degraded areas and also consideration of the principles espoused in the new Land Use Plans and the benefits from the new LUIMS and Monitoring System). Activities will be coordinated by a Forest Ecologist Consultant working with respective forest managers and District personnel, with the full participation of communities including shepherds and land owners. The work will be assisted by MoE, MoA and other sources of forest resources expertise such as stakeholder NGOs. Apart from providing the necessary expertise, project inputs will cover necessary consultation and the cost of printing draft working copies and the final versions of protection and management plans.

Output 1.2: *Techniques and management mechanisms for sustainable rangeland management developed and tested, and appropriate infrastructure established to operationalize SLM.*

Under this Output, the project will focus on the rangelands at the higher altitudes of Rachaya District. It will build on the data and information obtained through the surveys carried out under Output 2.1 and will be in line with ILUMPs established under Output 2.3. The target is to address up to 20,000 ha of land (directly or through replication) where management and protection regimes will be developed, tested and evaluated together with the appropriate infrastructure, such that the approach can be replicated to other rangeland environments within the catchment. As noted under Output 1.1 above, activities under this Output will also seek remnant patches of degraded forest in and among the grazing rangelands, and provide rehabilitation and protection. The project will engage a Rangeland Management Expert who will work in collaboration with MoA and MoE and in a participatory approach with land owners, shepherds, local government administration and communities to reach a consensus on the best approach so as to achieve sustainable use of the rangelands in perpetuity. The work may include a reduction in stock numbers, finding alternative grazing, applying a seasonal approach, and adopting exclusion zones for valuable areas providing ecosystem services (such as remnant forests). In addition to providing the necessary expertise and covering the costs of consultation workshops, travel and information distribution, the project will also promote income-generating strategies that meet the communities' economic needs while enhancing ecological success by reducing pressure on forests, rangelands and their biological resources. These strategies include the training of farmers and women's groups, farmer-to-farmer training and technology transfer and assistance to farmers in marketing the

products. Alternative Income Generation opportunities will be provided if the proposed measures are expected to have an impact on livelihoods. They also increase the chances of sustainability.

Output 1.3: *Implementation of sustainable agriculture management regime that integrates SLM considerations*

This Output will be coordinated by an Agriculture and Arable Land Expert. However, there will be a special focus on localities in West Bekaa and Zahle Districts and possibly at a lesser scale also in Rachaya District. Up to 40,000 ha are targeted to be addressed directly or through replication. The project, with the assistance of LARI and MoA, will explore and discover ways and means to reduce the impacts that current land uses are having on soil fertility, water quality and other ecosystem services. Consultations with different local stakeholders will be critical for the development and implementation of the sustainable agriculture regime. These consultations will be led by an Agriculture and Arable Land Expert who will coordinate a cross-sectoral stakeholder consultation committee and will include representatives from the LARI, MoA, community representatives and also representatives of local district agriculture and development sectors.

The project will work with individual landowners and farmers to experiment with innovative approaches to fruit and vegetable production (including irrigated lands, rain-fed production, glasshouses, etc) which enhance productivity and lower the impact on land and water. Among the approaches to be trialled will be conservation agriculture, organic farming, integrated crop management, drip-irrigation, recycling compost and other natural fertilizer, cover crops, soil enrichment, natural pest and predator controls, bio-intensive integrated pest management and other techniques which will arise from participatory brainstorming with community members. In addition to providing the necessary expertise and covering the costs of participatory workshops, travel and information distribution, the project will also explore and provide Alternative Income Generation activities such as homestays and guided hiking and other ecotourism activities, expansion of apiculture, possibly sericulture (silk), cultivation and processing of medicinal plants, tree nursery development, etc, for those required to change land use practices (with a resulting loss in income) so as to avoid land degradation.

Output 2.1: *A Land Use Information Management System (LUIMS) established*

A Land Use Information Management System (LUIMS) will be designed to serve as a repository for data and information obtained through the diagnostic studies and surveys in Output 2.2, which will inform Land Use Plans, provide a platform for decision-making, and serve as a source of up-to-date knowledge on land use as described in Output 2.5. The database will be developed by a Working Group led by an Information Technology (IT) Specialist. In addition to IT expertise, the Working Group will also comprise representatives of the expected key users of the LUIMS. The LUIMS will be developed on a GIS platform, possibly allied to and integrated with existing complementary databases. The Project will lead the discussion on the most appropriate and effective repository for the LUIMS. It will also develop the procedures and protocols for inputting and accessing information. In addition to setting up the databases, the project will provide the necessary survey equipment and IT hardware and software. The results of this Output will also support the updating or development of Forests Management Plans envisaged under Output 3.1. It will also provide the foundation for the monitoring system to be developed under Output 2.3. Since the LUIMS will be available for access (albeit in a managed manner and within certain limits) by the public, the project will assist with a nationwide as well as local level publicity campaign to inform about its value, availability and accessibility.

Output 2.2 *Integrated Land Use Management Plans (ILUMPs) developed, piloted, evaluated and refined as necessary for West Bekaa, and Rachaya, ensuring optimal allocation of land to generate development benefits and critical environmental benefits in tandem.*

The foundation work for the Land Use Planning exercise will commence with diagnostic Land Use, Ecological and Socio-Economic studies and surveys of West Bekaa and Rachaya Districts based primarily on available information supplemented as necessary to fill significant gaps. The surveys will also adopt the work on current legal provisions and procedures for land use planning and management and for regulating land use and the farming industry[63]. In many cases, these surveys will provide the first comprehensive recording of land use, ecological resources and socio-economic situation in Lebanon. Since this will serve to set a number of baselines for the project (see Section 3 – Strategic Results Framework), it will need to be carried out as one of the first Activities. The survey will complete its setting of the baseline by identifying the ongoing environmental mechanisms in the project localities, and how they link with the environmental and socio-economic trends. It will gain an understanding of current land uses and the ecological resources and ecosystem services that require protection and management.

The results of diagnostic studies and surveys will identify those priority aspects of the environment that could present significant constraints or opportunities to the development of the region. It will then explore comparative scenarios for land use and identify impacts that must be avoided and determine necessary compensatory and mitigatory measures for impacts which are unavoidable. The report on the diagnostic studies and surveys will be put out for public discussion and comment in a search for the scenario with the greatest benefit and the minimum impact, on a sustainable basis. Public input will be taken into account fully and consensus will be sought on the desirable way forward.

Work for the diagnostic studies will be coordinated by the MoE with the participation of the MoA, CDR, DGUP, District Administrations, the private sector, landowners and community representatives. The project will provide a Contractor Team with expertise in agricultural land use, natural resources, ecosystem services, and social mores and livelihoods. The project will work firstly on West Bekaa and Rachaya Districts with the aim of up-scaling it to the entire Qaraoun Catchment.

The data and information generated by the diagnostic studies and surveys, will form the core basis for the LUIMS (see Output 2.1 above) and will have similar coverage, and will lead in turn to the Land Use Planning. The plans will build on and update any existing plans prepared by national, territorial and development authorities for the selected Districts. The plans will set development limits so as to protect land from degradation, reduce/avoid impacts on ecosystem services, safeguard biodiversity and enhance livelihoods. They will define spatial areas where development should be avoided; where it may be permitted subject to management controls; and what mitigation and offset requirements are needed. Provisions will apply to Protected Forests and other Protected Areas and their buffer zones, remnant and degraded forests, rangelands, agricultural productive lands (arable lands), water bodies, urban areas, infrastructure such as waste management facilities, and the commons, including recreation spots. Activities under this output will be led by the CDR and DGUP with a Working Group of Planning and Land Use Experts and with the full cooperation and participation of the two districts, Unions and other municipality administrations, MoA, MoE, landowners, the private sector and communities. The methodology and approach will take cognizance of the work carried out by CDR[64], UN-HABITAT[65] and others and following consultation, the Working Group will produce an agreed protocol on how to approach the task and discuss this with the relevant planning authorities. The Working Group will then address each of the two Districts, building on the information in the LUIMS and while reflecting the results of the diagnostic studies and surveys, produce a draft proposed Land Use Management Plan for each. The Draft Plans will be put out for comments and discussion including

[63] As it is a legal requirement in Lebanon, a SEA has to be carried out as an integral part of Land Use Planning, the project will support make use of the results of the diagnostic studies and survey to integrate LD/SLM issues into the SEA process.

[64] Awada, Fouad (2011) *Final Report (N°3) of the short term mission : Definition of the Form and Content of a Strategic Sustainable Regional Development Plan adapted to the Lebanese needs and Context*. Presented to the Council for Development and Reconstruction (CDR) and the EU Delegation in Lebanon.

[65] UN-Habitat (undated) *UN-Habitat Medium-Term Strategic and Institutional Plan – A Focus on Lebanon.*

extensive public consultation meetings at various levels. Each of the drafts will be amended in the light of comments received and espoused by the respective authorities to guide land use so as to achieve sustainability and protect valuable ecosystem services. The project will submit the final outputs to DGUP and/or CDR and provide support in seeking formal approval of the plans by government. Following the adoption of the LUPs at the District level, the project will assist Municipalities (individually or in Unions) to develop Land Use Action Plans which will reflect the LUP at District level and provide for the implementation of the relevant LUP within their area of jurisdiction.

In addition to the diagnostic studies and surveys, project input will comprise an enhancement of planning capacity at governorate, district and municipalities level carried out in collaboration with partners; and a significant level of broad consultation and discussion aiming for consensus, through repeat workshops and similar events. There will also be a need for draft proposals to be distributed in printed and digital form. The final Land Use Management Plans will be released within a broad public information campaign (for landowners and communities) which stresses the value and vulnerability of land, ecosystem services, and biodiversity resources, hence the justification for the measures proposed in the Plans. In recognition of changing circumstances and priorities and to capitalize on experience gained, such plans are usually reviewed every 5-10 years and this will be written into the proposed methodology.

Output 2.3*: Land Use Monitoring System developed and implemented to update and maintain the LUIMS, identify trends and ensure that any changes in land use remain within acceptable limits; to include remedial measures that will be triggered by the monitoring.*

The Land Use Monitoring System will maintain the LUIMS (as set up under Output 2.1 above) as a relevant and up to date planning and decision-making tool. It will also help identify trends and ensure that any changes remain within pre-determined, acceptable limits. Scientifically-selected indicator species will be among the tools that will be used. A very important corollary to the monitoring system will be the identification of remedial measures such as tighter legislation, revised strategies, stronger enforcement, better outreach, etc, that will be triggered, if necessary, by the monitoring. The monitoring systems will be designed by a team of experts set up with the advice of MoE and MoA and led by a Monitoring Consultant. The approach and methodology to be used, the principles and objectives, and the capacity and know-how requirements will be developed initially at the central level. Working with the relevant authorities, the Working Group will then test the Monitoring System at each of the participating Districts following training and capacity enhancements of local personnel. After implementing any necessary refinements and adjustments, the Monitoring System for each of the Districts will be handed over to local responsibility, after any further necessary training and capacity building to enhance sustainability. In developing the system, the Working Group will explore the use of remote sensing together with on-ground measurements and observations, including indicator species.

The Working Group will also assist MoE and District and Municipalities Administrations to develop contingency plans for dealing with any worrying trends and other results of concern which might arise from the monitoring activity. Among the inputs for this Output, the project will assist with the procurement of any necessary monitoring equipment and training for its use, the implementation and evaluation of the trials at local level, and the contingency planning noted above. The project will also develop a handbook for land use/ecological monitoring, print it and distribute it in hard copy as well as digital version. This will be the key product for furthering replication and up-scaling of a Land Use Monitoring System.

Output 2.4*: Compliance and enforcement capacity heightened where necessary*

The focus of this Output is the enhanced operational, surveillance, interception and prosecution capabilities of agencies implementing (and enforcing) the Land Use Plans so as to stop unplanned

conversion of natural habitat, unsustainable application of agricultural chemicals, and non-compliance with land use permits and conditions. The work will be coupled with an effective system of penalties for breaches of planning provisions reflecting the new Sustainable Land Management approach. The project will clarify the respective roles of operative enforcement agencies, propose the rationalization of the enforcement framework and enhance its effectiveness. The project input will be led by a National Expert working with the main actors *i.e.* MoE, MoA, District and Municipal Administrations, the newly-appointed Environmental Public Prosecutors, the Internal Security Force (ISF), and other enforcement agencies and in close collaboration with those implementing Outputs 1.1 and 2.6, and with the advice of the Ministry of Justice. Further national experts will be engaged to develop and implement a training package (including Training of Trainers) for compliance and enforcement, and while the project's focus will be the project localities, the Output will be able to be upscaled nationally. Inputs will include various workshops with the main law enforcement stakeholders, the production of a handbook or similar guidance in printed form and digital version.

Output 3.1 *Recommendations to remove barriers to SLM in Lebanon integrated into relevant policies, legislation, procedures*

A Working Group will be set up, which will work closely with, and possibly be chaired by the Ministry of Justice. The Working Group will be supported by a Legal Consultant and will include MoE, MoA, CDR, DGUP and local government representatives. The project will seek clarifications in the mandates of the different agencies responsible for enforcement and prosecution as well as the capacity to implement the products of this Output. This output will begin with a review of the current legal provisions and procedures covering land use planning and management and regulating land use and the farming industry with a focus on amending key policies, procedures and legal instruments so as to identify and resolve gaps or inconsistencies in legislation and remove barriers to SLM. The Working Group will then propose amendments and updating of relevant legislation and other remedies reflecting a sustainable approach to land use in a Discussion Paper which will be distributed widely with an invitation for comments. Following this, the project will organize workshops to consider the Discussion Paper and the proposed improved system will be tested locally and refined before being proposed to the Ministry of Justice for adoption by government. This will be followed by a public awareness campaign nationwide which will target relevant administrations in particular as well as industrial developers, land owners, farmers and other land users and provide the reasons for the proposed "system", the proposed procedures to be followed, aids for improved SLM, etc. A handbook will be produced in both hard copy and digital version.

Output 3.2 *Economic incentives and disincentives designed and set in place to promote adherence by the agriculture industry (including forests and rangelands) to the reformed policies and regulation.*

This Output will develop and propose for adoption, a range of attractive and positive economic "rewards" which the agriculture industry can get for implementing sustainable land use measures. Conversely, it will also develop a range of economic "deterrents" which will apply to actions and developments that have an impact on land and its natural resources – in effect, this will promote adherence by the industry to the reformed policies and regulations leading to wise and sustainable land use. There is already some experience with such measures in the country, applied either in the context of agricultural development or related natural resource management practices. The work under this output is firmly embedded in on-going government led initiatives such as those related to the establishment and implementation of an action plan for introducing Environmental Fiscal Instruments (EFIs) and financing mechanisms, by the STREG[66] project. Such piggy-backing on larger efforts in the country will ensure that these mechanisms are effective and feasible in the country.

[66] Support to Reforms – Environmental Governance Project which is being implemented by the MoE.

Among the incentives and disincentives[67] that will be explored by the Working Group are the following:

- Eco-labelling and certification of products and services so as to gain a market advantage
- Pollution taxes, levies, penalties for the use of particular agri-chemicals
- Subsidies, incentives and concessions for conservation agriculture
- Payment for protecting ecosystem services, *e.g.* conservation easements near waterways
- Etc.

Activities for this Output will be coordinated by the PMU who will recruit an Economics Consultant to lead a Working Group comprising the Ministry of Finance, MoA, and full participation by the agriculture industry. The incentives/disincentives scheme will be developed upstream for national application. However, before it is proposed for adoption by the Ministry of Finance, the system will be tested at the local level for a trial period, and will be refined if necessary before being adopted nationally by government for implementation by relevant institutions. The project will print (including digital version) the adopted guidelines and ensure publicity to reach the farming industry.

Output 3.3 *Institutional and human capacity enhanced for professionals, administrators, NGOs and community leaders leading to an increased level of SLM consideration in land use planning and management.*

The project will support the development of a strategic, long-term approach to individual capacity building in SLM for professional staff of national, district and municipal administrations as well as NGOs and community leaders. Following an assessment of the key gaps and requirements in knowledge, this will involve the design of a formal certifiable SLM training programme (with competence standards / accreditations) or integrate SLM training courses in agreement with one or more academic institutions to provide an opportunity for graduates and professionals to gain higher level skills and qualifications in this subject. The project will support studies to design and develop the course as part of the in-service career progression of professionals. The number of potential beneficiaries is not known, but it is expected to be substantial as a result of the higher profile given to SLM by the project.

In the short to medium term, the project will establish formal cooperation agreements for delivery of training and capacity building either with specialised agencies such as UN-HABITAT, LARI, universities, institutes and/or NGOs, or with private sector specialists in the field. A series of training modules will be developed and delivered at various levels during the period of the project and expected to reach between 120 and 180 beneficiaries. These will be supported by manuals, presentations, advance study materials and written hand-outs for field learning, as well as tests to determine competency standards. The capacity building programme will generate training materials that reflect the Lebanese context while reflecting best international principles and practices. Trainees will be capable of supporting village level resource users for sustainable land management, including: sustainable agricultural practices (e.g., tillage, crop mix/rotations, nutrient management, soil and water conservation techniques, integrated pest management); sustainable harvesting methods for non-timber forest products; sustainable rangeland management.

At the grassroots level, the project will facilitate district, municipal and village level SLM short-training courses on various aspects of land use planning, agriculture, forestry and rangeland management, efficient use of water resources and/or animal health care improvement. The target groups will be village activists, NGOs, community organizations, etc, that can then replicate the learning among farmer groups. The training sessions will be conducted by the specialized agencies or in-house by the project as above, in the project localities. The modules for the training programmes will be finalized

[67] See also: Catie and the Global Mechanism (2012) *Incentive and market-based mechanisms to promote sustainable land management - Framework and tool to assess applicability*.

jointly by the project in consultation with the identified delivery agencies. Delivery will be through field/demonstration days and similar events.

Output 3.4: *A knowledge management and outreach programme for SLM developed and implemented to inform and help compliance, enhance sustainability, and prepare for replication and up-scaling.*

An important contribution towards ensuring mainstreaming of SLM is empowerment through knowledge. This is dependent on a strong knowledge base and knowledge sharing mechanisms among government decision-makers (national and local), professionals, practitioners, receptive communities and individual farmers. The project will therefore engage a Knowledge Management/Awareness Contractor to develop a knowledge management and outreach plan during the Inception Phase, and then coordinate its implementation during the project life. The Plan will be based on the following elements:

Land Use Information Management System (LUIMS): This web-based portal which will be the result of Output 2.1 above, will be established at national level, with pages for each District to ensure maximum coordination and sharing of information about the overall SLM programme. This will make available policies, plans, guidelines, technical documentation, as well as information on capacity building and events, etc.

SLM network: This network for professionals and practitioners (including individual farmers) will be set up by the PCU and managed by it until handed over to an appropriate national agency as part of the project's exit strategy. It will make maximum use of available technology and modern social media to share information. The network will arrange and be supported by a range of activities including: regular e-newsletters; the documentation of indigenous knowledge; Field/Demonstration Days organised in the different districts to demonstrate and share learning experiences in the application of different SLM techniques.

Regular Workshops/Seminars: An important mechanism for disseminating information related to SLM is through workshops and seminars which will be a feature of the project with its commitment to a participatory and inclusive approach. The project will design and organize workshops/seminars on important tools and topics related to sustainable land use, land degradation, the desertification process. The events will be organized at district level to share the best practices, encourage private investors in SLM, share research findings of local research institutes, and support participation by key champions.

Awareness raising: In order to raise awareness on desertification issues and SLM, user-friendly SLM materials in the form of leaflets, brochures, and fact sheets will be published and disseminated to a wider audience in hard copy as well as digitally. The prime target of these materials will be local farming communities, with a focus on issues related to land management and degradation. These materials will therefore be prepared in Arabic. The project will also work with local media (TV, radio and newspapers) to disseminate information about the project and the benefits of SLM approaches.

2.3 Assumptions and Risks

The following risks, identified in the PIF, have been confirmed as potential threats to the project.

Table 8. Risks and measures to reduce their likelihood and counter their severity

RISK	SEVERITY	LIKELIHOOD	ALLEVIATION AND MITIGATION MEASURES
Rehabilitation of forests and defining no-development zones in the Qaraoun Catchment may encounter resistance from production sectors such as infrastructure, mining and agriculture, and local Communities	Moderate	Medium	The project will work to reduce the likelihood of this risk occurring by ensuring that initiatives will be designed and implemented with the full participation of stakeholders from government, non-government and the private sector, fostering an understanding of the need for striking the right balance between development and safe-guarding of ecosystems for the services they provide. If the risk arises, the project will stress the economic case of sustainable land management versus the development of certain sectors in sensitive areas delivering critical ecosystem services. It will also put into effect an effective communication strategy and stakeholder involvement plan which is expected to lead to an appreciation, and defence, of what the project is proposing. In particular, the formulation of Land Use Plans, which will be an inclusive and participatory process based as much as possible on consensus, will reduce the likelihood of this risk.
Land owners/users circumvent planning regulations resulting in the proliferation of quarries, encroachment on valuable agricultural areas, employ high use of agricultural chemicals, and other impacts on ecosystems affecting ecosystem services	Moderate	Medium	The project targets specifically capacity for compliance monitoring and enforcement to address these undesirable behaviours on the part of individual land owners and managers. Establishment of landscape level management fora and landscape level management planning through participatory processes, as well as robust implementation of monitoring mechanisms will work towards minimising the risk. A dialogue with industry and farmers will be established as part of the process of district land use planning to obtain industry buy-in and address concerns, so as to improve compliance.
Future Government Administrations may be reluctant to increase areas designated for conservation for fear of losing state revenues	Moderate	Low	The project will invest in the development of a decision support system for land-use, with valuation tools for different types of ecosystem services and other land use values. The project will support integration of LD/SLM issues and principles into the SEA process and incorporate these into the SEA of the catchment and value the monetary loss from land degradation. This will help convince Government and the private sector of the importance of preserving these services for their economic as well as their ecological value.
Insecurity and political unrest resulting in considerable delays and postponement of project implementation.	High	Low	The current political situation in Lebanon is stable, but the potential for a spontaneous upsurge in violence is real. The project team with support of the Country Office will implement a continuous monitoring of the security situation in the country and update the project board on a regular basis so there is sufficient lead time for adequate response actions and adjustment in project strategy. The UN also constantly assesses country and localised risk in all areas where it operates through the unified UN Security System. During the project preparation and implementation, the system of security clearances will be enforced for any project related field deployment
Land Use Plans encounter challenges to their implementation in the form of: absence of formal approval by the Council of Ministers and therefore a lack of the appropriate decision-making power; absence of a programming phase following the drafting of the Plan; lack of budgetary resources required for implementation	Low to medium	High	Although CDR are development LUPs such as in Akkar, the institutional set-up for land use planning in Lebanon is weak in general and the project will be operating in an unappreciative environment. However, it will overcome this through its focus at local level, building capacity, awareness and appreciation. The risk is not so much to the project's LUP activities but to their sustainability and the project will overcome this through its participatory approach and its efforts towards local ownership of the LUPs, creating a groundswell of understanding and recognition of the value to the administrations and residents alike of planning for sustainable land management.

Further consideration of risks will be carried out by the project during the Inception Phase. Furthermore, the UNDP ATLAS base for this project will set up a Risk analysis and assessment system which will be reflected in the relevant section of the annual PIRs for the project.

2.4 Cost effectiveness

The business-as-usual scenario in which minimal considerations are given to sustainable land management, is leading to land degradation and loss of natural fertility requiring the increasing use of chemical fertilizers which, together with chemical pesticides, cost farmers over USD3,500 per hectare annually. Ecosystem services will also continue to diminish and management will continue to focus on the elimination of consequences after a threat materializes. The cost-effectiveness of this approach is extremely low. For example, rehabilitation/replanting of a forest after a fire costs approximately USD5 million/1,000 ha. By 2018, the amount needed to be invested in severely degraded ecosystems and the opportunity cost through lost production will substantially outweigh the investment proposed by the project. It is also likely that the cost of recovery will increase with the level of degradation. The financial and social value these lands generate is too high for them to be withdrawn from the economic cycle.

The cost effectiveness of this project will be further ensured by the following elements that have been included in project design.

- Combination of upstream, landscape (district) and site specific actions: The project design includes the development of the policy and regulatory framework at the central upstream level complemented by on-the-ground activities that will help develop and test innovative approaches in areas where the impact of current land use is being felt in the rural landscape. These experiences will inform the changes at the systemic level in terms of improved policies, procedures, manuals and guidelines, in turn facilitating the replication of site-level experiences.

- The project approach which involves the development or refinement of policies, legal mechanisms, approaches, processes and other tools at the upstream level in a participatory approach and their testing at the local level before they are adopted nationwide. In this way, wholesale adoption of these tools will only take place after they have been tried and tested and are therefore both more reliable and more acceptable.

- Selection of project localities that exhibit a range of biogeographical and socio-economic characteristics: This will make the site-level experiences relevant to a greater number of districts for further replication.

- The project will focus its interventions on localities selected because land is degraded or under serious threat of degradation. This will maximize the visible impacts and allow the beneficiary locations to act as models for wise land use throughout the Qaraoun Catchment and the entire Bekaa Valley. The project will implement on-the-ground interventions in cohesive and contained localities, rather than in geographically dispersed areas, and this will reduce operational costs significantly.

- The project will place equal emphasis on assisting compliance as well as enforcement which will require less intense and less costly levels of monitoring and prosecution. This will allow the project to work effectively with local communities and stakeholders to share management responsibilities and costs, as well as to develop sustainable economic activities that can benefit these partners and generate revenue streams from wise land use. This is more cost effective

than an exclusionary strategy which is likely to be costly to enforce and unlikely to be sustainable.

- Close coordination with on-going projects such as those funded by UNDP, the EU, FAO and the World Bank. Some of these projects have been under implementation for some time and have accumulated practical experiences with aspects of land use which are going to be invaluable for this project. While the focus on sustainable land use is unique to this project, many of the experiences and models developed by these other projects are still relevant.

2.5 Expected Global, National and Local Benefits

The project is designed to strengthen and complement on-going efforts in Lebanon to manage land use in the Bekaa Valley, in particular the catchment of the Qaraoun Lake. More specifically, the project targets forests, rangelands and arable land at the District/Municipal Unions level on a demonstration scale and prepares for upscaling and replication to the entire Bekaa Valley. A win-win conservation/ economic outcome is sought, whereby the adverse impacts on land of current farming practice are avoided where possible, or reduced and mitigated, while land, ecosystem services and other natural assets come to be recognized as the foundation for an improved and sustainable livelihood for those who depend on the Bekaa Valley. Although current land use practice is a threat to sustainable production, ecosystem services and livelihoods, if carefully managed, land use in the Bekaa Valley can also offer opportunities for improved livelihoods, sustainable productivity and conservation of ecological resources. There is therefore a need in Lebanon to both mitigate the adverse impacts of current land use in the Bekaa Valley, and also to optimize the contribution that the land can make to livelihoods, but on a sustainable basis. The resultant benefits will be spread across the farming industry and communities that rely on it for their livelihood, right across to the ecological benefits which are of global significance.

The project seeks to establish a national level regulatory framework, backed by an effective enforcement system and founded on sound management standards, to manage the mis-use of land. It will also enhance the institutional capacity required to mainstream and implement the SLM approach. It does this under Outcome 3. However, any central land management strategy needs to be applied at the regional level where there is limited capacity to internalize land use planning and management. The project will therefore address this weakness through further capacity building at the District level where it will test a well-founded land use planning package to serve as the basis for decisions on optimal land use on a sustainable basis. This will be done under Outcome 2. Finally, the project will address directly the impact of current land use practice in higher altitude rangelands, in forests and in the arable lands of the Valley under Outcome 1. All these benefits will serve Lebanon well in its search for a better return from its farming industry, but on a sustainable long-term basis.

The global environmental benefits of this project derive from the fact that the project is addressing the direct and indirect threats to globally significant landscape caused by the current land use practices. The project will seek to address forest fragmentation, influence the placement of infrastructure, maintain and restore ecological corridors, and improve the conservation status of species that depend on this environment, such as those of the Aammiq Wetland which lies on one of the most important bird migration routes in the world, and where over 250 species of bird have been recorded, including the globally vulnerable Great Spotted Eagle (*Aquila clanga*), Imperial Eagle (*Aquila heliaca*), and Lesser Kestrel (*Falco naumanni*). Records of globally near-threatened bird species in the area include the Great Snipe (*Gallinago media*), Ferruginous Duck (*Aythya nyroca*) and Pallid Harrier (*Circus macrourus*). The project will also address habitat destruction linked to high stock numbers in sensitive rangelands so as to enhance the conservation status of the high altitude pastures and rangelands. By promoting environmentally-friendly practices in the farming sector, the project will also contribute to

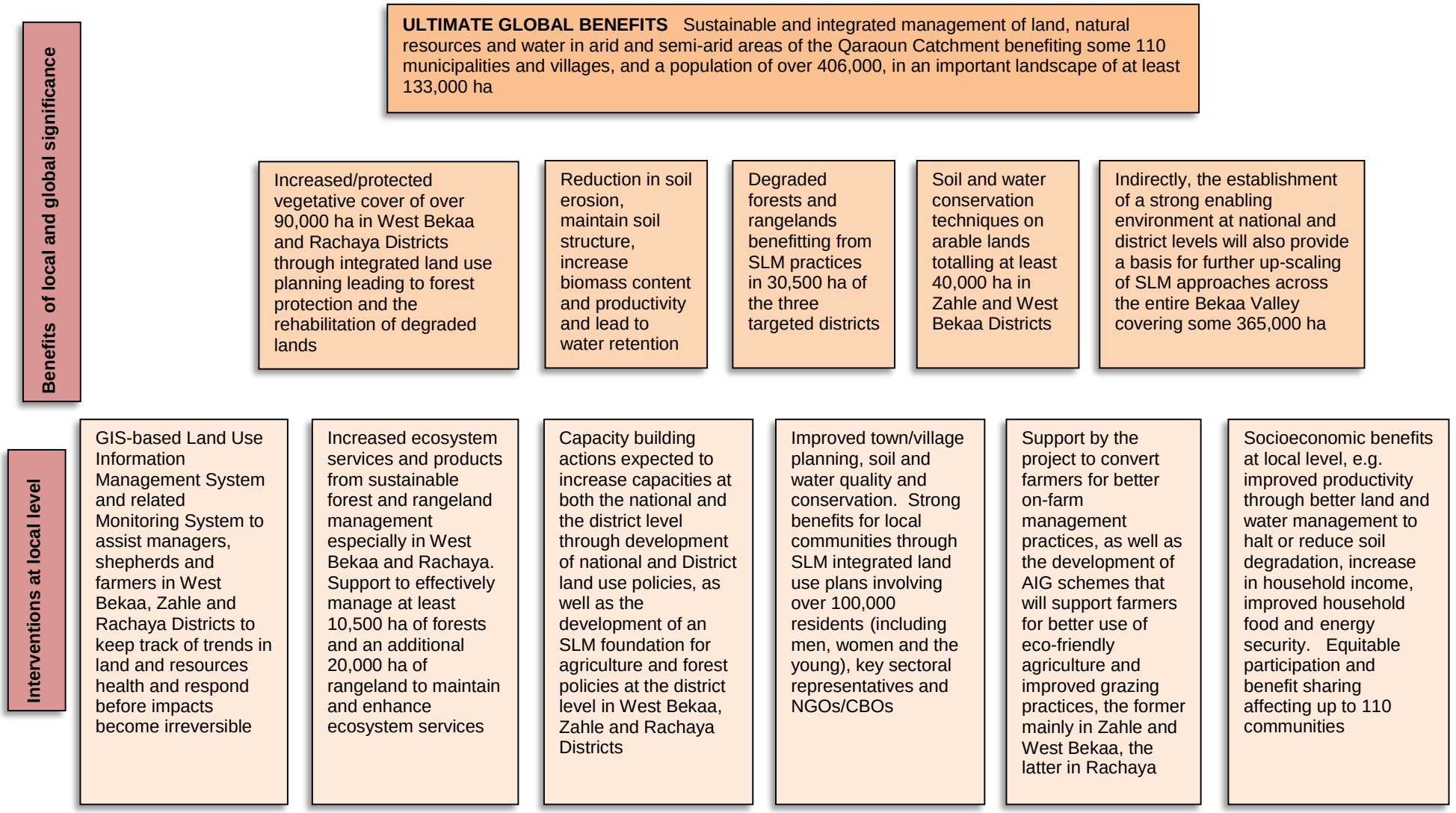
enhancing soil fertility, reducing water pollution and excessive abstraction, and other disturbance of the ecologically-sensitive sites. The project will engage the local population in sustainable land use activities and avoid encroachment on the natural resources in sensitive areas and intensive resource use to support their livelihood needs.

Figure 4 below summarizes the expected local, national and global benefits which will accrue from the project. The Figure indicates the geographical coverage at each level as well as some specific estimates of actual change in state to the extent possible.

Key socioeconomic benefits of the project include the move away from expensive agro-chemicals to more ecologically-friendly approaches which are expected to retain productivity if not increase it and achieve sustainability, thus enhancing livelihoods. Another socio-economic benefit arises through the protection of the environment which provides the ecosystem services that are often taken for granted but which have been threatened and impacted by current land use practices. Furthermore, the ecologically-friendly approaches proposed by the project are expected to lead to agricultural products that command a premium in niche markets in Europe and elsewhere thus increasing the returns that Bekaa Valley farmers will be able to achieve. The project will increase employment rates and will allow the diversification of employment to more innovative and sustainable activities. This project will focus particularly on the active participation of individual farmers, shepherds and other land users, including women[68].

[68] As observed elsewhere in this ProDoc, accurate/up-to-date demographic and socio-economic statistics in Lebanon, particularly at District level, are not available. Baselines will be established at the Inception Phase of the project through targeted surveys, and project progress and benefits will be assessed against these.

Figure 4. Summary figure of alternative land use practices that will be promoted and associated global and national benefits



2.6 Gender strategy

The project will adopt UNDP's commitment to gender equality and women's empowerment not only as human rights, but also because they are a pathway to achieving the project's goals of sustainable land management.

Gender equality and women's empowerment will be mainstreamed into project activities, ensuring that women have a real voice in project governance as well as implementation. Women will participate equally with men in any dialogue or decision-making initiated by the project and will influence decisions that will determine the success of the project and ultimately the future of their families.

The project will apply lessons arising in particular from the successful UNDP Project - "Mainstreaming Biodiversity Management into Medicinal and Aromatic Plants (MAPs) Production Processes in Lebanon" which was implemented by LARI high in the mountains of Mejdel Akkar in north Lebanon and through which women harvested and processed wild sage – the project could emulate this and similar activities in its search for eco-friendly Alternative Income Generating activities.

Further to the overall mainstreaming of gender equality measures into the general conduct of the project, the following table summarizes specific areas for women's participation.

Table 9. The involvement of women in project implementation

PROJECT ACTIVITY	INVOLVEMENT
Output 1.1: Measures to restore and rehabilitate degraded forests identified, demonstrated and integrated into existing FMPs	The views of women will be sought, in particular their use of forest resources and the potential impacts that project activities may bring about
Output 1.2: Techniques and management mechanisms for sustainable rangeland management developed and tested, and appropriate infrastructure established to operationalize SLM	This work will be primarily with shepherds but women will be consulted so as to obtain their input into the design of management mechanisms and identify any gender-based potential impacts
Output 1.3: Implementation of sustainable agriculture management regime that integrates SLM considerations	Women will form part of working groups and their views will be sought and reflected in project activities in pursuit of improved agricultural management
Output 2.1: A Land Use Information Management System (LUIMS) established	Surveys leading to the information database will be conducted with awareness of the different needs and different perspectives of the two genders
Output 2.2: Integrated Land Use Management Plans (ILUMPs) developed, piloted, evaluated and refined as necessary for West Bekaa, and Rachaya, ensuring optimal allocation of land to generate development benefits and critical environmental benefits in tandem	The plans will be developed with the full participation of all residents of the respective districts and the project will make a special effort to ensure that women are able to contribute their perspective. The diagnostic studies and surveys are a comprehensive exercise which should accommodate all residents and all activities, however, the project will make an effort to ensure that women's input is captured
Output 2.3: Land Use Monitoring System developed and implemented to update and maintain the LUIMS, identify trends and ensure that any changes in land use remain within acceptable limits; to include remedial measures that will be triggered by the monitoring	The project will engage both women and men in carrying out its monitoring activities so as to ensure that both genders' perspectives are contributing to the analysis and diagnosis of the results of monitoring
Output 2.4: Compliance and enforcement capacity heightened where necessary	Capacity enhancement will be provided as appropriate without a gender bias
Output 3.1 Recommendations to remove barriers to SLM in Lebanon integrated into relevant policies, legislation, procedures.	Consideration will be given to women's different needs when drafting regulatory reforms and impacts of the proposed reforms will be assessed from a gender disaggregated perspective
Output 3.2 Economic incentives and disincentives designed	In designing incentives and disincentives, the project will

and set in place to promote adherence by the agriculture industry (including forests and rangelands) to the reformed policies and regulation	ensure that the views of both women and men are taken into consideration. Women will form part of working groups set up to work on this Output
Output 3.3 Institutional and human capacity enhanced for professionals, administrators, NGOs and community leaders leading to an increased level of SLM consideration in land use planning and management	Women will be targeted specifically in the project's capacity building activities and their views will be sought when the enhancement activities are being designed
Output 3.4: A knowledge management and outreach programme for SLM developed and implemented to inform and help compliance, enhance sustainability, and prepare for replication and up-scaling	The outreach programme will be designed to cater for the specific needs and interests of both women and men, in their different roles

2.7 Project Consistency with National Priorities/Strategies

The project is in line with the national environmental policy measures set by the MoE in their Work Plan for 2011-2013. These include:

- Activation of the national strategy for the management of forest fires
- Follow up the implementation of the national plan for reforestation and combating desertification
- Promotion of natural sites and reserves and biodiversity
- Activation of the environmental management of water basins
- Planning for urbanization and reducing its environmental implications

The project will also indirectly contribute to alleviating pollution of the Litani River and Qaraoun Lake which was determined a national priority by the Lebanese Government in 2006.

The National Capacity Self-Assessment conducted in 2007 with support from GEF promotes the mainstreaming of environmental priorities into strategic national documents. Strengthening key institutions such as the MoE and MoA, which are implementing partners in this project, was also recommended. The implementation of the National Biodiversity Strategy and Action Plan and the National Action Plan to Combat Desertification were seen as essential.

The National Land Use Master Plan of 2005 presents sectoral action plans which include management of environmental resources, including forests and other important natural areas. Many of these areas are included within the Qaraoun Catchment.

The National Report to the United Nations Conference on Sustainable Development of 2012 proposed streamlining the high value attributed to agricultural land and fertile soil by the NLUMP for Lebanon into all regional urban master plans. The purpose of the district-level integrated land use plan proposed by the project is to do exactly that on a regional scale. The report also stresses the importance of water efficient agricultural practices including "low-till cultivation, drip irrigation, rainwater harvesting and drought tolerant crop varieties", which are a basic component of this project.

Improving agricultural infrastructure is one of the focal areas of Lebanon's Agriculture Strategy 2010-2014. It is planned on being achieved through increasing efficiency of utilization of natural resources, including water conservation and preventing water pollution.

Another focal area is conservation of natural resources through:

1- Sustainable management of marginal land and rangelands
2- Extension on agricultural land use and preventing pollution and desertification
3- Conservation of biodiversity and ecosystems (forests, rangelands, water, fisheries, etc.)
4- National forest management plan

The project activities will contribute to both these focal areas.

The National Action Plan to Combat Desertification (2003) stressed the importance of land use planning by proposing to “encourage land use planning at the local level within the framework of regional and national plans”. The project aims to address this issue at the regional level.

The plan also proposed interventions in North Bekaa (and parts of West Bekaa and Rachaya) that focus on, among other activities, “the promotion of sustainable agriculture practices including proper water, fertilizer and pesticide use” and “rangeland management in order to promote soil and water conservation and to provide adequate feed resources for animal production”. These activities form the core of the field work to be undertaken by the project.

Three of the eight goals set by the National Biodiversity Strategy and Action Plan in 2005 are in line with the project objective, outcomes and activities. They are as follows:

- Goal 1: To protect Lebanon’s terrestrial biodiversity from degradation and ascertain their availability for environmental and economic benefits.
- Goal 4: To protect Lebanon's agricultural diversity from degradation, and to maintain agricultural resources availability, while maximizing both environmental and economic benefits.
- Goal 5: To conserve biodiversity under natural conditions and establish a balanced ecosystem where plants and animals evolve naturally.

The project adds value to a number of related GEF-supported initiatives as described below.

The UNDP/GEF project “*Safeguarding and Restoring Lebanon’s Woodland Resources”* is creating an enabling environment for reforestation and building capacity for Sustainable Land Management in Lebanon. Based on the lessons learnt from reforestation, the project, through the MoE, initiated a new modality by directly contracting municipalities and providing them with technical and financial assistance in reforestation activities. This resulted in the reforestation of a total area of 102 ha distributed across the country, with the involvement of 48 municipalities. The new approach raises awareness among the local communities on the benefits of establishing new forests in their regions, in addition to training them on proper reforestation techniques, relying on them in actual planting and consequent maintenance of the established forests. It provides additional income sources to these communities, as well as creates forest-related short and long-term job opportunities in their villages. The project has also initiated innovative trials on novel reforestation techniques – which are based on the selection of the critical aspects of reforestation, such as minimization of water for irrigation, efficiency of use of younger seedlings, etc. In the near future, this achievement might lead to the establishment of new visions and concepts, which should lead into an easier, faster, cheaper and more efficient reforestation in coming years. The modalities and results of trials will be important in the implementation of the larger reforestation programme in the Qaraoun Catchment.

The UNDP/GEF Project *“Mainstreaming Biodiversity Management into Medicinal and Aromatic Plant (MAP) Production Processes”* is integrating conservation objectives into the gathering, processing and marketing of globally significant medicinal and aromatic plants. The main outcomes of the project are: 1) Appropriate collection methods ensure a viable long-term supply of raw materials of globally significant MAPs species, 2) Value-added processing and product improvement result in increased value of globally significant MAPs harvested in biodiversity-friendly manner; and (3) Supply chain framework strengthened for sustainable harvest of globally significant MAP species and awareness promoted for conservation-friendly MAP products. The proposed project will benefit from this project’s experience in drafting legislation in ensuring sustainable harvesting practices are implemented and the branding of organic products.

The UNDP/GEF Project *“Mainstreaming Conservation of Migratory Soaring Birds into Key Productive Sectors along the Rift Valley/Red Sea flyway”* – the overall goal of the project is to ensure that globally

threatened and significant populations of soaring birds that migrate along this unique flyway are affectively maintained. To achieve this, the project is mainstreaming conservation management objectives into the hunting and land-use planning in Lebanon. A Technical Working Group will be established that ensembles technical experts on forest, sustainable agriculture and water management in Lebanon and all the related projects in Qaraoun Catchment will be represented on this group. Regular meetings will be held between the different projects to leverage synergies.

Projects being implemented or planned by the MoE, will be coordinated in the Ministry which is also where the project office will be physically located. Appropriate mechanisms for this coordination will include participation in relevant and reciprocal technical advisory groups thus ensuring coordination in terms of activities; joint annual work planning; invitations as 'special invitee' to respective project board meetings to present key progress, lessons and challenges; and, invitations to all relevant initiatives to lessons dissemination and related activities. For those projects nearing completion, the project will focus on lessons generated of relevance to the three outcome levels (policy, capacity enhancement, landscape level SLM demonstration).

As one of the latest to be implemented, this project will benefit from advice, experiences and lessons arising from the other projects, recently finished or underway. Conversely this project will be able to influence positively those projects which are at the initial stages, such as the loans and investment ones, and ensure that their specific activities on the ground are in harmony with and complement this project. It may also be possible to achieve economies of scale in areas such as transport, the purchase of goods and services, and in survey and monitoring.

Special attention will be paid to the baseline / co-finance initiatives (as in Tables 3 and 5) to ensure close collaboration so that incremental activities do happen leading to the incremental benefits targeted under the GEF alternative – sustainable land and natural resource management that reduces degradation, ensures sustained supply of ecosystem services while also improving lives and livelihoods.

Table 10 below provides a summary listing of the key projects that this project will coordinate with, and what sort of coordination can be foreseen or pursued.

Table 10. On-going and planned projects that this project will collaborate with

MAIN ON-GOING OR PLANNED PROJECTS	AREAS OF COLLABORATION
A World Bank loan for USD50 million is expected to commence in 2015 to fund investments aimed at addressing the wastewater problem in the Qaraoun Catchment. This will include improvement or installation of Wastewater Treatment Plants in Zahle, Ferzol and possibly other locations in the Upper Litani Basin and reducing effluent discharges from private enterprises	Although the GEF Project is not working in the area of wastewater management it will collaborate with this project for example in Land Use Planning. It also looks to this project for monitoring water quality which, for the GEF Project is an indicator of its positive impact through SLM under Outcome 1
The Lebanon Pollution Abatement Project (LEPAP), funded by a USD3 million Italian Government grant and a USD15 million World Bank loan, commenced in 2014. The objective of LEPAP is "to reduce industrial pollution in targeted industrial enterprises and strengthen the monitoring and enforcement capabilities of the MoE through technical assistance and through establishing a financial mechanism for supporting pollution abatement investments". Relevant positive impacts of the LEPAP project include: • Improvement of surface water and groundwater quality therefore making it a reliable source of water supply to famers and local communities • Protection of biodiversity from wastewater disposal	The GEF Project will collaborate with this project in a similar way to that for the World Bank loan above. Namely, in the area of water quality monitoring as a measure of impact.

• Low cost method for sanitary disposal of municipal wastewater.[69] In addition, the Government of Italy has approved a technical assistance grant of 2.3 million Euros to support the LEPAP and provide the needed technical know-how to identify appropriate environmental solutions to industries located in the Qaraoun Watershed.	
The Support to Reform and Environmental Governance (St-REG) programme funded by the European Union for the amount of €8.0 million in partnership with the MoE focuses on environmental governance reforms. The general objective is to improve the environmental performance of the Lebanese public sector. Specific objectives are to improve MoE's capability of planning and executing environmental policy by building effective capacity within the Ministry	This project has already been listed in Table 5 as a relevant baseline activity and it is repeated here because of its importance. The GEF Project will work with the STREG Project, complementing its efforts to improve planning and enforcement of environmental policies for SLM.
National Reforestation Plan (NRP) as well as the funds from the USD12 million Lebanon Reforestation Initiative (funded by the International Programme of the US Forest Service). The goals of the initiative are to strengthen Lebanon's forest seedling nurseries and oversee the implementation of large-scale reforestation activities in the country, in line with the NRP. Of this amount, an estimated USD2 million is earmarked for the Qaraoun Catchment over the project period.	The GEF Project will look to re NRP and the lessons that arise from the GEF Woodlands Project which is ending soon, for techniques and methodologies for reforestation at high altitudes in the Catchment to resuscitate degraded forests and achieve critical connectivity between isolated remnant blocks. The GEF Project will also instill a SLM perspectivce into the NRP.
USD1 million can be considered as baseline from the Green Plan in the Qaraoun Catchment. This will contribute to addressing Land Degradation in that it provides grants to farmers to repair and/or build stone terraces and retaining walls, build hill lakes and install irrigation networks. An estimated USD2 million is earmarked for increasing the agricultural productivity and incomes of farmers (the Hilly Area Sustainable Agriculture Development Programme 2010 – 2016) through the improvements in soil and water harvesting structures and soil and water conservation measures leading to increased agricultural productivity. The Programme will also address better market access for small farmers through the provision of technical support services and strengthened capacity of project implementing agencies and farmers' organizations.b	This initiative complements the work which will be carried out by the GEF Project. Collaboration will be sought on combatting land degradation at farm level through improved irrigation techniques, soil improvements and market access.
The Agricultural and Rural Development Programme (ARDP) is currently being implemented by the MoA and funded by the European Union for the amount of €14 million. The project will run until 2015 with the objective of "improving the overall performance of the agriculture sector in order to achieve sustainable food security and to improve the livelihood of rural farming communities." The programme's objectives are to: 1. Strengthen the capacity of national institutions to work on a coherent agricultural/rural development vision and to better implement agriculture strategic orientations. 2. Support and empower local rural actors (farmers and cooperatives) by increasing access to credit and infrastructure. One of the ARDP components focuses on forestry and rehabilitating forest nurseries implemented by the MoA. The project aims to improve land management capacities, working with municipalities and cooperatives towards reforestation. The project also works with local actors to maintain and irrigate seedlings	Lessons arising from this project will be taken on board by the GEF Project which will also build on the experience of this project in livelihood improvements (through better return for lower inputs of expensive agricultural chemicals), access to credit (if required for alternative income generation), and the reforestation efforts.

2.8 Assessment of environmental and social impacts

The Environmental and Social Screening (ESSP) of the project, concluded that the project has environmental and social benefits, and possible impacts and risks, but these are predominantly indirect and very long-term and so extremely difficult or impossible to directly identify and assess. The full result of the screening process is in Annex 3.

[69] Government of Lebanon/GIZ (2013) Environmental and Social Assessment (ESA) of the Lebanon Pollution Abatement Project (LEPAP), prepared by Elard and GFA

Integrated Land Use Management Plans will be developed in two Districts by the project. These plans are aimed to have long term positive impacts at the social and environmental levels but it will be difficult to determine these impacts within the timeframe of project implementation. Site interventions under the project include (i) improved management of protected forests and the establishment of ecological corridors over 10,000 ha of protection forests; (ii) natural rehabilitation of 500 ha of degraded forest land; (iii) technologies developed, tested and appropriate infrastructure established to operationalize sustainable land management in 20,000 ha of production rangelands; and (iv) improved water quality and soil condition due to the reduction in pesticide and fertilizer pollution through improved agricultural management of up to 40,000 ha of arable land directly or through replication. The implementation of these activities/interventions will have measurable environmental and social impacts during the project period and subsequently. These will be primarily positive impacts, but there could also be temporary "negative" impacts on some farmers and shepherds who might agree to change land use practices so as to obtain sustainability.

In order to avoid even temporary negative impacts on beneficiaries of the project, project design incorporates a scheme for support through alternative income generation activities that the project will be able to implement to mitigate any impacts arising. Other long-term social and environmental impacts arising from the ILUMPs are expected to be positive and beneficial. However, project design has incorporated full consideration of social and environmental issues through the carrying out of social surveys to precede the development of the Land Use Plans ensuring limited negative impacts and fostering an environment for positive impacts. The potential social and environmental impacts will be determined as accurately as possible through an extensive socio-economic and land use survey which will provide baseline information that does not exist in Lebanon currently.

2.9 Sustainability and Replicability

This is a foundation project – it is testing various tools and mechanisms which, if successful, will lead to sustainable land management. As such, while its immediate benefits are very important, they are primarily on a local scale and the full benefits of the project will only accrue from replication and upscaling across the Qaraoun Catchment.

The project has therefore been carefully designed to optimize the prospects for sustainability of its products and results and pave the way for replication.

1. Environmental sustainability: This project is about environmental protection (with a focus on wise land use), and the planned interventions will ensure that land degradation is turned around and that impacts are reduced, mitigated and offset as necessary, thus reducing pressures on ecosystem services and valuable natural resources. The project will raise awareness of innovative ways of getting the most benefit from land with the minimum of impact on a sustainable long-term basis. This will change the way land is used – ensuring the compatibility of production practices with sustainable land management into the future. The sustainability of forests, rangelands, and arable lands will be assured through the mutual gains and benefits that are to be made.

2. Institutional sustainability: The project will influence the policies and operations of a number of government agencies responsible for primary production and land use management. The project model will see tools and mechanisms developed upstream and tested at the district and municipal level before being refined and adopted nationally for upscaling and wider application. At the same time, capacity will be enhanced to secure the implementation and application of the new tools. Since the new developments will be carried out with the full participation of local government, the private sector, communities, and the people who work the land, a deep sense of ownership will be generated.

The project strategy will anchor the policy and regulatory reform process in MoA, CDR, MoE, DGUP – which are responsible for various aspects of land use planning and management including the licensing of major developments. While specifically enhancing the capabilities of these key agencies to take sustainability into account in land use planning, management, licensing, etc, the project will also strengthen the capacity of district and municipal authorities which have been empowered with administrative responsibilities for land use planning and management, and which must also regulate land use. Such a two-pronged approach is critical to ensure effective implementation of the new paradigm of sustainable land management at the broad catchment level for the long term and enhance sustainability.

3. Financial sustainability: The project will be making the case for all stakeholders to start seeing sustainable land management as making economic as well as ecological sense. Recognition of the economic gains that will arise from the application of SLM tools and mechanisms together with the ownership that will be achieved in the project products will lead to a protective stance from land owners and land users, and this will augur well for the sustainability of the project products, services and benefits. The participating partners have confirmed their commitment to sustain the new management measures that will be put in place under the project and which render sustainable land management as the choice land use over the longer term. The project will also benefit from the significant level of co-funded baseline initiatives. It will demonstrate good practice which will then be emulated by these other initiatives.

In addition, the project will establish financial incentives and disincentives towards sustainable land management, set up an alternative income generation scheme, assist with marketing organic produce to a discerning market and create a context which is expected to be attractive to investors, sponsors and development assistance agencies alike, thus enhancing the chances of sustainability.

4. Replicability: Replication and upscaling are expected to spread the benefits of the project from the pilot localities to the entire Qaraoun Catchment and beyond. This will be achieved through the direct replication of successful project elements and practices and methods, as well as the scaling up of experiences. Each project output will include the documentation of lessons learnt from implementation of activities under the output, and a collation of the tools and templates (and any other materials) developed during implementation. The Project Manager will ensure the collation of all the project experiences and information. Through the knowledge management component of the project, information, know-how, and experience will be made accessible to different stakeholder groups to be emulated beyond the project “boundaries”, replicated, and leading to better support for decision-making processes in the Qaraoun Catchment.

3 PROJECT RESULTS FRAMEWORK

This project will contribute to achieving the following Country Programme Outcome as defined in CPD: Environmental considerations are mainstreamed in sector/local-level strategies/plans					
Country Programme Outcome Indicators: Indicator 1.1 Ministerial plans/strategies include environmental considerations such as the Land Use Master Plan; Indicator 2.1 Technical units with the Ministry operational and having a higher level of technical expertise related to each concerned environmental convention.					
Primary applicable Key Environment and Sustainable Development Key Result Area (same as that on the cover page, circle one): 1. Mainstreaming environment and energy.					
Applicable GEF Strategic Objectives: LD 1: Maintain or improve flow of agroecosystem services to sustaining the livelihoods of local communities; LD-2: Generate sustainable flows of forest ecosystem services in drylands, including sustaining livelihoods of forest dependent people; LD-3: Reduce pressures on natural resources from competing land uses in the wider landscape					
Applicable GEF Expected Outcomes: Outcome 1.2: Improved agricultural management; Outcome 1.3: Sustained flow of services in agro-ecosystems; Outcome 2.3: Sustained flow of services in forest ecosystems in drylands; Outcome 3.1: Cross- sectoral enabling environment for integrated landscape management (in support of SLM); Outcome 3.2: Integrated landscape management practice adopted by local communities; Outcome 3.3: Increased investments in integrated landscape management					
Applicable GEF Outcome Indicators: Indicator 1.3 Maintained/increased flow of services in agro-ecosystems; Indicator 2.2 Increased land area under sustainable forest management practices; Indicator 2.3 Increased quantity and quality of forests in dryland ecosystems; Indicator 3.1 Policies support integration of agriculture, rangeland, forest, and other land uses; Indicator 3.2 Application of integrated natural resource management (INRM) practices in wider landscapes					
	Indicator	**Baseline**	**Targets End of Project**	**Source of verification[70]**	**Assumptions and Risks**
Project Objective[71] ***Sustainable land and natural resource management alleviates land degradation, maintains ecosystem services, and improves livelihoods in the Qaraoun Catchment***	0.1 Alleviation of land degradation - Area of farmland in target districts managed according to SLM principles[72]	No explicit SLM practices in the 78,000 ha of agricultural land in the Qaraoun Catchment	SLM principles applied in 5% of agricultural land (4,000 ha) by end of project, and with potential for replication to 100%	Measurements/observations first taken at project initiation will be repeated at the project mid-term and at project closure	**Assumptions:** Awareness and sensitivity to the value and vulnerability of land and ecological resources will reach an effective critical level among government officials, land owners and others in the private sector, communities and individuals, leading to an alleviation of land degradation, protection of ecosystem services and improvement in livelihoods.
	0.2 Maintenance of ecosystem services – such as food and medicinal herbs from forests and rangelands, water quality (*e.g.* BOD, NH_3) and erosion control (*e.g.* Suspended Solids) at	Ecosystem services taken for granted and not recognized as dependent on wise land use. Data for pollutant entering Lake Qaraoun	Awareness and appreciation among 50% of surveyed residents of the dependence of ecosystem services on wise land use. Reduction in surveyed parameters by 10-20% at	Survey to establish baseline, and subsequent monitoring system to be established by the project (see Output 2.4)	

[70] Comprehensive surveys, ranging from ecosystem to household level, will be carried out under Outputs 2.1 and 2.2 at the Project Inception Phase and will serve to provide the baseline for a number of Indicators against which to gauge the progress of the project towards its targets. In addition specific localities at farm level will be identified during the Inception Phase and only when this is done can the project determine specific baseline data.

[71] Objective (= Atlas output) monitored quarterly ERBM and annually in APR/PIR

[72] See for example - http://www.google.co.nz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0CCkQFjAB&url=http%3A%2F%2Fwww.seqcatchments.com.au%2F_literature_129372%2FPrinciples_for_Sustainable_Land_Management&ei=LZ8KVOe2K4aIuATepoDYBA&usg=AFQjCNHoyI_Y0FTr1QXwmryvBBDHQXxJUw&bvm=bv.74649129,d.c2E

	the entry point of Lake Qaraoun	out of date and unreliable and project survey will establish baseline	project localities		**Risks:** The risk is that the project timescale is somewhat short for some of the project benefits to manifest themselves, resulting in a lack of appreciation. The project will mitigate against this by putting in place a robust information and participatory strategy whereby stakeholders will share the project challenges as well as its benefits. The selected Indicators will serve to discover any beneficial results from project activities or confirm whether a good enough foundation has been laid for such results.
	0.3 Improvement in livelihoods - Project communities are participating in SLM interventions and have improved their quality of life (measured by income level)	Baseline will be established by surveying representative selected communities, as an early activity of project inception (see Output 2.2)	Quality of life indicators[73] show 10% improvement by end of project	Socio-economic survey of selected communities for quality of life, incomes and livelihoods carried out early in project implementation and repeated at project mid-term and project closure	
Outcome 1 ***Landscape level uptake of SLM measures avoids and reduces land degradation, delivering ecosystem and development benefits in the Qaraoun Catchment***	1.1 Recovery trend in degraded forests and rangelands, particularly in Rachaya District - Area of degraded forests and rangelands recovered through SLM techniques and connectivity achieved between remnant isolated forest pockets	In target districts, up to 20,000 ha of rangelands and 500 ha of forests are badly degraded	Turnaround in 10,000 ha of rangelands and 300 ha of forests by end of project, and with potential for replication to 20,000 ha of rangelands and 500 ha of forests	Measurable in hectares recovered, through survey aided by remote sensing.	**Assumptions :** The Outcome assumes that the uptake of SLM measures will lead to very specific beneficial results in the catchment; and that these results will be evident soon enough to ensure the sustainability of project benefits. **Risks:** If the planned outputs are indeed obtained through the project and if awareness is raised to an effective level, there is very little or no risk that the outcome will not be achieved.
	1.2 Uptake of SLM measures in arable land especially in Zahle and West Bekaa Districts	Few if any farmers and other land users apply SLM measures knowingly. Exact level to be established by survey in target areas	>50% of all farmers and land users in project target areas apply SLM measures demonstrated by the project in Zahle and West Bekaa	Baseline to be established by survey during the Inception Phase; subsequent surveys to measure the uptake of SLM Measures	
	1.3 Percentage of land users in project localities in each of the three Districts that are applying SLM approaches in upland forests, rangelands and valley arable lands	Current level in project target areas is very low (see Output 2.2)	>25% implementation within project target areas	Land use practice survey	
	OUTPUTS: **Output 1.1:** *Measures to restore and rehabilitate degraded forests identified, demonstrated and integrated into existing FMPs* **Output 1.2:** *Techniques and management mechanisms for sustainable rangeland management developed and tested, and appropriate infrastructure established to operationalize SLM.* **Output 1.3:** *Implementation of sustainable agriculture management regime that integrates SLM considerations*				

[73] See for example http://www.qualityoflifeproject.govt.nz/indicators.htm

Outcome 2 ***Pressures on natural resources from competing land uses in the Qaraoun Catchment are reduced***	2.1 Integrated and participatory district level land use plans in West Bekaa and Rachaya Districts reflecting SLM principles developed and adopted	No Land Use Plans reflecting SLM principles, exist in the project target areas	Land Use Plans for West Bekaa and Rachaya Districts (91,000 ha) developed and available for replication to the rest of the Catchment (total of 157,000 ha)	Availability of the appropriate planning documents	**Assumptions:** The Outcome assumes that pressures on natural resources can be reduced and that this can be obtained through the elimination of competing land uses through effective land use planning and management. **Risks:** The risk is that the capacity at local levels will not be adequate to carry on with the benefits of the project. However, if capacity development by the project is well-targeted and effective there is no risk that this will not be the case.
	2.2 Reduction in pressure on rangeland resources in the high country of West Bekaa and Rachaya Districts – as shown by species composition and productivity[74]	51,400 ha of rangelands estimated to be degraded. Estimate to be refined through the first survey under Output 2.2	An improvement of 20% (>10,000 ha) when compared to control in Rachaya District	Repeat surveys of simple transects or quadrats in 4 representative areas of rangelands in Rachaya District	
	2.3 Reduction in pressure on forest resources in West Bekaa and Rachaya Districts – as shown by the level of regeneration and recruitment of seedlings	6,032 h of forests estimated to be degraded. Estimate to be refined through the first survey under Output 2.2	An improvement of 8% (± 500 ha)when compared with a control in West Bekaa and Rachaya Districts	Repeat surveys of simple transects or quadrats in 4 representative areas of the target Districts	
	OUTPUTS: **Output 2.1:** *A Land Use Information Management System (LUIMS) established* **Output 2.2:** *Integrated Land Use Management Plans (ILUMPs) developed, piloted, evaluated and refined as necessary for West Bekaa, and Rachaya, ensuring optimal allocation of land to generate development benefits and critical environmental benefits in tandem.* **Output 2.3***: Land Use Monitoring System developed and implemented to update and maintain the LUIMS, identify trends and ensure that any changes in land use remain within acceptable limits; to include remedial measures that will be triggered by the monitoring.* **Output 2.4***: Compliance and enforcement capacity heightened where necessary*				
Outcome 3[75] ***Institutional strengthening and capacity enhancement for promoting sustainable forest and land management in the Qaraoun Catchment through an INRM approach across the landscape***	3.1 Capacity development indicator score for Land Use Planning and Management in West Bekaa and Rachaya Districts[76] at Districts and Municipalities level	Current score for West Bekaa and Rachaya Districts: 33.3%	By end of project an overall score of > 50%	UNDP-GEF Capacity Development Scorecard record repeated at mid-term and at project closure	**Assumptions:** The Outcome seeks ultimate results – sustainable forests and land management, and it is assumed that stronger institutions and enhanced capacity will achieve this. **Risks:** The risk that stronger institutions and enhanced capacity may not lead to the desired results is low and the likelihood is reduced further through the economic incentives and disincentives that will be developed by the project and the fact that the
	3.2 Number of Municipalities in each of the three Districts with knowledge of the benefits of SLM in project target areas	Currently low or no appreciation of the benefits of SLM among Municipalities in the project target areas	> 50% of Municipalities in project target areas, by project end	Targeted questionnaire administered to municipalities in the project target areas. Quality of LUPs and the mainstreaming of SLM in the plans.	

[74] Osman, Ahmed and Cocks, Phil (1992) Prospects for improving Mediterranean grasslands in Lebanon through seeding, fertilization and protection from grazing. Pasture Forage and Livestock Program, International Center for Agricultural Research in the Dry Areas (ICARDA). *Expl Agric.* (1992), volume 28, pp. 461-471.
[75] All outcomes monitored annually in the APR/PIR.
[76] See Annex 6 for the UNDP-GEF Capacity Development Scorecard as recorded during the Project Formulation Phase (PPG)

	3.3 Acceptance level by communities in Zahle, West Bekaa and Rachaya Districts, and individual farmers, shepherds, etc, of the value of SLM as a rational approach for land use.	Current level in project target areas is very low (see Output 2.2)	Increased acceptance and implementation (20%) by land users illustrated by their level of compliance (requiring less enforcement effort)	Socio-economic survey to set baseline, repeated at mid-term and terminal phases	framework will be developed with the full participation of the private sector.
	3.4 Extent of mainstreaming of SLM principles into policy, regulatory framework, strategy, planning, management, accountability, reporting and institutional capacity of key central government agencies, districts and municipalities	Currently there is no evidence of SLM principles in the policies, planning and operations of key government agencies, districts and municipalities	SLM principles evident in the policies, regulations, strategies, planning, management and reporting of MoA, MoE, CDR, and other key agencies, as well as West Bekaa, Zahle and Rachaya District administrations and municipalities	Baseline to be set during the Inception Phase. Measured quantitatively by recording the occurrence of SLM principles	
	3.5 Success of economic incentives and disincentives in promoting adherence to land use criteria, regulations and guidance	None exist at present	Increase in the level of compliance and a decrease in the need for enforcement (reduction by 20%)	Number of prosecutions and enforcement orders (as a proxy)	
	OUTPUTS: **Output 3.1:** *Recommendations to remove barriers to SLM in Lebanon integrated into relevant policies, legislation, procedures* **Output 3.2:** *Economic incentives and disincentives designed and set in place to promote adherence by the agriculture industry (including forests and rangelands) to the reformed policies and regulation.* **Output 3.3:** *Institutional and human capacity enhanced for professionals, administrators, NGOs and community leaders leading to an increased level of SLM consideration in land use planning and management.* **Output 3.4:** *A knowledge management and outreach programme for SLM developed and implemented to inform and help compliance, enhance sustainability, and prepare for replication and up-scaling.*				

4 TOTAL BUDGET AND WORKPLAN

Award ID:	*00081592*	Project ID(s):	*00090788*
Award Title:	Sustainable Land Management in the Qaraoun Catchment, Lebanon		
Business Unit:	*LBN*		
Project Title:	Sustainable Land Management in the Qaraoun Catchment, Lebanon		
PIMS no.	4642		
Implementing Partner (Executing Agency)	Ministry of Environment		

GEF Outcome/Atlas Activity	Responsible Party/ Implementing Agent	Fund ID	Donor Name	Atlas Budget Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Total (USD)	See Budget Note
OUTCOME 1:	**UNDP/MoE**	**62000**	**GEF**	71200	International Consultants	-	-	25,000.00	-	25,000.00	1
Landscape level uptake of SLM measures avoids and reduces land degradation, delivering ecosystem and development benefits in the Qaraoun Catchment				71400	Contractual Services-Individuals	62,800.00	62,800.00	62,800.00	62,800.00	251,200.00	2
				72100	Contractual Services-Companies	-	219,000.00	300,000.00	500,000.00	1,019,000.00	3
				72200	Equipment and Furniture	10,000.00	-	-	-	10,000.00	4
				72600	Grants	-	45,000.00	190,000.00	190,000.00	425,000.00	5
				72800	Information Technology Equipment	10,000.00	22,000.00	45,000.00	-	77,000.00	6
				73400	Rental and Maintenance of Other Equipment	3,000.00	6,000.00	6,000.00	6,000.00	21,000.00	7
				74500	Miscellaneous	1,000.00	2,000.00	2,000.00	2,000.00	7,000.00	8
				75700	Training, Workshops and Conferences	4,500.00	10,000.00	10,000.00	10,000.00	34,500.00	9
					Sub-total GEF	**91,300.00**	**366,800.00**	**640,800.00**	**770,800.00**	**1,869,700.00**	
					Total Outcome 1	**91,300.00**	**366,800.00**	**640,800.00**	**770,800.00**	**1,869,700.00**	
OUTCOME 2:	**UNDP/MoE**	**62000**	**GEF**	71400	Contractual Services-Individuals	62,800.00	62,800.00	62,800.00	62,800.00	251,200.00	10
Pressures on natural resources from competing land uses in the Qaraoun Catchment are reduced				71600	Travel	4,000.00	10,000.00	10,000.00	10,000.00	34,000.00	11
				72100	Contractual Services-Companies	50,000.00	130,000.00	230,000.00	225,000.00	635,000.00	12
					Sub-total GEF	**116,800.00**	**202,800.00**	**302,800.00**	**297,800.00**	**920,200.00**	
					Total Outcome 2	**116,800.00**	**202,800.00**	**302,800.00**	**297,800.00**	**920,200.00**	

OUTCOME 3:	**UNDP/MoE**	**62000**	**GEF**	71300	Local Consultants	-	25,000.00	25,000.00	25,000.00	75,000.00	13
Institutional strengthening and capacity enhancement for promoting sustainable forest and land management in the Qaraoun Catchment through an INRM approach across the landscape				71400	Contractual Services-Individuals	18,270.00	18,270.00	18,270.00	18,270.00	73,080.00	14
				72100	Contractual Services – Companies	-	20,000.00	20,000,00	25,000.00	65,000.00	15
				74200	Audio-visual and printing production costs	-	5,000.00	15,000.00	15,000.00	35,000.00	16
					Sub-total GEF	**18,270.00**	**68,270.00**	**78,270.00**	**83,270.00**	**248,080.00**	
					Total Outcome 3	**18,270.00**	**68,270.00**	**78,270.00**	**83,270.00**	**248,080.00**	
Project Management	**UNDP/MoE**	**62000**	**GEF**	71200	International Consultants	-	30,000.00	-	35,000.00	65,000.00	17
				71600	Travel	2,000.00	4,000.00	4,000.00	4,000.00	14,000.00	18
				72200	Equipment and Furniture	5,000.00	2,000.00	-	-	7,000.00	19
				72500	Office Supplies	4,000.00	2,000.00	2,000.00	2,000.00	10,000.00	20
				72800	Information Technology Equipment	7,000.00	1,231.00	-	-	8,231.00	21
				74500	Miscellaneous	-	5,850.00	4,630.00	-	10,480.00	22
				74598	UNDP cost recovery charges-Bills	3,960.00	7,150.00	6,870.00	3,000.00	20,980	23
				75700	Workshops and Conferences	2,000.00	4,000.00	4,000.00	4,000.00	14,000.00	24
					Sub-total GEF	**23,960.00**	**56,231.00**	**21,500.00**	**48,000.00**	**149,691.00**	
		04000	**UNDP**	71400	Contractual Services-Individuals	75,000.00	75,000.00	75,000.00	75,000.00	300,000.00	25
					Sub-total UNDP	**75,000.00**	**75,000.00**	**75,000.00**	**75,000.00**	**300,000.00**	
					Total Management	**98,960.00**	**131,231.00**	**96,500.00**	**123,000.00**	**449,691.00**	
					PROJECT TOTAL GEF	**250,330.00**	**694,101.00**	**1,043,370.00**	**1,199,870.00**	**3,187,671.00**	
					PROJECT TOTAL UNDP	**75,000.00**	**75,000.00**	**75,000.00**	**75,000.00**	**300,000.00**	
					PROJECT TOTAL	**325,330.00**	**769,101.00**	**1,118,370.00**	**1,274,870.00**	**3,487,671.00**	

#	**NOTES ON BUDGET** (all figures in US Dollars; USD1.00 = LBP1,480.00)
1	International consultant Agro Expert Stock and Action Plan @ USD500/day for activities under Outputs 1.1, 1.2 and 1.3
2	25% of Project Manager overall cost @ USD73,080/year for technical input into Outputs 1.1, 1.2 and 1.3 comprising coordination of Working Groups, authoring of discussion and other papers, lobbying with relevant authorities, liaison with various actors, training and capacity building, production of handbooks and other guidance documents; Agri/Forest Site Engineer (Local Team Leader) @ USD44,530/year, based at LARI in West Bekaa to serve as project gateway at District level and coordinate the various activities in West Bekaa for survey, LUP, LUIMS, Monitoring system and other activities under Outputs 2.1 to 2.5, but primarily to coordinate work under Outputs 1.1 to 1.3, firstly in West Bekaa, but also in the other Districts
3	4 contracts to carry out: (1) Community involvement @ USD259,000 in all three Districts under each of Outputs 1.1 to 1.3; (2) Rangeland trials @ USD260,000 under Output 1.2; (3) Socio-economic assessment @ USD80,000 in all three Districts with relevance to a number of Outputs, in particular Outputs 3.2, 2.3, 1.1, 1.2 and 1.3; (4) Integrated Crop Management and Conservation Agriculture trials @ USD260,000/contract primarily under Output 1.3
4	Basic equipment and running costs for office at LARI, West Bekaa, for the Local Team Leader
5	Grants for forest management and to set up Alternative Income Generating activities. SLM techniques may include a reduction in stock numbers, finding alternative grazing, applying a seasonal approach, and adopting exclusion zones for valuable areas providing ecosystem services (such as remnant forests). Therefore there is a need to find concrete sustainable alternative sources of livelihood or at least diversification of income for some communities. The grants would be used to do so based on technical assessment of needs and finding sound business/financial alternatives which are financially viable and sustainable. These are under Outputs 1.1 to 1.3
6	IT equipment at LARI, District offices and selected Municipalities to allow access to the LUIMS and contribute to and implement the knowledge management and outreach programme, based under Output 3.4 but applicable across the project, especially under Outputs 1.1 to 1.3 and for Land Use Planning activities under Output 2.3
7	Fuel and vehicle maintenance; maintenance/rental of other equipment. This activity is applicable firstly to all Outputs 1.1 to 1.3, but also to Outputs 2.1 to 2.4.
8	Miscellaneous, contingency. To provide for unpredictable expenses
9	Total cost of at least 2 Workshops @ USD17,250/event. These will be in addition to the numerous working groups and public consultation workshops which will be covered under the expenses for specific Outputs. They will be pitched at national level as part of the upscaling and replication effort.
10	25% of Project Manager overall cost @ USD73,080/year for technical input into Outputs 2.1 to 2.4 comprising coordination of Working Groups, authoring of discussion and other papers, lobbying with relevant authorities, liaison with various actors, training and capacity building,; LUP Site Engineer (Local Team Leader) @ USD44,530/year, based at a host institution in the field (probably Rachaya District) to serve as project gateway at District level for Rachaya District and coordinate the various activities in the field for survey, LUP, LUIMS, Monitoring system and other activities under Outputs 2.1 to 2.4 as well as provide support for activities under Outputs 1.1-1.3 .
11	Study Tour – travel and training costs, for selected District and Municipal personnel with responsibilities for LUP and management (Output 2.3), monitoring (Output 2.4), enforcement (Output 2.5)
12	6 contracts to carry out at 2 sites: (1) Diagnostic studies + surveys @ USD85,000/site (Output 2.2); (2) LUIMS @ USD50,000/site (Output 2.1); (3) ILUMP @ USD90,000/site (Output 2.3); (4) LU Monitoring systems + training @ USD50,000/site (Output 2.4); (5) LU equipment @ USD 50,000/site ; (6) Awareness Campaign @ USD50,000/site – under Output 2.1, 2.2, 2.4 and in relation to Output 3.4
13	Printing/publication costs for electronic and hardcopy brochures and other information materials and guidance manuals under Output 2.2, 2.3, 2.4 and in relation to Output 3.4
13	Local consultants – Legal @ USD700/day to coordinate work under Output 3.1 seeking institutional reforms necessary for SLM; Environmental Economist/Finance @ USD500/day to lead a Working Group to develop incentives and disincentives under Output 3.2 and produce guidelines for application; LUP Expertise @ USD500/day for delivery of training and capacity building under Output 3.3 – likely to be through formal cooperation agreement/s with academic institutions, NGOs and/or private sector specialists in the field.
14	25% of Project Manager overall cost @ USD73,080/year for technical input into Outputs 3.1, 3.2 and 3.3 comprising coordination of Working Groups, authoring of discussion and other papers, lobbying with relevant authorities, liaison with various actors, training and capacity building, production of handbooks and other guidance documents, etc.
15	Contract for awareness campaign, knowledge management and outreach (Output 3.4)
16	Production of handbooks and other guidance documents, other knowledge management under Output 3.4
17	International consultants for independent MTE and TE @ USD32,500/contract
18	Travel for project personnel - field visits, preparing for replication, outreach, project exposure
19	Setting up Office at MoE for three personnel
20	Office consumables – stationery, books, etc for the main office and also for the office bases of the two Local Team Leaders at district level
21	IT equipment (X3) for office in MoE @ USD5,077
22	Miscellaneous, contingency. To provide for unpredictable expenses
23	Direct Project Costs are estimations based on the expected services to be provided. However, the exact amount will be charged annually based on the actual transaction costs (using UNDP Universal Price List) of services provided. A Letter of Agreement (refer to draft LoA in annex 8) will be signed between UNDP and the Government of Lebanon, and will include the description and the breakdown of the support services.
24	Workshops and Conferences @ USD3,500/event (4 events over 4 years) to publicize project, outreach and exchange lessons, as well as for personal professional development.
25	25% of Project Manager overall cost @ USD73,080/year for purely management and administration input including planning, reporting, accountability, financial planning and management; Project Admin & Finance Assistant all inclusive @ USD38,385/year; Driver all inclusive @ USD22,400/year (vehicle will be provided by UNDP at no cost to the project; driver required to satisfy UNDSS Security requirements). UNDP co-financing in cash provides the required flexibility for this item

SUMMARY OF FUNDS IN US DOLLARS: [77]

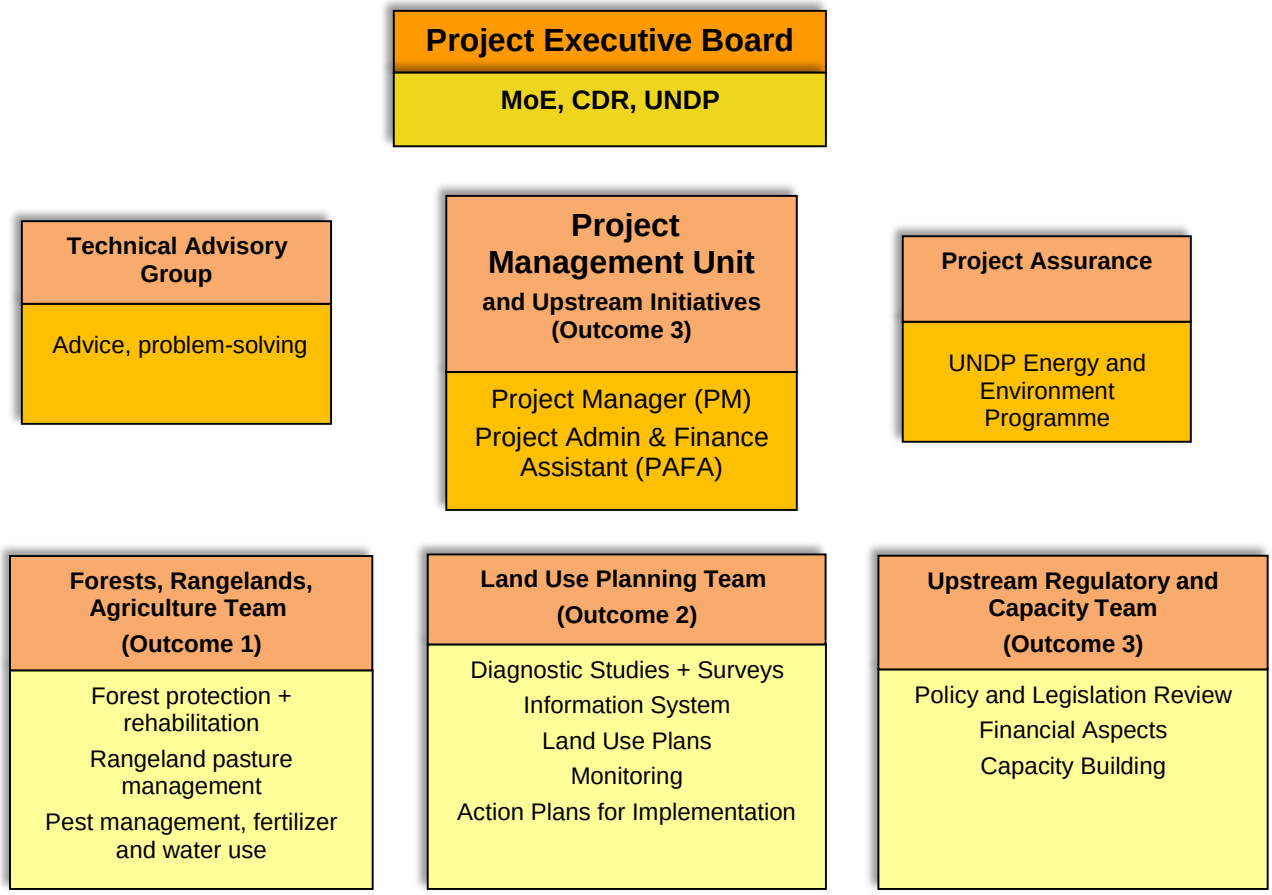
FUNDING SOURCE	Amount Year 1	Amount Year 2	Amount Year 3	Amount Year 4	Total
GEF	250,330.00	694,101.00	1,043,370.00	1,199,870.00	3,187,671.00
UNDP	112,500.00	112,500.00	112,500.00	112,500.00	450,000.00
Ministry of Environment[78]	4,400,000.00	4,400,000.00	4,400,000.00	4,400,000.00	17,600,000.00
TOTAL	**4,762,830.00**	**5,206,601.00**	**5,555,870.00**	**5,712,370.00**	**21,237,671.00**

[77] Summary table includes all financing of all kinds: GEF financing, cofinancing, cash, in-kind, etc...

[78] As a result of the political and security situation in Lebanon, co-financing sources identified in the PIF did not materialize. However, the MoE was able to make up for the difference.

5 IMPLEMENTATION ARRANGEMENTS

The project will be implemented through the following framework comprising governance, coordination and management, and implementation.



UNDP is the GEF Implementing Agency (IA) for the project which will be implemented over a period of four years and will have the Ministry of Environment as the Executing Agency / Implementation Partner. Other government and non-government organizations will also play important roles in implementation. The project will be executed in the Support to NIM modality using the direct payment approach, in line with the Standard Basic Assistance Agreement (SBAA) between the UNDP and the Government.

National Focal Point

The Government will appoint a high level official who will serve part time as the National Focal Point (NFP) for the project. The NFP will be a senior person appointed to oversee the project who is accountable to the Government and UNDP for the implementation of the project in line with the signed project document. He/she is the approving officer for the project and will be responsible for providing government oversight and guidance for project implementation. The NFP will not be paid from project funds, but will represent part of the government in-kind contribution to the project.

Among the duties and responsibilities of the NFP are the following[79]:

1. Serves as a focal point for coordination of the project with implementing agencies, UNDP, Government and other partners
2. Ensures that Government inputs for the project are available and that the project activities are in line with national priorities.
3. Leads and coordinates partners in the selection of the Project Manager/Coordinator.
4. Coordinates with the Project Manager/Coordinator and facilitates his/her work and all staff.
5. Ensures that the required project work plan is prepared and updated and distributed to the Government relevant entities.
6. Will represent the National Executing Agency at project meetings and annual reviews.
7. Will lead efforts to build partnerships for the support of outcomes indicated in the project document.
8. Will support resource mobilization efforts to increase resources in cases where additional outputs and outcomes are required.

UNDP Country Office

As GEF Implementing Agency, UNDP Country Office (UNDP-CO) is ultimately accountable and responsible for the delivery of results through the PEB. UNDP will provide the day-to-day oversight and quality control over project deliveries and shall provide project cycle management services (equivalent to GMS fees cited in paragraph 4 of the Letter of Agreement), that will include the following:

- Providing financial and audit services to the project
- Overseeing financial expenditures against project budgets approved by PEB,
- Ensuring that activities including procurement and financial services are carried out in strict compliance with UNDP/GEF procedures,
- Ensuring that the reporting to GEF is undertaken in line with the GEF requirements and procedures,
- Facilitate project learning, exchange and outreach within the GEF family,
- Contract the project mid-term and final evaluations and trigger additional reviews and/or evaluations as necessary and in consultation with the project counterparts.

The related fees will be paid directly by the UNDP-GEF Unit to the Country Office, and will are not part of the Project Management Cost allocation identified in the project budget.

At the request of the Government of Lebanon, UNDP shall also provide **Direct Project Services** (DPS) specific to project inputs according to its policies and convenience. These services, and the costs thereof, are specified in the Letter of Agreement in paragraph 3. In accordance with GEF requirements, the costs of these services will be part of the executing entity's Project Management Cost allocation identified in the project budget. UNDP and the Government of Lebanon acknowledge and agree that these services are not mandatory and will only be provided in full accordance with UNDP policies on recovery of direct costs. Direct project services will be charged annually using the Universal Price List for Direct Project Services requested by the Government of Lebanon.

Support Services for Implementation are related to the recovery of costs for providing services to the implementation of the project based on real costs or transaction fees, including:

1. Payments, disbursements and other financial transactions
2. Recruitment of staff, project personnel, and consultants
3. Procurement of services and equipment, and disposal/sale of equipment
4. Organization of training activities, conferences, and workshops, including fellowships
5. Travel authorizations, visa requests, ticketing, and travel arrangements
6. Shipment, custom clearance, vehicle registration, and accreditation

[79] See UNDP Bureau of Management (2003) Country Office Support For Effective Project Management: Working Paper #3- National Project Directors Manual

These costs are an integral part of the project implementation and will be charged to budget 74599 in the Project Management component, according to the current Universal Price List for transactional services.

Project Executive Board

Project Governance will be through the Project Executive Board (PEB) which will be convened by UNDP in consultation with the government and will serve as the project's governance and decision-making body. The PEB, will comprise representatives of UNDP, CDR, MoE and other entities as agreed between UNDP and the Government. The PM will also be in attendance at PEB meetings. It will meet as necessary, but not less than once every 12 months, to review project progress, approve project work plans (including budgets) and approve major project deliverables. The PEB is responsible for ensuring that the project remains on course to deliver products of the required quality to meet the outcomes defined in the project document. The PEB's role will include: (i) overseeing project implementation; (ii) approving all project work plans and budgets, as put forward by the PM, for submission to the UNDP Regional Centre in Bangkok and the GEF Unit in New York; (iii) approving any major changes in project plans or programmes; (iv) providing technical input and advice; (v) approving major project deliverables; (vi) ensuring commitment of resources to support project implementation; (vii) arbitrating any conflicts within the project and/or negotiating solutions between the project and any parties beyond the scope of the project; and (viii) overall project evaluation.

Project Management Unit

A Project Management Unit (PMU)[80] will be set up to provide the day-to-day coordination and administration of the project. The project will hire a Project Manager (PM) who will lead the PMU and report to the Project Executive Board (PEB). He/she will work in close collaboration with the NFP to ensure cost efficient, technical and administrative project operations. In addition to the Project Manager (PM), the PMU will comprise the Project Administration and Finance Assistant (PAFA). The PMU will also include the two Local Team Leaders (LTL), one to lead the Land Use Planning Team (Outcome 2) and one to lead the Forests, Rangelands and Agriculture Team (Outcome 1). Both will be hosted by the Lebanese Agriculture Research Institute (LARI).

Project staff will be recruited using standard UNDP recruitment procedures. The PM, with the support of the PAFA, will assume the lead responsibility for the Upstream Regulatory and Capacity elements of the project (primarily Outcome 3), as well as provide oversight and coordination among the key Implementing Partners at the various downstream localities, namely, West Bekaa, Rachaya and Zahle Districts. The PMU, while assuming responsibility for the upstream activities, will provide advice, support and coordination for all project activities. The PM will liaise and work closely with all partner institutions to link the project with complementary national programmes and initiatives. The PM is accountable to the PEB for the overall quality, timeliness and effectiveness of the activities carried out, as well as for the use of funds.

Many outputs will require technical know-how and expertise most of which will be obtained through consultancies and contracts with individuals and companies. Often, as described in Section 2.2.4 above, the expert will lead or coordinate a working group made up of representatives from the key stakeholders. A list of all the delivery contracts envisaged is in Annex 7.

The PM will collate the input from the key Implementation Partners and produce Annual Work and Budget Plans to be approved by the PEB at the beginning of each year. These plans will provide the basis for allocating resources to planned activities. The PM will further produce collated quarterly operational reports and Annual Progress Reports (APR/PIR) for submission to the PEB. These

[80] Terms of Reference for key project personnel are in Annex 7

reports will summarize the progress made by the project against the expected results, explain any significant variances, detail the necessary adjustments and serve as the main reporting mechanism for monitoring project activities.

Technical Advisory Group

The PM will be supported by a Technical Advisory Group (TAG) which will provide advice and support on any technical aspects, in particular the reviewing and drafting of Terms of Reference and reviewing the outputs of consultants and other subcontractors. The TAG will be made up of representatives of key implementing partners, stakeholders and beneficiaries as well as some individuals and organizations selected in recognition of their particular expertise of interest to the project. Expertise sought will range from institutional, legal, policy development, land use planning, ecosystem services, biodiversity values and vulnerability, community involvement, private sector involvement, capacity building, etc. The PM will attend TAG meetings to the extent possible. The TAG will meet as required and will be based centrally. The TAG will regulate its own procedures but it is proposed that the Chair will be selected by consensus and will become an *ex officio* member of the PEB meetings (see above) to contribute technical advice. In addition to providing advice to the PEB, the TAG will also advise the PM, the Local Team Leaders and the key Implementing Partners – on request as well as on the TAG's own initiative. TAG members will not be paid from project funds but their contribution will be recognized as a contribution in-kind.

Local Advisory Committees

A Local Advisory Committee (LAC) will be set up at each of West Bekaa, Rachaya and Zahle Districts. The LACs will be set up by the PM, in consultation with key local stakeholders and with the support of the LTLs. Each will comprise representatives of the local Implementing Partners (Districts and Municipalities), relevant central government organizations (MoE, MoA, CDR, etc), the private sector, NGOs, communities and individuals known to possess valuable expertise. The LACs, which will be chaired by a nominee of the respective District, will perform a similar task to the central Technical Advisory Group (see above) and provide advice and support to the LTLs, the PM and others involved in project implementation.

Reporting arrangements

The PM will collate inputs from Local Team Leaders to produce the comprehensive project AWP which will be approved by the Project Executive Board with advice from the Technical Advisory Group. Each of the local implementation teams will have a distinctive AWP component for which they will be accountable. The LPLs will report to the PM quarterly to inform his/her reporting to UNDP and the PEB.

Audit

The audit of NIM projects is made through the regular external (UN Board of Auditors) or internal audits (audits managed by UNDP's Office of Audit and Investigations).

6 MONITORING FRAMEWORK AND EVALUATION

The project will be monitored through the following M&E activities covered by a budget as provided in the table below. However, M&E expenditure is not identified specifically in the budget but covered under various items in project management costs.

Project Inception Workshop

A Project Inception Workshop will be held within the first two months of project start with the participation of those with assigned roles in the project organizational structure, UNDP Country Office and district and municipal representatives, technical and policy advisors from various government entities, as well as communities and other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first Annual Work Plan.

The Inception Workshop should address a number of key issues including:

a) Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and UNDP-RCU staff *vis à vis* the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.

b) Review the Strategic Results Framework (the Logframe) and confirm the Outputs and, in particular, define the specific parameters that will be used by the Indicators as necessary.

c) Based on the project Strategic Results Framework (the Logframe) and the relevant GEF Tracking Tool, finalize the first Annual Work Plan. Review and agree on the Indicators, Baselines, Targets and their means of verification, and recheck Assumptions and Risks.

d) Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.

e) Discuss financial reporting procedures and obligations, and arrangements for annual audit.

f) Plan and schedule Project Executive Board meetings. Roles and responsibilities of all project organisational structures should be clarified and meetings planned. The first Project Executive Board meeting should be held within the first 12 months following the Inception Workshop.

An Inception Workshop Report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

Quarterly Monitoring

- Progress made shall be monitored in the UNDP Enhanced Results Based Managment Platform.
- Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS. Risks become critical when the impact and probability are high. Note that for UNDP GEF projects, all financial risks associated with financial instruments such as revolving funds, microfinance schemes, or capitalization of ESCOs are automatically classified as critical on the basis of their innovative nature (high impact and uncertainty due to no previous experience justifies classification as critical).
- Based on the information recorded in ATLAS, a Project Progress Report (PPR) can be generated in the Executive Snapshot.
- Other ATLAS logs can be used to monitor issues, lessons learned etc... The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.

Annual Reviews

- Annual Project Review/Project Implementation Reports (APR/PIR): This key report is prepared to monitor progress made since project start and in particular for the previous reporting period (year ending 30 June). The APR/PIR combines both UNDP and GEF reporting requirements.

The APR/PIR includes, but is not limited to, reporting on the following:

- Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative)

- Project outputs delivered per project outcome (annual).
- Lesson learned/good practice.
- AWP and other expenditure reports
- Risk and adaptive management
- ATLAS QPR
- Portfolio level indicators (*i.e.* GEF focal area tracking tools) are used by most focal areas on an annual basis as well.

Periodic Monitoring through site visits

UNDP CO and the UNDP RCU will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess at first hand project progress. Other members of the Project Executive Board may also join these visits. A Field Visit Report/BTOR will be prepared by the CO and UNDP RCU and will be circulated no less than one month after the visit to the project team and Project Executive Board members.

The GEF Portfolio Monitoring and Tracking Tool

Tracking tools are an important component of projects submitted to the GEF and are invaluable for monitoring results of GEF operations in the various focal areas, including progress towards achieving the GEF mandate on global environmental benefits. The Land Degradation Focal Area Portfolio Monitoring and Assessment Tool (PMAT) is one such tracking tool and serves as a means to capture the necessary data and information during project design and implementation. Annex 4 contains the first completed Tracking Tool for this project. As noted below, it should be repeated at the time of the Mid-Term Evaluation and again at the Terminal Evaluation.

As noted in the Guidelines, the GEF recognizes that not all components of the PMAT will apply to every project and this project is no exception. The project proponents faced some challenges in completing the first PMAT. In particular, it had to cope with the incomplete and outdated data in Lebanon on land use in general and its total lack at the District level. This has affected the information recorded on socio-economic aspects such as income levels, and primary productivity per hectare for forests, rangelands and agricultural arable land. The project will address these information gaps during the inception phase, thus setting a baseline for the PMAT as well as the M&E system.

Mid-term Evaluation

The project will undergo an independent Mid-Term Evaluation at the mid-point of project implementation (around 24 months since inception). The Mid-Term Evaluation will determine progress being made toward the achievement of outcomes and will identify course corrections if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project. The Terms of Reference for this Mid-Term Evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the UNDP Evaluation Office Evaluation Resource Center (ERC).

As noted above, the PMAT Tracking Tool will also be completed during the mid-term evaluation.

Terminal Evaluation

An independent Terminal Evaluation will take place three months prior to the final Project Executive Board meeting and will be undertaken in accordance with UNDP and GEF guidance. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF.

The Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response which should be uploaded to PIMS and to the UNDP Evaluation Office Evaluation Resource Center (ERC).

As noted above, the PMAT Tracking Tool will be completed during the terminal evaluation.

During the last three months, the project team will prepare the Project Terminal Report. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results. It is desirable for the Project Terminal Report to be made available to the independent Terminal Evaluation.

Learning and knowledge sharing

Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums. The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects. Finally, there will be a two-way flow of information between this project and other projects with a similar focus.

Communications and visibility requirements

Compliance is required with UNDP's Branding Guidelines as applied in Lebanon, taking into account the security situation. These can be accessed at http://intra.undp.org/coa/branding.shtml, and specific guidelines on UNDP logo use can be accessed at: http://intra.undp.org/branding/useOfLogo.html. Amongst other things, these guidelines describe when and how the UNDP logo needs to be used, as well as how the logos of donors to UNDP projects needs to be used. For the avoidance of any doubt, when logo use is required, the UNDP logo needs to be used alongside the GEF logo.

The GEF logo can be accessed at: http://www.thegef.org/gef/GEF_logo. The UNDP logo can be accessed at http://intra.undp.org/coa/branding.shtml.

Compliance is also required with the GEF's Communication and Visibility Guidelines as agreed to be applied to the situation in Lebanon. They can be accessed at: http://www.thegef.org/gef/sites/thegef.org/files/documents/C.40.08_Branding_the_GEF%20final_0.pdf. Amongst other things, the GEF Guidelines describe when and how the GEF logo needs to be used in project publications, vehicles, supplies and other project equipment. The GEF Guidelines also describe other GEF promotional requirements regarding press releases, press conferences, press visits, visits by Government officials, productions and other promotional items.

Where other agencies and project partners have provided support through co-financing, their branding policies and requirements should be similarly applied.

M&E Workplan and Budget

The following M&E Plan and Budget will be reviewed during the Inception Workshop, adjusted as necessary and adopted by the Project Executive Board.

Table 11. Early M&E Plan to be confirmed at Inception.

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time frame
Inception Workshop and Report	▪ Project Manager ▪ UNDP CO, UNDP GEF	Indicative cost: 10,000	Within first two months of project start up
Measurement of Means of Verification of project results.	▪ UNDP GEF RTA/Project Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members.	To be finalized in Inception Phase and Workshop.	Start, mid and end of project (during evaluation cycle) and annually when required
Measurement of Means of Verification for Project Progress on *output and implementation*	▪ Oversight by Project Manager ▪ Project team	To be determined as part of the Annual Work Plan's preparation.	Annually prior to ARR/PIR and to the definition of annual work plans
ARR/PIR	▪ Project manager and team ▪ UNDP CO ▪ UNDP RTA ▪ UNDP EEG	None	Annually
Periodic status/ progress reports	▪ Project manager and team	None	Quarterly
Mid-term Evaluation	▪ Project manager and team ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team)	Indicative cost: 30,000	At the mid-point of project implementation.
Final Evaluation	▪ Project manager and team, ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team)	Indicative cost : 35,000	At least three months before the end of project implementation
Project Terminal Report	▪ Project manager and team ▪ UNDP CO ▪ local consultant	0	At least three months before the end of the project
Visits to field sites	▪ UNDP CO ▪ UNDP RCU (as appropriate) ▪ Government representatives	For GEF supported projects, paid from IA fees and operational budget	Yearly
TOTAL indicative COST Excluding project team staff time and UNDP staff and travel expenses		US$ 187,000	

7 LEGAL CONTEXT

This project document shall be the instrument referred to as such in Article 1 of the Standard Basic Assistance Agreement (SBAA) between the Government of Lebanon and the United Nations Development Programme, signed by the parties on 10 February 1986.

Consistent with the Article III of the Standard Basic Assistance Agreement (SBAA), the responsibility for the safety and security of the Implementing Partner and its personnel and property, and of UNDP's property in the Implementing Partner's custody, rests with the Implementing Partner. To this end, the Implementing Partner shall:

a) put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
b) assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of the Implementing Partner's obligations under this Project Document.

The Implementing Partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/sc/committees/1267/aq_sanctions_list.shtml. This provision must be included in all sub-contracts or sub-agreements entered into under/further to this Project Document".

The UNDP Resident Representative in Lebanon is authorized to effect in writing the following types of revisions to the Project Document, after consultation with the project partners:

- Revision of, or addition to, any of the annexes to the Project Document;
- Revisions which do not involve significant changes to the immediate objectives, outputs or activities of the project, but are caused by the rearrangement of inputs already agreed to or by cost increases due to inflation;
- Mandatory annual revisions which re-phase the delivery of agreed project outputs or increased expert or other costs due to inflation, or take into account agency expenditure flexibility; and
- Inclusion of additional annexes and attachments

United Nations Development Programme

Country: LEBANON

PROJECT DOCUMENT

Project Title: **Sustainable Land Management in the Qaraoun Catchment, Lebanon**

ANNEXES

ANNEX 1 THE QAROUN CATCHMENT

1 Physical features

The Qaroun Catchment, which is also referred to as the Upper Litani Basin, comprises the headwaters and main catchment area of the Litani River, the country's largest and longest river, up to where it discharges into the man-made Qaroun Lake. The Litani River and Lake Qaroun are considered to be the most important source of fresh water in Lebanon with 350,000 people in 161 communities being dependent on the surface and groundwater resources of the river basin for drinking water.[1]

The Catchment straddles an altitudinal range between 800 m and 2,615 m and extends over an area of 1,468 km^2. Average rainfall is about 800 mm a year with precipitation being the highest in the western mountains with an annual rainfall of about 1,500 mm^2.

The Litani River has an average discharge rate of 770 m^3, marked by high seasonal fluctuation. The highest stream flows are registered in the wet season with peaks in February and March. This flow is derived largely from the surface runoff of winter rainfall. Large perennial springs make a major contribution to base flow during the dry season. Many tributaries flowing from the eastern and western slopes of Mount Lebanon and Anti-Lebanon join the Litani River within the catchment, with the Ghzayyel and the Berdawni rivers being the largest.

The Qaroun Dam has a storage capacity of 220 Mm^3, of which 160 Mm^3 are used for irrigation and 60 Mm^3 as base for dry season storage. About 1,400 ha of the agricultural area in the Bekaa Valley and a further 36,000 ha in South Lebanon are irrigated by the lake's water. More than 80% of the water in the Lake (or 180 Mm^3) is used to generate electricity in the Markaba (34 MW), Awali (108 MW) and Joun (48 MW) hydroelectric power plants operated by the Litani River Authority[3].

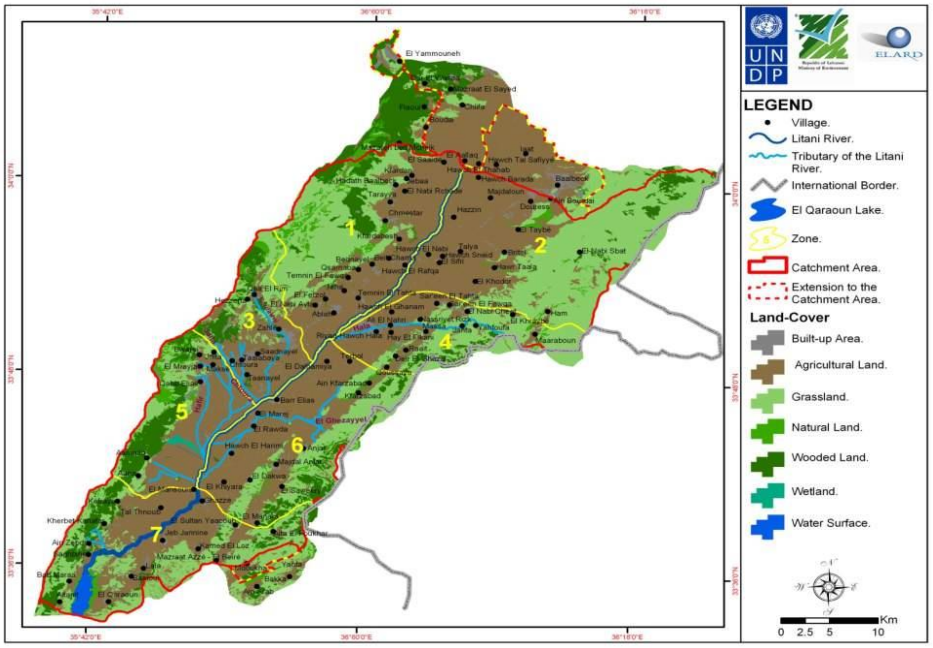


Figure 1 The Qaroun Catchment[4]

[1] Ramadan, Hamzeh (2012) Climate Effects on the Litani Basin Watershed in Lebanon. PhD Thesis Concordia University
[2] Forward Program (2003) Water Quality Assessment of the Upper Litani River Basin and Lake Qaraoun Lebanon
[3] UNDP / MOE (2011) Business Plan for Combating Pollution of the Qaroun Lake, prepared by ELARD
[4] ELARD (2011) Business Plan for Combating Pollution of the Qaroun Lake. Prepared for UNDP and the Ministry of the Environment

The Bekaa is considered to be one of the most fertile parts of Lebanon. The main crops (in hectares) of Bekaa are: cereals 300,000, vegetables 260,000, fruit 220,000, industrial crops 150,000, and olives 32,000[5]. A significant percentage of the land of the Upper Litani Basin is used for agricultural purposes. The table below summarizes the land use in the Upper Litani Basin.

Table 1. Categories of land use in the Upper Litani Basin[6]

LAND USE CATEGORY	%
Barren Rocks – Barren Land	12.7
Farm Constructions	0.1
Forest	2.2
Deciduous Fruit Trees	6.3
Industrial/Commercial	0.06
Marsh Lands	1.1
Olive	0.5
Open Field Agriculture	24.0
Parks and Gardens	9.5
Protected Agriculture	0.06
Quarries / Construction Sites	0.55
Sparse Vegetation - Grassland – Forbs	37.0
Urban areas	1.5
Vineyards	4.09
Water Bodies	0.34

The Qaroun Catchment has 18,756 ha of natural forests, wetlands and associated ecosystems (12% of the catchment), 77,908 ha of agricultural land (50%), 55,585 ha of rangelands (35%), and 4,751 ha are built-up areas (3%). Calliprine Oak (*Quercus calliprinos*) forests and Gregian Juniper (*Juniperus excels*) forests are found on the eastern slopes of Mount Lebanon with Calliprine Oak forest predominating on the western slopes of the Anti-Lebanon range. Sheep and goats constitute the main livestock in the area. 75% of the diet of these herds is provided through grazing on the rangelands.

2 Social aspects and administration

The Bekaa Valley is divided into two Governorates – the Bekaa Governorate comprising the districts of West Bekaa, Rachaya and Zahle; and the Baalbek-Hermel Governorate comprising Baalbek and Hermel Districts. The Qaroun Catchment spans parts of four districts – Baalbek, Zahle, West Bekaa and Rachaya. It includes the eastern slopes of the Mount Lebanon Range, part of the Bekaa Valley and the western slopes of the Anti-Lebanon Range.[7]

The population of Bekaa is estimated to be 533,305 (13.5% of the total Lebanese population) with an average population density of 110 person/km^2. According to the latest national survey in 2004, males comprised 50.7% of the population of Bekaa, some 28% of the population was under the age of 15 and the average household size was about 4.6 persons. The graph below breaks down the residents by age group[8].

[5] Global Eye (2006) The Bekaa Valley
[6] Forward Program (2003) Water Quality Assessment of the Upper Litani River Basin and Lake Qaraoun Lebanon
[7] *Ibid*
[8] Central Administration for Statistics and UNDP (2004) The National Survey of Households Living Conditions. Ministry of Social Affairs.

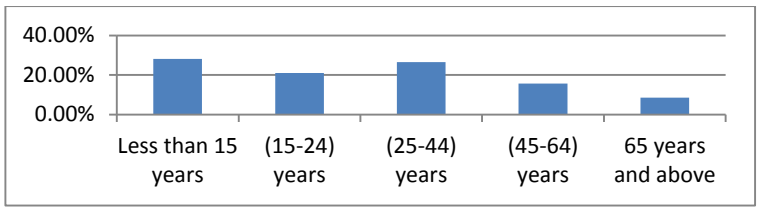


Figure 2 Distribution of Bekaa population by age

The main source of heating in the Bekaa is kerosene or gas oil (83.9%). About 6.7% use gas oil central heating and less than 1% of the population kutilize electric heating. 54.9% of residents dump their waste at disposal sites located near their residence.

The economic activity rate for Bekaa residents is 37.7% - 64.2% for males and 10.9% for females. The service sector attracts the highest percentage of the local labour force. Average literacy rate of the Bekaa is 85.4% - male literacy rate is 90.5% and 80.2 % for females. Only 39% of residents have health insurance. Figure 3 below summarizes the distribution of the labour force by sector.

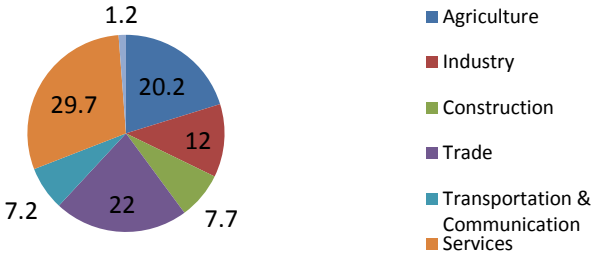


Figure 3 Distribution of Labour Force by Economic Sector (%)[9]

3 Forests in the Catchment

The Bekaa Governorate has limited forest cover. A combination of climate, the importance of agriculture, high population density and the prevalence of grazing have contributed over the centuries to the reduction of the region's forest cover.

Table 2. Percentage of forests and pastures within the Bekaa districts[10]

DISTRICT	FORESTS %	PASTURES %
Rachaya	10.17	76.82
West Bekaa	8.33	37.61
Zahle	2.97	33.34

The forests of the Bekaa Governorate face a multitude of threats, most prominent of which are:

- Grazing: the high number of livestock within the Bekaa negatively impacts the density and regeneration of woodlands; however if managed properly grazing can be beneficial to forests in terms of regeneration and forest fires prevention.
- Conversion of forest lands to other land-uses: the higher profitability of agriculture and the real estate sectors encourages owners to convert their forest lands. Lebanese legislation protects against the cutting of coniferous trees, however, oak forests which dominate the Bekaa landscape are not protected as such.
- Production of wood and charcoal: oak wood has a high density and high calorific value, as such it is collected as fuel and heating wood, in addition, it is the primary wood source for

[9] *Ibid*
[10] MoA (1998) Agricultural Census.

charcoal production. Unsustainable production of wood and charcoal affect the health and regeneration of oak forests

- Forest fires: a leading stressor of forests at the national level, the forest fires threat is the highest in the West Bekaa versus other regions of the Bekaa.

The restricted area that forests occupy within the Bekaa should encourage more efforts to be deployed for their protection. The multitude of services forests provide, especially non-provisioning services such as protection of water resources are often overlooked in local development plans. However, with increasing risks of desertification and land degradation the role of forests becomes ever so important especially in the Bekaa, exposed to great risk of desertification at the national level.

Table 3 provides a comparative summary of the forest sector in the three districts of the Bekaa governorate that the project will focus in.

Table 3. Comparative analysis of the main forest descriptors within the Bekaa districts

MAJOR FOREST DESCRIPTORS	RACHAYA	WEST BEKAA	ZAHLE
Area	Limited	Limited	Minimal
Condition	Mismanaged; degraded, low density open woodlands for the most part	Large protected areas within the Shouf Biosphere reserve, medium to high density in protected areas, low density open woodlands in non-protected areas	Mismanaged; stressed and overgrazed, low density open woodlands for the most part
Diversity	Very high; 4 major bioclimatic zones	High; 3 major bioclimatic zones	High; 3 major bioclimatic zones
Number of grazing animals	High; goats dominate	Very high; goats dominate	Very high; sheep dominate
Services	Provisioning of wood and non-wood forest products; protection of soil resources; enhancing water quality and quantity; protection of biodiversity	High value of water resource protection for many of the Litani River tributaries; protection of soil resources; provisioning of wood and non-wood forest products ; protection of biodiversity	Provisioning of wood and non-wood forest products; protection of soil resources; enhancing water quality and quantity; protection of biodiversity
Main Threats	Grazing, illegal cutting, desertification, conversion of lands	Forest fires, illegal cutting, desertification, conversion of lands	High urban pressure, conversion of lands, grazing, desertification
Opportunities	Large lands suitable for reforestation and afforestation; development of eco-tourism and recreation, assess carbon trade to boost reforestation, develop forest management plans that focus on increasing forest benefits to the local communities	Availability of lands suitable for reforestation and afforestation; development of eco-tourism and recreation, assess carbon trade to boost reforestation, develop forest management plans that focus on increasing forest benefits to the local communities	Availability of lands suitable for reforestation and afforestation; development of eco-tourism and recreation, assess carbon trade to boost reforestation, develop forest management plans that focus on increasing forest benefits to the local communities

4 Rangelands of the Catchment

Lands dedicated to grazing or which could be used potentially as grazing lands make up a high percentage of the Bekaa Governorate. Small ruminants namely goats and sheep make up the total number of free range grazing animals. Cattle on the other hand are normally kept in farms of various sizes and are normally dependent on locally produced and imported feed[11]. However, in some cases they might be grazed on pastures close to the owners' farms. Goat and sheep shepherds graze their flocks in rangelands, forests, especially open woodlands, on agricultural lands (fallow

[11] FAO (2011) Lebanon Pasture/Forage Resources Profile

lands and consumption of agricultural remains). Additionally, shepherds are forced to buy feed to supplement the diet of their animals, especially in drier years where rangelands provide even less for the animals. Feed concentrates pricing is quite high, reaching as much as USD500/tonne[12] knowing that one tonne would suffice a flock of 100 goats for approximately 12 days. Feed concentrates should be complemented with a rich source of fibre such as hay in order to satisfy the caloric needs of goats and their ruminant nature[13].

The woodlands and pastures of Lebanon are rich in wild relatives of major fodder crops. Through repeated selection and breeding, cultivated fodder crops outperform their wild relatives in terms of yield; however their wild relatives are better suited and adapted to the challenging soil and weather conditions. But grazers eat more than these species and can consume woody shrubs and even tree leaves such as that of oak species[14]. In addition to many of the wild fodder crops, the bioclimatic vegetation zones found in the Bekaa governorate offer many more shrubs and herbal species that can supplement the diet of grazing animals. It should be noted that the oro-mediterranean region is only truly represented within the Rachaya district.

As a result of their nomadic lifestyle, most shepherds do not own the lands they graze on. As they move from one village to another and one pasture to another, shepherds pay for grazing rights to the communities that own the lands. It is common for communities to rent one km^2 (i.e. 100 ha) of their lands for USD1,300 to shepherds[15]. This situation is more descriptive of villages with highlands that are typically not cultivated making land rental a profitable economic investment for the communities.

Key products related to rangelands management include dairy and meat. Dairy products such as yoghurt and labneh (made from strained yoghurt) are a staple in the Lebanese diet and the most popular protein source[16]. Labneh is either consumed fresh or preserved in olive oil, sometimes complemented with herbs to make it more flavoursome. Yoghurt is either consumed fresh, with salads or used as a base for many local dishes. Yoghurt is used to produce Keshk, a traditional product in which yoghurt is mixed with bulgur wheat to finally give a dry powder very popular in local cuisine. In addition, traditional cheeses are often prepared in villages using goat and sheep milk. The Baladi cheese prepared with raw goat's milk is considered a delicacy, however, its consumption is quite risky[17].

Table 4 provides an estimate of the meat production capacity of all the districts within the Bekaa governorate. The figures are based on information gathered from various sources. The number of slaughter animals was determined by subtracting the number of females (milk producers) from the total number of animals within the given species. Therefore, some overestimation of the total number of slaughter animals might be present. Despite the smaller number of cattle when compared to sheep and goats, cattle produce the largest volumes of meat. It is worth noting that most of the meat produced is consumed locally (i.e. within the same region of origin), especially with cattle meat, as most urban supermarkets are swamped by imported meat from various countries such as Brazil[18]. The West Bekaa District has the highest meat producing potential among the districts in the Governorate.

Table 4. An estimate of the meat production capacity of Rachaya, West Bekaa and Zahle

DISTRICT	ANIMAL SPECIES	AVERAGE MEAT/HEAD (Kg)[19]	TOTAL NUMBER OF ANIMALS SLAUGHTERED	TOTAL MEAT PRODUCED (TONNES)	INFLUENCE OF RANGELANDS ON PRODUCTION
Rachaya	Sheep	43	1,533	65.919	High

[12] Dr. Mounir Abi Saiid, personal communication.
[13] University of Minnesota website. (www.extension.umn.edu/agriculture) Accessed on 11/3/2014
[14] AFDC (2007) The State of the Forest Report.
[15] FAO (2011) Lebanon Pasture/Forage Resources Profile
[16] Ibid
[17] Ibid
[18] Dick, C (2003) Adaptation Strategies of Small Ruminants Production Systems to Environmental Constraints in Semi-Arid Areas of Lebanon. Thesis Submitted to AUB.
[19] MoA (2009) الزراعة في لبنان في عامي 2008 و 2009

	Goat	36	11,065	389.34	High
	Cattle	373	552	205.896	Low
			District Total	**661.155**	
West Bekaa	Sheep	43	14,701	632.143	High
	Goat	36	21,036	757.296	High
	Cattle	373	3,146	1,173.458	Low
			District Total	**2562.897**	
Zahle	Sheep	43	19,689	846.627	High
	Goat	36	7,621	274.356	High
	Cattle	373	3043	1135.039	Low
			District Total	**2256.022**	

Milk and dairy consumption is vital to the Lebanese diet and unfortunately local supply does not meet demand, as shown in Table 5 below. The sector will have to be significantly upgraded before Lebanon reaches a state of self-sufficiency. More investment is needed in cattle rearing to improve the productivity of the sector as cattle are by far more productive per head than sheep and goats. Local breeds of cow are often crossed with the Holstein Friesian breed noted for its milk-producing qualities. Management of animal husbandry of cattle, sheep and goat should enhance all aspects related to milk yield with special attention to more balanced diets, enhanced artificial insemination and better disease management[20].

Table 5. Exported and imported dairy products (in tonnes)[21]

ITEMS	EXPORTS			IMPORTS		
	2009	2010	2011	2009	2010	2011
Butter, cow milk	162	73	72	7,066	5,880	6,146
Buttermilk, curdled, acidified milk	121	186	84	18	43	84
Cheese, processed	47	80	253	12,200	11,621	11,964
Cheese, whole cow milk	796	486	683	20,238	20,951	21,522
Cream fresh	2	18	13	2,924	3,015	2,982
Milk Dry + (Total)	127	85	99	19,443	18,918	17,316
Milk Equivalent + (Total)	5,954	6,036	7,939	317,728	312,399	298,724
Milk, products of natural constituents	1	740	1,181	19	74	63
Milk, skimmed cow	48	2	18	1,549	2,364	1,613
Milk, skimmed dried	63	45	80	3,499	2,420	2,844
Milk, whole condensed	45	62	36	1,648	903	1,164
Milk, whole dried	64	40	19	15,944	16,498	14,472
Milk, whole evaporated	4	8	13	122	121	167
Milk, whole fresh cow	95	5	1	4,150	5,247	1,492
Whey, dry	0	84	122	286	624	330
Yoghurt, concentrated or not	9	907	1,098	294	1,236	1,084

Table 6. Estimate of the milk production capacity of Rachaya, West Bekaa and Zahle

DISTRICT	ANIMAL SPECIES	AVERAGE MILK/HEAD (Kg)	TOTAL NUMBER OF FEMALES	TOTAL MILK PRODUCED (TONNES)	INFLUENCE OF RANGELANDS ON PRODUCTION
Rachaya	Sheep	114	2,166	246.924	High
	Goat	145	16,786	2,433.97	High
	Cattle	4100	955	3,915.5	Low
			District Total	**6,596.394**	
West Bekaa	Sheep	114	21,964	2,503.9	High
	Goat	145	31,229	4,528.2	High
	Cattle	4100	5,192	21,287.2	Low
			District Total	**28,319.3**	

[20] FAO (undated) Lebanon Recovery Fund Project. http://www.economy.gov.lb/public/uploads/files/3516_4009_4229.pdf
[21] FAOSTAT website (http://faostat3.fao.org/faostat-gateway/go/to/home/E) accessed 10/3/2014

Zahle	Sheep	114	29,831	3,400.734	High
	Goat	145	12,534	1,817.43	High
	Cattle	4100	5,918	24,263.8	Low
			District Total	**29,481.964**	

Table 7. Wild relatives of important fodder crops found in Lebanon[22]

Alfalfa		**Clover**	**Vetch**
Medicago granatensis		*Trifolium subterraneum*	*Vicia ervilia*
M. itertexta	*M. polymorpha*	*T. cherlei*	*V. monantha*
M. murex	*M. minima*	*T. fragiferum*	*V. narbonensis*
M. turbinate	*M. lacnriata*	*T. hirtum*	*V. pannonica*
M. aculeate	*M. praecox*	*T. pilulare*	*V. peregrine*
M. constricta	*M. rotate*	*T. resupinatum*	*V. sativa amphicarpa*
M. rigidula	*M. blancheana*	*T. tomentosum*	*V. sativa angustifolia*
M. truncatula	*M. rugosa*	*T. alexandrinum*	*V. sativa cordata*
M. litoralis	*M. scutellata*	*T. campestre*	*V. villosa*
		T. scabrum	
		T. purpereum	
Wild wheat	**Wild barley**	**Wild Chick peas**	**Wild lentils**
Triticum thaoudar	*Hordeum spontaneum*	*Cicer arietinum*	*Lens culinaris*
T. dicoccoides	*H. hystrix*	*C. inicisum*	*L. ervoides*
T. Urartu	*H. leporinum*	*C. pinnatifidum*	*L. orientalis*
T. boeoticum	*H. bulbosum*	*C. judaicum*	
Aegilops sp. (related to wheat)			**Wild oats**
Aegilops ovate	*A. intermedia*	*A. crassa*	*Avena barbata*
A. triaristata	*A. peregrine*	*A. ligustica*	*A. sterilis*
A. columnaris	*A. brachyatera*	*A. speltoides*	
A. biuncialis	*A. cylindrical*	*A. longissima*	
A. triuncialis	*A. caudate*	*A. searsii*	
A. kotschyi	*A. comosa*	*A. vavilovii*	
A. multiaristata	*A. squarrosa*		

Table 8. Major bioclimatic and vegetation zones of the Bekaa governorate with associated shrubs and herbal species[23]

Bioclimatic zone	Dominant tree species	Companion trees/shrubs	Herbal species
Eu-mediterranean (500-1000 m)	*Qurecus calliprinos, Q. infectoria, Pinus brutia*	*Pistacia palestina, Arbutus andrachne, Phillyrea media, Crataegus azarolus, Acer syriacum, Laurus nobilis, Viburnum tinus, Calycotome villosa, Rhamnus punctata, Hypericum Thymifolium, Cistus creticus, Salvia fruticosa, Poterium spinosum, Styrax officinalis, Cercis siliquastrum, Spartium junceum, Origanum syriacum, Thymbra spicata*	*Lotus judaicus; Cyclamen persicum; Rubia tenuifolia; Grasslands: Hyparrhenia hirta; Andropogon distachyum, Brachypodium pinnatum*
Supramediterranean (1000-1500 m)	*Quercus calliprinos, Q.infectoria, Q.cerris*	*Calycotome villosa, Origanum syriacum, Teucrium divaricatum, Lonicera nummulariifolia, Spartium junceum, Poterium spinosum*	*Brachypodium pinnatum, Melica angustifolia, Poa bulbosa, Lathyrus niger, L. digitatus*
Montanemediterranean (1500-2000)	*Quercus brantii, Q, cedrorum*	*Sorbus flabellifolia, Berberis libanotica, Cotoneaster nummularia, Acer tauricolum, Malus triloba, Sambucus ebulus, Coronilla emeroides, Colutea cilicica, Sorbus*	*Dactylis glomerata, Agropyrum Panormitanum, Poa diversifolia, Sesleria anatolica, Lathyrus libani, Doronicum caucasicum, Trifolium physodes,*

[22] FAO-UNDP-MoA (1996) Biological Diversity in Lebanon, volume 7 (Agricultural and Livestock Habitats and Nature Reserves). & Tohme, G. and Tohme, H.2007. Illustrated Flora of Lebanon. CNRS. 608 pp. 462 p.
[23] FAO (2011) Lebanon Pasture/Forage Resources Profile

		torminalis, Genista libanotica, Rosa dumetorum, Rosa glutinosa	*Trifolium stellatum, Lathyrus digitatus, Vicia tenuifolia, Medicago lupulina, Medicago minima, Medicago radiata*
Oromediterranean (above 2000 m)	*Juniperus excelsa*	*Rhamnus libanotica, Berberis libanotica, Prunus prostrate, Pyrus syriaca, Cotoneaster nummularia, Astragalus spp, Acantholimon libanoticum*	*Onobrychis cornuta, Agropyron libanoticum*

The Qaroun Catchment rangelands are stressed and overgrazed, especially in the West Bekaa and Zahle districts. The continuous irrational use of these rangelands impacts the services they provide, some of which, such as milk, meat and honey production are the main income for hundreds of families within the Catchment. In addition, healthy rangelands preserve soils and affect the groundwater recharge capacities.

Grazing is the greatest impact on the rangelands and pastures of the catchment. As a result, grazing management is extremely important. During meetings with municipalities within the Qaroun Catchment, this issue was raised and it is clear that the local authorities do not yet have a proper understanding of how to manage grazing within their jurisdictions. A common scenario is repeated all throughout the Catchment in which local farmers report shepherds who come close to or into their lands. The municipalities sometimes report the shepherds to the internal security forces. The fact that many shepherds are not locals from the villages they roam and graze in draws stronger animosity towards them. However, as end users of the land, their rights should be respected in the same way as farmers and villagers. As a result, grazing management plans are needed throughout the Catchment especially in those municipalities that "*suffer*" the most from shepherds and grazing. At the same time, environmental considerations should be paramount in grazing management. Vast territories with the Catchment are threatened by desertification and cannot be sustainably used if grazing is not managed through an environmental lens that pays attention to natural fodder species, their density and the impact grazing is causing to the landscape and soil resources which ultimately affect water resources in terms of quality and quantity.

Table 9. Comparative analysis of rangelands between Rachaya, West Bekaa and Zahle

DESCRIPTORS	RACHAYA	WEST BEKAA	ZAHLE
Area	Very large	Large	Large
Conditions	Mismanaged; stressed	Mismanaged; stressed and overgrazed	Mismanaged; stressed and overgrazed
Diversity	Very high; 4 major bioclimatic zones	High; 3 major bioclimatic zones	High; 3 major bioclimatic zones
Number of grazing animals	High; goats dominate	Very high; goats dominate	Very high; sheep dominate
Services	Provisioning of fodder for grazing animals and of melliferous plants for honeybees; protection of soil resources; enhancing water quality and quantity; protection of biodiversity		
Major threats	High desertification risk; grazing mismanagement; loss of biodiversity, strained water resources, conflict between local communities and shepherds.		
Opportunities	Localized grazing management plans, encourage education of shepherds to optimize rangelands' use efficiency; well managed grazing enhances biodiversity and reduces the risk of wild fires; elevate the importance of rangelands to the shepherds and local communities by enhancing the value chain of the dairy sector		
Key products	Milk, dairy products and honey		

5 Agriculture in the Catchment

The Bekaa valley is Lebanon's breadbasket and the Qaroun Catchment concentrates its most productive lands that have been farmed since ancient times. The Bekaa Governorate is the country's leading production region in many crops, some of which are presented in the table below:

Table 10. Main agricultural products of the Bekaa Governorate[24]

CROP	SURFACE AREA (ha)	% REPRESENTED BY BEKAA FROM THE TOTAL LANDS DEVOTED TO THE CROP	RANK AT THE NATIONAL LEVEL
Wheat	13,130	44%	1
Potatoes	5,676	51%	1
Leafy vegetables	3,212	44%	1
Olive	2,682	5%	7
Grapes (table)	2,491	33%	2
Cherries	1,605	26%	2
Onions	1,511	40%	1
Apples	1,493	12%	5
Grapes (wine)	1,408	46%	1
Corn (silage)	1,142	57%	1
Beans	921	30%	1
Peach + nectarine	818	23%	2
Almonds	760	14%	2
Barley	748	7%	2
Tomatoes	701	16%	3
Cucumbers	668	16%	2
Alfalfa	604	73%	1
Chickpeas	575	20%	2
Pears	307	17%	2
Figs	154	9%	5

Table 10 demonstrates the importance of the Bekaa Governorate at the national level as a leading agricultural region and efforts should be made to preserve the region's main character.

Agriculture faces several problems within the Bekaa, the most prominent of which include:

- Lack of agricultural extension, technical outreach and support. Official state support for farmers dropped significantly after the end of the civil war. Recent efforts by the MoA sought to strengthen extension to farmers, but for the large part, extension has been provided by private sector companies and private academic institutions
- Competition in both the local and export markets. On several occasions, many European countries banned Lebanese produce because of the high level of residual pesticides. Overuse and misuse of pesticides are common in the Bekaa area as farmers are not fully aware on the proper use of these chemical products relying quite often on the advice of company salesmen for mode of use. In fact, Lebanon has some of the highest pesticide usage rates in the Arab World at over 5 kg/ha[25].
- Improper use of fertilizers. Fertilizers are a common source of pollution of agricultural lands especially when they are overused and leach out to water resources. Lebanese farmers apply on average a high rate of fertilizers estimated at 414 kg/ha[26]. Within the Qaroun watershed, farmers rarely test their soils to determine the exact nutrients available and do not sample their plants to determine the macro and micro nutrient content. As a result, overuse of fertilizers is common, a situation that is not helped with the weak state of agricultural extension[27].
- Water consumption is high and misuse is common[28]. The problem will likely increase as climate change amplifies weather extremes and water shortages become chronic.

[24] MoA and FAO (2012) Résultats Globaux du Module de Base du Recensement de L'Agriculture de 2010.
[25] ESCWA (2007) Barriers to Trade impacting Arab Countries and Regional Trade in Selected Sectors.
[26] FAO (2006) Statistical Yearbook 2005-2006. Volume 2/1.
[27] UNDP / MOE (2011), Business Plan for Combating Pollution of the Qaroun Lake, prepared by ELARD
[28] Ibid

- A sizeable percentage of yields is left uncollected or unsold, especially of fruit crops in years when prices are low and where economic returns do not cover the costs incurred during collection and marketing of yields.
- Lack of differentiation and diversification of crops. Alternative crops need to be tested and tried as a replacement for crops that are usually purchased from other countries. Additionally, the agricultural calendar for imports needs to be applied more stringently to ensure local farmers have precedence over foreign import.
- Urban intrusion into agricultural lands especially in the urbanized central area of the Bekaa plain. The loss of the most productive lands of Lebanon will exacerbate the problems of the agricultural sector. The remaining lands will be pushed to their limits and more chemical inputs will be used in order to increase yields acting against the ideals of sustainable land use and development.

Table 11 below summarizes the main agricultural descriptors of the Bekaa districts.

Table 11. Agricultural comparative analysis between the districts of the Bekaa Governorate

MAJOR AGRICULTURAL DESCRIPTORS	RACHAYA	WEST BEKAA	ZAHLE
Area	Large	Very Large	Very Large
Irrigation	Minimal	Co-dominant	Co-dominant
Rainfed	Dominant	Co-dominant	Co-dominant
Number of grazing animals	High; goats dominate	Very high; goats dominate	Very high; sheep dominate
Agricultural skills	Especially in olives and vineyards for fresh consumption and for grape molasses	High technical skills in irrigation, fertilization, pest management for major agricultural crops such as wheat and potatoes	High technical skills in irrigation, fertilization, pest management for major agricultural crops such as wheat and potatoes
Agro-industries	Limited, rural skills in grape molasses manufacturing	High: dairy, production of food items such as jams, pickles, juices…	High: dairy, production of food items such as jams, juices, potato chips,…
Key agricultural crops	Olives, vineyards, wheat	Wheat, potatoes, leafy vegetables	Wheat, potatoes, leafy vegetables
Stand-out products	Grape molasses, olive oil and honey	Wine, processed agricultural crops and dairy products	Wine, processed agricultural crops and dairy products
Key problems	Lack of extension, water shortages, commercialization	Lack of extension, high cost of production, commercialization, intrusion of urban areas into agricultural lands	High cost of production, lack of extension, commercialization, intrusion of urban areas into agricultural lands
Development axes	Upgrade infrastructure, increase knowledge on water use efficiency, agricultural extension, promotion and labeling of stand-out products especially grape molasses and honey, promotion of IPM, ICM and CA concepts among farmers	Upgrade infrastructure, increase knowledge on water use efficiency, agricultural extension, promotion of IPM, ICM and CA concepts among farmers, development of agricultural and wine tourism sectors	Upgrade infrastructure, increase knowledge on water use efficiency, agricultural extension, promotion of IPM, ICM and CA concepts among farmers , development of agricultural and wine tourism sectors

Table 12. Permanent agriculture in the target districts of the Bekaa[29]

West Bekaa									
Citrus crops	**Pome fruits**	**Stone fruits**	**Vineyards**	**Olives**	**Bananas**	**Walnut**	**Industrial crops**	**Other fruits trees**	**Area of permanent crops (ha)**
0%	20.6%	14.4%	28.2%	31%	0%	2.5%	0.3%	3%	4,568.8

[29] MoA (2010) Agricultural Census 2010, website (http://www.agriculture.gov.lb/html/RESULTATS_RECENCEMENT_AGRICULTURE_2010/caza.html)

Zahle									
0%	12.4%	47.9%	33.8%	2.1%	0%	0.5%	0%	2.8%	5,046
Rachaya									
0%	6.6%	16.5%	32.4%	37.5%	0%	2.5%	0.1%	4.4%	2,951.2

Table 13. Seasonal agriculture in the target districts of the Bekaa[30].

West Bekaa							
Cereals	**Leguminous crops**	**Forages**	**Leafy vegetables**	**Fruits consumed as vegetables***	**Tubers**	**Industrial crops**	**Area of seasonal crops (ha)**
60.6%	4.7%	3.6%	4.6%	7.2%	19.1%	0.1%	13,318.2
Zahle							
23.5%	21%	0.2%	13.7%	19.2%	12%	10.3%	1,415.8
Rachaya							
66.4%	22.2%	2.1%	1.4%	6.8%	1%	0%	2,458

*This group includes vegetables that are fruits in the botanical sense but consumed as vegetables such as tomatoes and cucumbers

6 Ecosystem functions and services in the Qaroun Catchment

Forests are considered as one of Lebanon's primary natural resources offering a range of functions and services often determined by the dominant tree species within the forest. Oak woodlands constitute the main forests of Lebanon and are used to produce charcoal and to collect firewood. Additionally, grazing is commonly practiced in unprotected oak woodlands[31]. Oak forests harbour a wide range of plant and fauna species and stabilize soils and protect water resources. Pine forests are the second most dominant type of Lebanese forests. Stone pine (*Pinus pinea*) forests offer the most important economic forest activity in Lebanon due to their production of the highly prized pine kernels[32]. The other two common pine species in Lebanon (*P. brutia* and *halepensis*) do not have such a productive nature, and hence a lower economic value. Nonetheless, all pine forests protect biodiversity, soil and water resources. Cedar forests, mostly confined to well protected and managed reserves, harbour an impressive diversity of fauna and flora. In addition to promoting tourism and recreation Cedars also have a sentimental value to the Lebanese. Other common conifers and broadleaves offer similar services and functions. In general, all of Lebanon's forests and woodlands help to stabilize soils, especially in mountain areas noted for their poorer soils. Additionally, in 2005, the above and below ground biomass of Lebanese forests and wooded lands were estimated to sequester close to 2 million tonnes of carbon[33]. The total economic value of one hectare of Lebanese forests, according to 2010 estimates, was equivalent to USD296[34].

Table 14. Dense and open forests and their functions[35]

FOREST TYPE	DENSE FORESTS (HA)	OPEN FORESTS (HA)	TOTAL		FOREST FUNCTIONS
			HA	%	
Cedar	626	510	1,136	0.85	Protection, recreation
Fir	717	886	1,603	1.2	Protection
Cypress	7	197	204	0.15	Protection
Juniper	0	11,917	11,917	8.87	Protection and production (firewood, charcoal and resin)
Pine	9,512	10,832	20,344	15.15	Protection and production (firewood and pine kernels)

[30] Ibid
[31] Sattout, E., Talhouk, S., Kabbani, N (2005) Lebanon Case Study, in Valuing Mediterranean Forests - Towards Total Economic Value. Editors Maurizio Merlo *and* Lelia Croitoru. CABI Publishing. 414 pp, 161-175
[32] Ibid
[33] FAO and MoA (2005) National Forest and Tree Assessment and Inventory.
[34] GIZ and Silva Mediterranea (2012) Contribution of forests to a green economy in the Middle East and North Africa
[35] Lichaa El-Khoury, D. and Bakhos, W (2003) *Land Cover Land Use Map of Lebanon (1/20000) –Technical Report*. LEDO, Ministry of Environment, UNDP, Ministry of Agriculture/FAO and National Centre for Remote Sensing, Lebanon. (Adapted from)

Oak	26,588	44,943	71,531	53.27	Protection and production (firewood and charcoal
Mixed forests	11,374	13,145	24,519	18.26	Protection and production (firewood and charcoal
Other broadleaves	729	2,293	3,022	2.25	Molasses and firewood
Total forest cover	**49,533**	**84,723**	**134,276**	**100**	

Rangelands constitute an important land use in Lebanon and they provide a vast array of ecosystem services. It should be noted that specific studies on ecosystem services of rangelands in Lebanon are lacking. Rangelands are primarily associated with grazing and the production of meat, dairy products and hides, and therefore have a direct economic benefit to the Lebanese economy. However, most rangelands are poorly managed and overstocked by 30% [36] and currently only provide no more than a third of the feed the animals require[37]. Throughout the Near East region, grazing lands are usually marginal and dry lands with poor soils and their importance is not always realized[38]. However, rangelands are one of the most common land use types globally and their impact on biodiversity, carbon and nutrient storage, water quality and quantity, soil conservation, forage production, and in addition to their recreational importance cannot be underestimated[39]. Current estimates indicate that no more than 400,000 ha can be classified as rangelands in Lebanon including true grasslands, shrublands and areas with little or no vegetation[40].

Lebanese wetlands are quite restricted with the most significant and healthiest one being that of Aammiq in the Bekaa Valley. Previously part of a more expansive network of wetlands that covered the central and western Bekaa, the Aammiq wetland covers a mere 280 ha[41]. In contrast to their size, wetlands play a vital role in the seasonal migration of birds that fly over Lebanon to their wintering lands. Additionally, wetlands harbour an impressive variety of adapted fauna and flora[42]. Wetlands attract bird watchers and nature enthusiasts thereby allowing for eco-tourism.

The Qaroun Catchment landscape and ecosystems provide a number of services. According to TEEB[43] ecosystem services are the direct and indirect contributions of ecosystems to human well-being which support human survival and quality of life. Ecosystem services from the Qaroun Catchment are summarized in the following Figure.

Figure 4. Ecosystem services in the Qaroun Catchment

SUPPORTING		
Nutrient cycling: Natural processes, especially water, serve as agents for nutrient cycling; plants capture and store nutrients temporarily **Soil formation:** Ecosystem processes generate and preserve soils and renew their fertility **Primary production:** Forests and rangeland grasslands serve as the basis of the food chain		
PROVISIONING	**REGULATING**	**CULTURAL**
Food: Rangeland grasslands provide food for stock which in turn serve as food for humans; insects serve as	**Climate regulation:** Forests and grasslands sequester CO_2, moderate weather extremes	**Aesthetic:** Forests, rangelands, wetlands and other natural

[36] Hamadeh, Sh (2005) Feeding calendar and grazing survey and development of rangeland management options. UNDP/GEF Conservation and sustainable use of dryland agrobiodiversity of the Near East-Lebanese component. *Annexes 11-17*: 11-30

[37] Darwish, T. and Faour, G (2008) Rangeland degradation in two watersheds of Lebanon. Lebanese Science Journal, Vol. 9 (1): 71-80.

[38] Louhaichi, M. Johnson, M.D. Clark, P.E. Belgacem, A.O. and Johnson, D (2012) Developing a coherent monitoring system for Mediterranean grasslands. Options Méditerranéennes, A, no. 102, 2012. 47-51

[39] Lemaire, G. Hodgson, J. Chabbi, A (2011) Grassland Productivity and Ecosystem Services. CABI Publishing. 306 pp, 14-16.

[40] FAO (2012) Country Study on Status of Land Tenure, Planning and Management in Oriental Near East Countries, Lebanon case

[41] Storey, R (2003) Assessing groundwater and surface water flows through Aammiq Wetland. *In* Resource Kit on Environment Flow Concepts, Methods and Emerging Practices. IUCN.

[42] Ibid

[43] The Economics of Ecosystems and Biodiversity (TEEB). See http://www.teebweb.org/resources/ecosystem-services/

pollination agents **Fresh water:** Numerous freshwater springs, including those that give rise to the Litani River **Wood and fibre:** Forests, carefully managed for sustainability, provide wood **Fuel:** Forests, carefully managed for sustainability, provide fuelwood **Medicine:** Forests and rangelands provide medicinal herbs and potions **Habitat:** Wetlands provide habitat for migratory species **Biodiversity:** natural ecosystems maintain the viability of gene-pools, and biological diversity; natural agents disperse seeds	and impacts, and contribute to climate stability **Flood regulation:** Vegetative land cover soaks up rainwater and mitigates flood events **Water purification:** Riparian vegetation filters nutrients and other impurities from run-off water, providing waste management and detoxification **Erosion control:** Forests and grasslands bind soil and prevent erosion **Pest control:** Birds control insect pests; some plants inhibit plant pests; natural systems regulate disease-carrying organisms	ecosystems provide a pleasing and appealing environment **Spiritual:** Natural landscapes are mystical and inspirational **Educational:** Natural ecosystems serve as outdoor teaching laboratories; they provide for intellectual development **Recreational:** Forests and highlands provide opportunities for hiking, horse trekking and other outdoor pursuits

ANNEX 2 LETTERS OF PLEDGE

REPUBLIC OF LEBANON
MINISTRY OF ENVIRONMENT

Beirut, 23-11-2012
Our Ref: 4879/B

THE MINISTER

Mr. Yannick Glemarec
United Nations Development Programme
Global Environment Facility Unit (UNDP-GEF)
304 East 45th Street, Rm 916
New York, NY 10017 USA
Fax: +1-212-906-6998

Dear Mr. Glemarec,

Subject: Endorsement for project "Sustainable Land Management in the Qaroun Watershed" Project

In my capacity as GEF Political and Operational Focal Point for the Republic of Lebanon, I confirm that the above project proposal (a) is in accordance with my government's national priorities and our commitment to the relevant global environment conventions; and (b) was discussed with relevant stakeholders, including the global environmental convention focal points.

I am pleased to endorse the preparation of the above project proposal with the support of UNDP as specified below. If approved, the project will be prepared and implemented by Ministry of Environment with support from relevant partner institutions and organizations. I request the UNDP to provide a copy of the project document before it is submitted to the GEF Secretariat for CEO endorsement.

The total financing from the GEFTF being requested for this project is US$ **3,600,000** using the GEF-5 flexibility mechanism, inclusive of project preparation grant (PPG) and Agency fees for project cycle management services associated with the total GEF grant. The financing requested for Lebanon is detailed in the table below:

Source of Funds	GEF Agency	Focal Area	Amount (in US$)			
			Project Preparation	Project	Fee	Total
GEF Trust Fund	UNDP	Biodiversity	0	1,095,890	104,110	1,200,000
GEF Trust Fund	UNDP	Land Degradation	100,000	2,091,781	208,219	2,400,000
Total GEF Resources			100,000	3,187,671	312,329	3,600,000

I consent to the utilization of Lebanon's allocations in GEF-5 as defined in the System for Transparent Allocation of Resources (STAR).

Sincerely,

Nazem El-Khoury
Minister of Environment

Cc:
- *Mr. Hussein Nasrallah, Convention Focal Point for UNCCD*
- *Ms. Lara Samaha, Convention Focal Point for Biodiversity*
- *Mr. Robert Watkins, UNDP Resident Representative*
- *Mr. Johan Robinson, Regional Technical Advisor, UNDP/GEF*

AA-F-16-V.1-1/1

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Home Page: www.moe.gov.lb

REPUBLIC OF LEBANON
MINISTRY OF ENVIRONMENT

THE MINISTER

Beirut, 12-9-2014
Our Ref.: 4879/B

Ms Adriana Dinu
Executive Coordinator and Director, a.i.
Energy and Environment Group, BDP
UNDP-GEF
304 East 45th Street, 9th Floor
New York, NY 10017 USA
Fax: +1 212 906 6998

Dear Ms. Dinu,

Subject: The Sustainable Land Management in Qaraoun Catchment Project.
Ref.: Ministry of Environment letter 4879/B dated November 23, 2012

Following our letter of November 23, 2012 (attached), the Ministry of Environment reiterates its full endorsement of the Sustainable Land Management in the Qaroun Catchment project, which was prepared by UNDP Lebanon in full coordination with the Ministry of Environment and national stakeholders in the field. The project falls within the priorities of the Government of Lebanon which has in the past few years been working extensively for the depollution of the Qaraoun Lake and its watershed.

The Government has set up a Ministerial Committee to follow-up on the programme and the Parliament is about to issue a "Programme Law" that covers the financing of projects that aim to depollute the upper and lower Qaraoun Watershed. Furthermore, the Ministry of Environment is working on mobilizing several loan and technical assistance programmes from the World Bank and others that would support activities in the same area. Further to our letter of 8 July 2014, the exact co-financing targeting the agricultural sector would amount to $4.2m, the solid waste sector to approximately $5.15m and $5.5m will target policy level support in terms of land use, management and capacity development. Therefore the total co-financing specifically aligned to the GEF project amounts to USD 14.85 million in-cash (whereas the USD 23 million mentioned in our letter dated 8 July 2014 covers, in addition to the above, several other activities planned in the Qaroun Watershed).

We look forward to the approval and successful implementation,

Sincerely Yours,

Mohamad Al Mashnouk
Minister of Environment

AA-F-16-V1-1/1

Encl.: MoE Letter 4879/B dated November 23, 2012
Cc: Mr. Doley Tshering, UNDP GEF Regional Technical Specialist
Mrs. Nancy Khoury, Acting Head, Department of Public Relations & External Affairs
Mr. Nadim Mroueh, Chief, Service of Natural Resources

United Nations Development Programme
برنامج الأمم المتحدة الأنمائي

Pipeline/PIMS 4642
150/JS

Beirut, 08 September 2014

Dear Ms. Ishii,

Subject: Co-financing for the "Sustainable Land Management in the Qaraoun Catchment, Lebanon" Project

In reference to the GEF project proposal "Sustainable Land Management in the Qaraoun Catchment, Lebanon", UNDP Lebanon fully endorses the importance of this proposal which aims to promote wise land use on a sustainable long-term basis for the Qaraoun Catchment. The project will build institutional capacity and the mainstream sustainability ethic into land use.

Accordingly, the UNDP Lebanon Country Office hereby confirms its contribution of 300,000 USD in cash co-financing over the four years duration of the project to cover the activities related to learning, evaluation and adaptive management; in addition to cash co-financing up to 150,000 USD by aligning the activities of the below listed projects implemented by UNDP to the overall goal of the above-mentioned project. Total co-financing will be equivalent to **450,000 USD**:

Thematic area	**Activities aligned with the "Sustainable Land Management in the Qaroun Catchment" project**	**Estimated co-financing value (USD)**
Local Development	- Supporting local municipalities in land use management activities in the West Bekaa (Qaroun Watershed) - Capacity building for municipalities in West Bekaa and Baalbeck on sustainable use of natural resources	150,000
Project Management	- Support to running costs of the project	300,000

We look forward to the approval and successful implementation of this project.

Sincerely yours,

Luca Renda
Country Director

Dr. Naoko Ishii
GEF Secretariat
1818 H Street, NW, MSN G6-602
Washington, DC 20433
USA

C.c.: Mr. Doley Tshering, Team Leader, UNDP GEF Regional Technical Specialist

United Nations Development Programme
برنامج الأمم المتحدة الأنمائي

Pipeline/PIMS 4642
150/JS

Beirut, 08 September 2014

Dear Ms. Ishii,

Subject: Co-financing for the "Sustainable Land Management in the Qaraoun Catchment, Lebanon" Project

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Project Management	- Support to running costs of the project	300,000

We look forward to the approval and successful implementation of this project.

Sincerely yours,

Luca Renda
Country Director

Dr. Naoko Ishii
GEF Secretariat
1818 H Street, NW, MSN G6-602
Washington, DC 20433
USA

C.c.: Mr. Doley Tshering, Team Leader, UNDP GEF Regional Technical Specialist

ANNEX 3 ENVIRONMENTAL AND SOCIAL SCREENING (ESSP)

PROJECT: Sustainable Land Management in the Qaroun Catchment

A. Environmental and Social Screening Outcome

☐Category 1. No further action is needed

☒Category 2. Further review and management is needed. There are environmental and social benefits, and possible impacts, and/or risks associated with the project, but these are predominantly indirect and very long-term and so extremely difficult or impossible to directly identify and assess.

☐Category 3. Further review and management is needed, and it is possible to identify these with a reasonable degree of certainty. If Category 3, select one or more of the following sub-categories:

☐Category 3a: Impacts and risks are limited in scale and can be identified with a reasonable degree of certainty and can often be handled through application of standard best practice, but require some minimal or targeted further review and assessment to identify and evaluate whether there is a need for a full environmental and social assessment (in which case the project would move to Category 3b). See Section 3 of the Review and Management Guidance.

☐Category 3b: Impacts and risks may well be significant, and so full environmental and social assessment is required. In these cases, a scoping exercise will need to be conducted to identify the level and approach of assessment that is most appropriate. See Section 3 of Review and Management Guidance.

B. Environmental and Social Issues

During project implementation, Integrated Land Use Management Plans will be developed in two Districts in the Qaroun Catchment to serve as pilots for replication. The project will also support the development of Action Plans to implement the Land Use Plans at Municipality level. These plans are aimed to have long term positive impacts at the social and environmental levels but it will be difficult to determine these impacts during project implementation. Site interventions under the project include (i) improved management of protected forests and the establishment of ecological corridors over 10,000 ha of protection forests; (ii) natural rehabilitation of 500 ha of degraded forest land; (iii) technologies developed, tested and appropriate infrastructure established to operationalize sustainable land management in 20,000 ha of production rangelands; and (iv) improved water quality and soil condition due to the reduction in pesticide and fertilizer pollution through improved agricultural management of up to 40,000 ha of arable land directly or through replication. The implementation of these activities/interventions will have measurable environmental and social impacts during the project period and subsequently. These will be primarily positive impacts, but there could also be temporary "negative" impacts on some farmers and shepherds who might change land use practices so as to obtain sustainability.

C. Next Steps

In order to avoid even temporary negative impacts on beneficiaries of the project, project design incorporates a scheme for support through alternative income generation activities that the project will be able to implement to mitigate any impacts arising. Other long-term social and environmental impacts arising from the ILUMPs are expected to be positive and beneficial. However, project design has incorporated full consideration of social and environmental issues through the carrying out of Strategic Environmental Assessments to precede the development of the Land Use Plans ensuring limited negative impacts and fostering an environment for positive impacts. The potential social and environmental impacts will be determined as accurately as possible through an extensive socio-economic and land use survey which will serve as the foundation for the SEA and provide baseline information that does not exist in Lebanon.

D. Sign Off

Project Manager **Date**

PAC **Date**

Programme Manager **Date**

ENVIRONMENTAL AND SOCIAL SCREENING CHECKLIST

QUESTION 1:

Has a combined environmental and social assessment/review that covers the proposed project already been completed by implementing partners or donor(s)?

✓ **NO** → Continue to Question 2

QUESTION 2:

Do <u>all</u> outputs and activities described in the Project Document fall within the following categories?

- ☐ Procurement
- ☐ Report preparation
- ☐ Training
- ☐ Event/workshop/meeting/conference
- ☐ Communication and dissemination of results

✓ **NO** → Continue to Question 3

QUESTION 3:

Does the proposed project include activities and outputs that support *upstream* planning processes that potentially pose environmental and social impacts or are vulnerable to environmental and social change (refer to Table 3.1 for examples)? (Note that *upstream* planning processes can occur at global, regional, national, local and sectoral levels)

✓ **YES**

<u>TABLE 3. 1</u> EXAMPLES OF UPSTREAM PLANNING PROCESSES WITH POTENTIAL DOWNSTREAM ENVIRONMENTAL AND SOCIAL IMPACTS	
1 Support for the elaboration or revision of **global- level** strategies, policies, plans, and programmes.	N/A
2 Support for the elaboration or revision of **regional-level** strategies, policies and plans, and programmes.	N/A
3 Support for the elaboration or revision of **national-level** strategies, policies, plans and programmes.	N/A

TABLE 3. 1 EXAMPLES OF UPSTREAM PLANNING PROCESSES WITH POTENTIAL DOWNSTREAM ENVIRONMENTAL AND SOCIAL IMPACTS	
4 Support for the elaboration or revision of **sub-national/local-level** strategies, polices, plans and programmes.	The project has **potential** social impacts.

QUESTION 4:

Does the proposed project include the implementation of *downstream* activities that potentially pose environmental and social impacts or are vulnerable to environmental and social change?

✓ **NO**

TABLE 4.1: ADDITIONAL SCREENING QUESTIONS TO DETERMINE THE NEED AND POSSIBLE EXTENT OF FURTHER ENVIRONMENTAL AND SOCIAL REVIEW AND MANAGEMENT		
1.	**Biodiversity and Natural Resources**	
1.1	Would the proposed project result in the conversion or degradation of modified habitat, natural habitat or critical habitat?	No
1.2	Are any development activities proposed within a legally protected area (e.g. natural reserve, national park) for the protection or conservation of biodiversity?	No
1.3	Would the proposed project pose a risk of introducing invasive alien species?	No
1.4	Does the project involve natural forest harvesting or plantation development without an independent forest certification system for sustainable forest management?	No
1.5	Does the project involve the production and harvesting of fish populations or other aquatic species without an accepted system of independent certification to ensure sustainability?	No
1.6	Does the project involve significant extraction, diversion or containment of surface or ground water?	No
1.7	Does the project pose a risk of degrading soils?	No
2.	**Pollution**	
2.1	Would the proposed project result in the release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local, regional, and transboundary impacts?	No
2.2	Would the proposed project result in the generation of waste that cannot be recovered, reused, or disposed of in an environmentally and socially sound manner?	No
2.3	Will the propose project involve the manufacture, trade, release, and/or use of chemicals and hazardous materials subject to international action bans or phase-outs?	No
2.4	Is there a potential for the release, in the environment, of hazardous materials resulting from their production, transportation, handling, storage and use for project activities?	No
2.5	Will the proposed project involve the application of pesticides that have a known negative effect on the environment or human health?	No

TABLE 4.1: ADDITIONAL SCREENING QUESTIONS TO DETERMINE THE NEED AND POSSIBLE EXTENT OF FURTHER ENVIRONMENTAL AND SOCIAL REVIEW AND MANAGEMENT	
3. Climate Change	
3.1 Will the proposed project result in significant[44] greenhouse gas emissions	No
3.2 Is the proposed project likely to directly or indirectly increase environmental and social vulnerability to climate change now or in the future (also known as maladaptive practices)? You can refer to the additional guidance in Annex C to help you answer this question.	No
4. Social Equity and Equality	
4.1 Would the proposed project have environmental and social impacts that could affect indigenous people or other vulnerable groups?	No
4.2 Is the project likely to significantly impact gender equality and women's empowerment[45]?	No
4.3 Is the proposed project likely to directly or indirectly increase social inequalities now or in the future?	No
4.4 Will the proposed project have variable impacts on women and men, different ethnic groups, social classes?	No
4.5 Have there been challenges in engaging women and other certain key groups of stakeholders in the project design process?	No
4.6 Will the project have specific human rights implications for vulnerable groups?	No
5. Demographics	
5.1 Is the project likely to result in a substantial influx of people into the affected community(ies)?	No
5.2 Would the proposed project result in substantial voluntary or involuntary resettlement of populations?	No
5.3 Would the proposed project lead to significant population density increase which could affect the environmental and social sustainability of the project?	No
6. Culture	
6.1 Is the project likely to significantly affect the cultural traditions of affected communities, including gender-based roles?	No
6.2 Will the proposed project result in physical interventions (during construction or implementation) that would affect areas that have known physical or cultural significance to indigenous groups and other communities with settled recognized cultural claims?	No
6.3 Would the proposed project produce a physical "splintering" of a community?	No
7. Health and Safety	
7.1 Would the proposed project be susceptible to or lead to increased vulnerability to earthquakes, subsidence, landslides, erosion, flooding or extreme climatic conditions?	No

[44] Significant corresponds to CO_2 emissions greater than 100,000 tons per year (from both direct and indirect sources). Annex E provides additional guidance on calculating potential amounts of CO_2 emissions.

[45] Women are often more vulnerable than men to environmental degradation and resource scarcity. They typically have weaker and insecure rights to the resources they manage (especially land), and spend longer hours on collection of water, firewood, etc. (OECD, 2006). Women are also more often excluded from other social, economic, and political development processes.

TABLE 4.1: ADDITIONAL SCREENING QUESTIONS TO DETERMINE THE NEED AND POSSIBLE EXTENT OF FURTHER ENVIRONMENTAL AND SOCIAL REVIEW AND MANAGEMENT	
7.2 Will the project result in increased health risks as a result of a change in living and working conditions? In particular, will it have the potential to lead to an increase in HIV/AIDS infection?	No
7.3 Will the proposed project require additional health services including testing?	No
8. Socio-Economics	
8.1 Is the proposed project likely to have impacts that could affect women's and men's ability to use, develop and protect natural resources and other natural capital assets?	No
8.2 Is the proposed project likely to significantly affect land tenure arrangements and/or traditional cultural ownership patterns?	No
8.3 Is the proposed project likely to negatively affect the income levels or employment opportunities of vulnerable groups?	No
9. Cumulative and/or Secondary Impacts	
9.1 Is the proposed project location subject to currently approved land use plans (e.g. roads, settlements) which could affect the environmental and social sustainability of the project?	No
9.2 Would the proposed project result in secondary or consequential development which could lead to environmental and social effects, or would it have potential to generate cumulative impacts with other known existing or planned activities in the area?	No

ANNEX 4 LAND DEGRADATION PORTFOLIO MONITORING AND ASSESSMENT TOOL (LD-PMAT)

Land Degradation Focal Area - Portfolio Monitoring and Tracking Tool (PMAT)

PROJECT IDENTIFICATION

1. Project Title	Sustainable Land Management in the Qaroun Catchment, Lebanon
2. GEF ID:	5229
3. Project Implementation Period (Indicate: starting and ending dates)	January 2015 - January 2019
4. PMAT Completion Date	
a. CEO Endorsement/Approval Document	Aug-14
b. Annual (specify year) – TO BE LINKED TO **PIR**	Jan-17
c. Project Closure (specify year)	Jan-19
5. Person Responsible for Completing the PMAT (Indicate Name, Position, Institution):	Formulation Team - Philip Tortell, Lama Bashour, Elias Chnais
6. Scale of Project - Refer to Guidelines for definition and check (x) only the most appropriate.	
a. Global	
b. Regional	
c. Sub regional/ Transboundary	
d. National	
e. Sub national - district, provincial	
f. Site - landscape, watershed/catchment, river basin (specify)	Qaroun Catchment, Liktani River, Bekaa Valley

PART I – PROJECT CONTEXT AND TARGETED IMPACTS

1. Agro-ecological context – Characterization of area in which project is located			
1.a	What agroecological zone(s) is the project situated? Select the most appropriate from the drop down menu.	iii. Semi-arid	Select
1.b.	What production system(s) will the project target? Please provide an estimated coverage of the area targeted.		
	i. Agriculture (including food crop, tree crop, and crop-livestock)	45500	Hectares
	ii. Rangeland	70820	Hectares
	iii. Pastoral	0	Hectares
	iv. Forestry	10500	Hectares
	v. Mixed Systems	0	Hectares
1.c.	Focus of project interventions – Please provide total area covered for only those that apply		
	i. Improved agricultural management (crop and crop-livestock)	4000	Hectares
	ii. Improved rangeland and pasture management (livestock based)	10000	Hectares
	iii. Improved forest management (SFM)	300	Hectares
	iv. Restoration of degraded lands	0	Hectares
	v. Re-vegetation, Reforestation	100	Hectares
	vi. Protection of natural resources (e.g. Newly designated protected areas, erosion/flood/landslide control)	0	Hectares
	vii. Integrated landscape management (land-water-vegetation)	91000	Hectares
1.d.	What types of agricultural land use and/or farming practices are employed in the target area? Please provide an estimated coverage as appropriate.		
	i. Rain-fed	11780	Hectares
	ii. Irrigated	29870	Hectares
	iii. Mixed	0	Hectares
2. Socio-economic context - Characterization of affected communities and populations			
2.a.	Numbers of rural people		
	Male	79396	Number
	Female	77204	Number
2.b.	Number of people defined as poor		
	Male	76050	Number
	Female	77204	Number
2.c.	Number of urban/peri-urban people		
	Male	194383	Number
	Female	189017	Number
2.d.	Average annual farm production (crop, livestock)		
	Crop (Main Crop Only) - wheat	6	Tons/Hectare
	Livestock – cattle	13	Number
2.e.	Average annual income (per household, in 2004 - to be updated by household survey)	10000	US$
3. Land Degradation (desertification and deforestation) problem			

3.a.	What is the extent of land degradation within the project boundary?		
	i. Agriculture (including food crop, tree crop, and crop-livestock)	22500	Hectares
	ii. Rangeland	51400	Hectares
	iii. Pastoral	0	Hectares
	iv. Forestry	6032	Hectares
	v. Mixed Systems	0	Hectares
3.b.	What is the nature of land degradation to be addressed directly? Please refer to guidelines and check **(X)** only the most relevant and provide relevant data where applicable and available		
	i. Loss of vegetative cover	X	
	ii. Degradation of vegetation (biomass, health, damage, age structure)	X	
	iii. Degradation of soil properties (chemical, physical and biological)	X	
	iv. Soil loss by wind / water erosion		Tons/ Hectare
	v. Loss of land by soil deposits and moving sand dunes		
	vi. Loss of above-ground carbon		Tons/ Hectare
	vii. Loss of soil carbon		Tons/ Hectare
	viii. Declining land productivity - based on Net Primary Productivity measure	X	Kg C/ha/year
	ix. Loss of biodiversity characterized at habitat level - based on Biodiversity Intactness Index		Index
	x. Loss of biodiversity characterized at species level		
	xi. Increase in invasive, harmful or less useful species		
	xii. Loss/reduced water supply (surface and ground water)		
	xiii. Loss/reduced water quality (surface and ground water)		
	xiv. Lowering of groundwater table / reduced aquifer		
	xv. Loss of wetlands and their functions		
	xvi. Increased extent and severity of flood, drought, storm damage		
3.c.	What are the direct causes or drivers of land degradation? Please refer to guidelines and check **(X)** only those that apply under each relevant category.		
	i. Soil management		
	(s1) Cultivation of highly unsuitable / vulnerable soils		*Check (X) only those that apply*
	(s2) Missing or insufficient soil conservation / runoff and erosion control measures	X	
	(s3) Heavy machinery (including timing of heavy machinery use)		
	(s4) Tillage practice	X	
	(s5) Other (specify:_____ _____)		
	ii. Crop and rangeland management		
	(c1) Reduction of plant cover and residues	X	*Check (X) only those that apply*
	(c2) Inappropriate application of manure, fertilizer, herbicides, pesticides and other agrochemicals or waste	X	
	(c3) Nutrient mining		
	(c4) Shortening of the fallow period in shifting cultivation		
	(c5) Inappropriate irrigation	X	

	(c6) Inappropriate use of water in rainfed agriculture		
	(c7) Bush encroachment and bush thickening		
	(c8) Occurrence and spread of weeds and invader plants		
	(c9) Other (specify:_____ _____)		
	iii. Deforestation and removal of natural vegetation		
	(f1) Large-scale commercial forestry		*Check (X) only those that apply*
	(f2) Expansion of urban / settlement areas and industry	X	
	(f3) Conversion to agriculture	X	
	(f4) Forest / grassland fires	X	
	(f5) Road and rail construction		
	(f6) Other (specify:_____ _____)		
	iv. Over-exploitation of vegetation for domestic use		
	(e1) Excessive gathering of fuel wood, (local) timber, fencing materials	X	*Check (X) only those that apply*
	(e2) Removal of fodder	X	
	(e3) Other (specify:_____ _____)		
	v. Overgrazing		
	(g1) Excessive numbers of livestock	X	*Check (X) only those that apply*
	(g2) Trampling along animal paths		
	(g3) Overgrazing and trampling around or near feeding, watering and shelter points		
	(g4) Too long or extensive grazing periods in a specific area or camp	X	
	(g5) Change in livestock composition		
	(g6) Other (specify:_____ _____)		
	vi. Industrial activities and mining		
	(i1) Industry	X	*Check (X) only those that apply*
	(i2) Mining	X	
	(i3) Waste deposition	X	
	(i4) Others (specify)		
	vii. Urbanisation and infrastructure development		
	(u1) Settlements and roads	X	*Check (X) only those that apply*
	(u2) (Urban) recreation		
	(u3) Other (specify:__large numbers of refugees in informal settlements)		
	viii. Discharges from		
	(p1) Sanitary sewage disposal	X	*Check (X) only those that apply*
	(p2) Waste water discharge	X	
	(p3) Excessive runoff	X	
	(p4) Poor and insufficient infrastructure to deal with urban waste	X	
	(p5) Other (specify:_____ _____)		

	ix. Release of airborne pollutants leading to		
	(q1) Contamination of vegetation/ crops and soil		*Check (X) only those that apply*
	(q2) Contamination of surface and ground water resources:		
	(q3) Other (specify:_____ _____)		
	x. Disturbance of the water cycle leading to		
	(w1) Lower infiltration rates / increased surface runoff		
	(w2) Other (specify:_____ _____)		
	xi. Over-abstraction / excessive withdrawal of water		
	(o1) Irrigation	X	*Check (X) only those that apply*
	(o2) Industrial use		
	(o3) Domestic use		
	(o4) Mining activities		
	(o5) Decreasing water use efficiency	X	
	(o6) Other (specify:_____ _____)		
	xii. Natural causes		
	(n1) Change in temperature	X	*Check (X) only those that apply*
	(n2) Change of seasonal rainfall	X	
	(n3) Heavy/extreme rainfall (intensity and amounts)		
	(n4) Windstorms / dust storms		
	(n5) Floods		
	(n6) Droughts	X	
	(n7) Topography	X	
	(n8) Other (specify:_____ _____)		
3.d.	What are the indirect drivers/causes of land degradation? Indicate **(X)** only those that apply		
	i. Population pressure	X	*Check (X) only those that apply*
	ii. Consumption pattern and individual demand		
	iii. Land Tenure	X	
	iv. Poverty	X	
	v. Labour availability		
	vi. Inputs and infrastructure		
	vii. Education, awareness raising and access to knowledge and support services and loss of knowledge	X	
	viii. War and conflict	X	
	ix. Governance, institutions and politics	X	
	x. Other (specify:_____ _____)		

4. What are the effects of land degradation on ecosystem services? ***Please refer to the guidelines for description of the impacts. Select all that apply and then use rating provided below to indicate nature of the impact.***

1:High negative effect: land degradation contributes negatively (more than 50%) to changes in ES
2: Negative effect: land degradation contributes negatively (10-50%) to changes in ES
3: Little or no effect: contribution of land degradation to changes in ES is modest or negligible (0-10%)
4: Positive effect: land degradation contributes positively (10-50%) to the changes in ES
5: High positive effect: land degradation contributes positively (more than 50%) to changes in ES.

	a. Productive services		
	(P1) Production (of animal / plant quantity and quality including biomass for energy) and risk	2	Rating
	(P2) Clean water supply for human, animal and plant consumption	2	
	(P3) Land availability (area of land for production per person)	2	
	(P4) Other (specify:_____ _____)		
	b. Water services		
	(E1) Regulation of excessive water such as excessive rains, storms, floods	2	Rating
	(E2) Regulation of scarce water and its availability	3	
	c. Soil services		
	(E3) Organic matter status	3	Rating
	(E4) Soil cover	2	
	(E5) Soil structure surface and subsoil affecting infiltration, water and nutrient holding capacity	2	
	(E6) Nutrient cycle (N, P, K) and the carbon cycle (C)	2	
	(E7) Soil formation (including wind-deposited soils)	3	
	d. Biodiversity		
	(E8) Biodiversity (specify:_forest species, wild forage species, threatened birds such as Syrian Serin)	2	Rating
	e. Climate services		
	(E9) Greenhouse gas emission (CO2, methane)	2	Rating
	(E10) (micro)-climate (wind, shade, temperature, humidity)	3	
	(E11) Others (specify)		
	f. Socio-cultural services / human well-being and indicators		
	(S1) Spiritual, aesthetic, cultural landscape and heritage values, recreation and tourism,	3	Rating
	(S2) Education and knowledge (including indigenous knowledge)	3	
	(S3) Conflict resolution	3	
	(S4) Food & livelihood security and poverty	2	
	(S5) Health	3	
	(S6) Net income	2	
	(S7) Protection / damage of private and public infrastructure	3	
	(S8) Marketing opportunities	3	
	(S9) Others (specify)		
5. Measurable global environmental benefits in the project target area			
	a. Land cover		
	i. Vegetative cover	14400	Hectares
	ii. Biomass - Net Primary Productivity (NPP) - for rangelands, orchards and forests	0.75, 1.9, 12.88	tonnes C/ha/year
	iii. Tree density	500	Number/

			Hectare
	b. Avoided emissions		
	i. Carbon stocks		Tons/Hectare
	ii. Other GHG gases		Tons CO2 e/ Ha
	c. Carbon sequestration		
	i. Above ground biomass		Tons CO2 e/ Ha
	ii. Soil Carbon		Tons CO2 e/ Ha
	d. Biodiversity conservation		
	i. Ecosystem status e.g. Biodiversity intactness index; sustained systems diversity		Index
	ii. Habitat protected		Hectares
	iii. Conservation status of target species		Percent Change
	e. Surface and groundwater resources		
	i. Improved irrigation flow -land area		Hectares
	ii. Improved/increased water availability - land area		Hectares
6.	**Development benefits in the project target area**		
	a. Productivity of crops (main crop only)		Tons/Hectare
	b. Livestock productivity		Number or Value
	c. Average annual income from crop and livestock production - monthly, for 2004	500	US$
	d. Average annual household income from forest and tree products - $$ value		US$

PART II – PROJECT OUTCOMES AND ADAPTIVE MANAGEMENT

1. Outcome Monitoring			
LDFA Objectives and Outcomes	**Indicators and Measures**		**Notes/Units**
LD1 – Ecosystem services in production landscapes (agriculture, rangeland)			
i. An enhanced enabling environment within the agricultural sector	Agriculture Policy	4	Score - See "Score Guide" Tab
	Agricultural policies incorporating smallholder and community tenure security	1	Number
	Land tenure security	3	Score - See "Score Guide" Tab
ii. Improved agricultural management	Sustained agricultural productivity	2	Score - See "Score Guide" Tab
	Agriculture policies incorporating smallholder and community tenure security	1	Number
	Community vulnerability - will be determined by household survey		Score - See "Score Guide" Tab
iii. Sustained flow of services in agro-ecosystems	Land area of production systems with increased vegetation cover	4000	Hectares
	Land area under diversified production	4000	Hectares
iv. Increased investments in SLM	1. Direct payments or PES schemes		US$
	2. Small credit schemes		US$
	3. Voluntary carbon market		US$
	4. Eco-labeling, certification schemes		US$
	4. Eco-labeling, certification schemes		
LD2 – Ecosystem services in forest landscapes			
i. An enhanced enabling environment within the forest sector in dryland dominated countries	Forestry Policy	1	Score - See "Score Guide" Tab
	Forestry policies incorporating smallholder and community tenure security	0	Number
ii. Improved forest management in drylands	Provide total area under SFM by forest ownership		
	1. Community		Hectares
	2. Private		Hectares
	3. Government	3000	Hectares
	Provide total spatial coverage of SFM practices and technologies and check **(X)** on all that apply in the list below		Hectares
	1. Best Management Practices/Reduced Impact Logging		*Check (X) only those that apply*
	2. Biodiversity conservation	X	
	3. Forest protection	X	
	4. Management planning and multiscale		

	land-use planning		
	5. Participatory forestry		
	6. Sustained timber and NTFP production	X	
iii. Sustained flow of services in forest ecosystems in drylands	Forested area	10500	Hectares
	Forest cover in project area (%)	8	Percent
	Standing volume / hectare forested area	35	M^3/Hectare
iv. Increased investments in SFM	1. Direct payments or PES schemes		US$
	2. Small credit schemes		US$
	3. Voluntary carbon market		US$
	4. Eco-labeling, certification schemes		US$
LD3 – SLM in wider landscapes (integrated management)			
i. Enhanced cross-sector enabling environment for integrated landscape management	Framework strengthening INRM	1	Score - See "Score Guide" Tab
	Integrated land management plans	0	Number
	Capacity strengthening	2	Score - See "Score Guide" Tab
ii. Integrated landscape management practices adopted by local communities	Spatial coverage of integrated natural resource management practices in wider landscapes	326	Hectares
	Indicate number of INRM tools and methodologies introduced and list at most three below	1	Number
	Al Hima concept of protection		List
iii. Increased investments in integrated landscape management	1. Direct payments or PES schemes		US$
	2. Small credit schemes		US$
	3. Voluntary carbon market		US$
	4. Eco-labeling, certification schemes		US$
LD4 – Adaptive management and SLM learning			
i. Increased capacities of countries to fulfill obligations in accordance with the provisions provided in the UNCCD.	Will the project contribute to UNCCD **reporting** by country? Mark X	Yes X No	
	Select the UNCCD 10-year Strategy Objective(s) to be **directly** addressed by project and **describe** nature of contribution:		
	SO1 To improve the living conditions of affected communities The project will engender a paradigm shift to sustainable land use and land management in the Qaraoun Catchment and a direct result of this will be enhanced quality of life and livelihoods of communities in the Catchment. Where, the shift to SLM requires a change from current practice and where this is going to affect individuals oir communities, the propject will provide support through an AIG scheme to overcome the temporary disadvantages.		
	SO2 To improve the conditions of affected ecosystems The project will lead to direct improvements in ecosystem health and robustness, particularly to forests and rangelands ecosystems and to arable land thus safeguarding ecosystem services. It will also improve conditions indirectly for wetland ecosystems.		

	SO3 To generate global benefits through effective implementation of the UNCCD Because of the unique ecological assemblages, endemism, and landscape environment of the Bekaa Valley within the Middle East region, benefits accruing to Lebanon from the project also have a global dimension. Likewise, with the newly acquired know-how and expertise from the project, Lebanon will be able to implement effectively the provisions of the UNCCD.		
	SO4 To mobilize resources to support implementation of the Convention through building effective partnerships between national and international actors		
	Select Operational Objective(s) from the UNCCD 10-year Strategy to be **directly** supported by the project and **describe** nature of support.		
	1. Advocacy, awareness raising and education	What the project will achieve in the Qaraoun Catchment, will raise awareness of SLM throughout Lebanon.	
	2. Policy framework		
	3. Science, technology and knowledge	Particularly through its activities on farming, crop production and the management of arable land, the project will experiment with innovative approaches to land use and make the know-how and expertise available for replication and upscaling.	
	4. Capacity building	The project will adopt an inclusive, participatory approach through which beneficiaries at various levels will be fully involved. This will enhance individual and community capacity.	
	5. Financing and technology transfer		
ii. Improved GEF portfolio monitoring using new and adapted tools and methodologies	Indicate contributions to be made by the project on the following:		
	1. Knowledge management websites	1	Number
	2. Exchange workshops	4	Number
	3. Knowledge management networks	1	Number
	4. Monitoring tools/systems established for		
	a) Land Degradation Trends	0	Number
	b) Environment and Development Benefits	1	Number

2. Co-financing from sectors			
i. Agriculture		US$	to be confirmed at inception
ii. Livestock		US$	
iii. Forestry		US$	to be confirmed at inception
iv. Water		US$	
v. Energy (hydropower)		US$	to be confirmed at inception

vi. Climate change mitigation (biofuel, bionergy, carbon offsets)		US$
vii.Climate change adaptation		US$

3. Knowledge application	

a. Knowledge resources utilized from GEF-financed targeted research (**describe**)

i. Data	
ii. Tools and Methodologies	
iii. Best Practices	

b. Knowledge resources contributed to focal area learning objectives (**describe**)

i. Data	
ii. Tools and Methodologies	
iii. Best Practices	

4. Knowledge contribution as global public goods	

a. Knowledge resources and products (**Describe and list under each category**)

i. Publications	
ii. Tools and Methodologies	
iii. Best practice guidelines	

b. Knowledge dissemination (Describe)

i. Websites	
ii. Workshops	
iii. Conferences and seminars	
iv. Networks	

5. SLM Learning

a. Describe how and what the project will contribute toward a framework and tools for linking the measurement of GEBs at project level to impacts across multiple scales.

b. Describe how the project will increase understanding of multiple benefits from integrated management of landscape mosaics, and mixed agricultural and forest ecosystems.

Guidance on Scores

Scores to be included into the LD PMAT (heading numbers refer to numbers for section on Outcomes and Adaptive Management)

PART II - PROJECT OUTCOMES AND ADAPTIVE MANAGEMENT

LD1 – Ecosystem services in production landscapes (agriculture, rangeland)

LD1.i Agriculture policy enhancement score

Rating		Benchmark	Notes
	1	no sector policy/regulation framework in place	Baseline assessment made during project design and planning phase and repeated annual assessments reported in PIRs
	2	sector policy/regulation framework has been discussed and formally proposed	
	3	sector policy/regulation framework have been formally proposed but not adopted	
	4	sector policy/regulation framework formally adopted by the Government but weak enforcement mechanisms	
	5	sector policy/regulation framework are enforced	

LD1.i Land tenure security of affected farmers / communities

Rating		Benchmark	Notes
	1	No land tenure arrangements and use rights in place	Baseline assessment made during project design and planning phase and repeated annual assessments reported in PIRs
	2	Land tenure arrangements and use rights partially in place	
	3	Land tenure arrangements and use rights in place	
	4	Land tenure and use rights effectively in place	
	5	Land tenure and use rights secured and protected over the long-term	

LD1.ii Sustained agricultural productivity score

Rating		Benchmark	Notes
	1	Yields of main crops / livestock productivity decreased	Available data on yields of main crops /
	2	Yields of main crops / livestock productivity stable	
	3	Yields of main crops / livestock productivity with annual increase	

	4	Yields of main crops / livestock productivity with >2years increase during project lifetime	livestock productivity will be provided as baseline during project design and planning phase and repeated within the monitoring of the project and reported annually through PIRs
	5	Yields of main crops / livestock productivity with increases that are sustained over the long-term	

LD1. ii. Rate local population's perception of the vulnerability of their livelihood (based on specific factor) - Community Vulnerability			Annual assessment (preferably from participatory household surveys disaggregated by gender
	1	Extreme Vulnerability	
	2	High Vulnerability	
	3	Medium Vulnerability	
	4	Low Vulnerability	
	5	No Vulnerability	

LD2 - Ecosystem services in forest landscapes

LD2.i Forest policy enhancement score			
Rating		**Benchmark**	**Notes**
	1	no sector policy/regulation framework in place	Baseline assessment made during project design and planning phase and repeated annual assessments reported in PIRs
	2	sector policy/regulation framework has been discussed and formally proposed	
	3	sector policy/regulation framework have been formally proposed but not adopted	
	4	sector policy/regulation framework formally adopted by the Government but weak enforcement mechanisms	
	5	sector policy/regulation framework are enforced	

LD3 - SLM in wider landscapes (integrated management)			
LD3.i Framework strengthening INRM			
Rating		**Benchmark**	**Notes**
	1	no INRM framework in place	Baseline assessment
	2	INRM framework has been discussed and formally proposed	

	3	INRM framework have been formally proposed but not adopted	made during project design and planning phase and repeated annual assessments reported in PIRs
	4	INRM framework formally adopted by stakeholders but weak enforcement mechanisms	
	5	INRM framework is enforced	

LD3.i Capacity strengthening to enhance cross-sector enabling environment

Rating		Benchmark	Notes
	1	No capacity built	Baseline assessment made during project design and planning phase and repeated annual assessments reported in PIRs
	2	Initial awareness raised (e.g. workshops, seminars)	
	3	Cross-sectoral training courses addressing cross-sectoral issues are conducted	
	4	Knowledge effectively transferred (e.g. working groups tackle cross-sectoral issues)	
	5	Application of enhanced capacity demonstrated (framework, regulations, mechanism, structures for cross-sectoral management in place)	

ANNEX 5 PROJECT LOCALITIES

1 Criteria and selection of localities

The project will operate on a pilot/demonstration scale within the resources available and at selected localities. A set of criteria was applied to the four Districts within the Bekaa Governorate which had been identified in the PIF. The criteria reflect the aims of the project which are to test various approaches for sustainable land management in forests, rangelands and arable land environments, particularly examples of land in a degraded state. While presenting real-life challenges to the project, the localities must also possess a reasonable chance of success so as to serve as models for replication and up-scaling.

The criteria were clustered into five categories and these are shown in the table on the next page together with the scores achieved. From the overall perspective, West Bekaa and Zahle are equally attractive with West Bekaa scoring slightly better on potential co-financing partners and lower costs. Baalbek is of concern on costs, inherent risks, low chance of success and lack of implementation partners. From this assessment, Baalbek was seen as a substantial challenge for project activities.

All four Districts need Land Use Planning with West Bekaa as the best locality. Zahle would also be attractive were it not for its high density of informal settlements. All but Rachaya appear to be equally attractive as localities for project work in arable land on crops and orchards. On rangelands and pastures, West Bekaa and Baalbek satisfy all criteria while Zahle is not attractive for rangelands work. Regarding forests, West Bekaa and Baalbek once again are the most attractive with Rachaya close behind. Zahle is definitely not a locality suited for the project's forests activities.

In selecting localities for its activities, the formulation team was conscious of the targets that had been indicated in the PIF. The Qaroun Catchment has 18,756 ha of natural forests, wetlands and associated ecosystems (12% of the catchment), 77,908 ha of agricultural land (50%), 55,585 ha of rangelands (35%), and 4,751 ha (3%) are built-up areas. The PIF indicated that the project work will involve 10,500 ha of protection forest, 500 ha of degraded forest, 20,000 ha of rangeland pastures and 40,000 ha of agricultural land.

On the basis of this desk assessment, the formulation team consulted with experts and met with prospective implementation partners and other stakeholders, and came to the following conclusions regarding the localities where the project could test its approaches to sustainable land management:

Strategic Environmental Assessment and Integrated Land Use Management Planning

- In each of West Bekaa and Rachaya Districts

Forest work

- Major focus on the eastern flanks of Jabal Niha and Jabal el Barouk in West Bekaa District (the highlands of Aitanit, Bab Maraa, Deir Ain el Jaouze, Saghbine, Ain Zebde, Khirbit Kanafar, Kafraya, Aana, Ammiq, Haouch Aamiq and Haouch el Saalouq)
- Work in Rangelands at other localities, opportunities for Forest work will also be considered

Rangeland work

- Primarily on the slopes of Jabal esh Sheikh to Haloua in Rachaya District
- If the opportunity arises, between Jabal al Aarabi and Soultan Yaaqoub in West Bekaa District (in effect a continuation of the Rachaya rangelands as above)
- Wherever working in Forests, opportunities for Rangeland work will also be considered

Arable land work

- Selected from the valley around Saghbine, el Khraizat, Jobb Jannine, el Mansoura; around Aammiq in West Bekaa District
- From between Zahle town and Niha as well as the Anjar – Kfar Zabad area in Zahle District

Table 1. Assessment of suitability of project localities

CRITERIA	WEST BEKAA	ZAHLE	BAALBEK	RACHAYA
OVERALL CRITERIA				
Must fit within the scope of the GEF guidance	3	3	3	3
Contribute to satisfying the GEF targets	3	3	3	3
Reasonable road access (all weather)	3	3	3	3
Amenable stakeholders, willing implementation partners	2	2	1	2
Provide a challenge but have a high chance of success	2	2	1	2
Effective communication links (on mobile phone network and internet coverage)	2	3	2	3
Previous exposure to international development aid activities	3	3	2	2
Low inherent risks, severity and likelihood	2	2	1	1
Area of interest to potential agent for upscaling and replication	3	3	3	3
Comparatively lower costs for the same activities	3	2	1	3
Potential co-financing partner/s	3	2	2	1
Solution of any needs which may arise from the Capacity Assessment	3	3	3	3
SUB-TOTAL FOR OVERALL CRITERIA	**32**	**31**	**25**	**29**
ADDITIONAL CRITERIA FOR LAND USE PLANNING				
Active unions for land use planning	3	3	2	1
Low density of informal settlements	3	1	2	3
Capacity and willingness to engage	3	3	1	2
Need for land use planning	3	3	3	3
SUB-TOTAL FOR LAND USE PLANNING	**12**	**10**	**8**	**9**
ADDITIONAL CRITERIA FOR AGRICULTURE – CROPS AND ORCHARDS				
Agriculture is main source of income	3	3	3	3
Influential farmers with large lands whose knowhow can trickle down to smaller land famers	3	3	2	3
At least 3 cultivated field crops in the area (ex. potatoes, wheat, etc.)	3	3	3	2
At least 1 major fruit crop (apple, grape, apricot, etc.)	3	3	3	3
Protected agriculture (greenhouses, hydroponics, etc.) (use more water and pesticide)	3	3	3	1
SUB-TOTAL FOR AGRICULTURE, CROPS AND ORCHARDS	**15**	**15**	**14**	**12**
ADDITIONAL CRITERIA FOR RANGELANDS, PASTURES				
Relatively high number of grazing livestock (especially goats)	3	2	3	1
Diversity of rangelands (degraded forests, forests, fallow land, high altitude rangelands)	3	2	3	3
Biodiversity at risk from grazing	3	2	3	3
SUB-TOTAL FOR RANGELANDS AND PASTURES	**9**	**6**	**9**	**7**
ADDITIONAL CRITERIA FOR FORESTS				
Large area of naturally forested land	3	1	3	3
Diversity of forest types (oak, pine, juniper, etc.)	3	1	3	2
Forest state ranges from healthy to degraded to severely degraded	3	2	3	3
Forests provide wide range of ecosystem services	3	2	3	3
Forests contribute to sustainable livelihoods of local communities	3	2	3	3
Majority of forest land is public	3	2	3	3
SUB-TOTAL FOR FORESTS	**18**	**10**	**18**	**17**
OVERALL TOTALS	**86**	**72**	**74**	**74**

The Strategic Environmental Assessment and Integrated Land Use Management Planning work will be carried out with Municipalities Unions and District administrations as partners (on advice from the Ministry of Environment, the Ministry of Public Works and Transport, and the Council for Development & Reconstruction). The Forest and Rangeland work to be carried out with Municipalities Unions and shepherds as partners (on advice from the Ministry of Agriculture and the Ministry of Environment). The Arable land work will be carried out with landowners as partners (on advice from the Lebanese Agricultural Research Institute (LARI).

A more detailed description of each of the three selected Districts follows below. However, while socioeconomic data in Lebanon is generally available at the governorate level, it is not available at district level.

2 West Bekaa District

The West Bekaa District will serve as a locality for land use planning, rangelands and pastures, forests and some arable lands activities. As such, it will be the main centre of activity for the project.

2.1 Locality and Administration

West Bekaa is located at the southwestern part of the Bekaa Valley in Bekaa Governorate. Joub Jannine is the capital of West Bekaa District and is located at the foot of Jabal el Aarabi at an altitude of 930 m above sea level and about 68 km southeast of Beirut.

Administratively the West Bekaa is bordered by Zahle District in the north, the governorates of Mount Lebanon and South Lebanon in the west, in the south the governorate of Nabatiyeh and to the east the district of Rachaya.

The district of West Bekaa has 30 municipalities, 11 villages with no municipality and two municipality unions – the Plain Union of Municipalities (or Sahel Union of Municipalities) located north of the district and the Union of Lake Municipalities (or Al Bouhayra Union of Municipalities) located at the southern end. Table 2 below summarises the administrative setup in West Bekaa District.

Table 2. Unions, Municipalities and Villages of the West Bekaa

Union of Municipalities of Bouhayra	Union of Municipalities of Sahel	Independent Municipalities	Villages (no municipality)
Aitanit, Ain Zebde, Baaloul, Bab Maraa, Joub Jannine, Kefraya, Khirbet Qanafar, Lala, Libbaya, Machghara, Qaroun, Saghbine, Sohmor, Yohmor	Ghazzeh, Houch el Harimeh, Kamed el Laouz, Khiara, Hammara, Mansoura, El Marj, Saouiri, Soultan Yaaqoub	Aammiq, Aana, Ain Et Tineh, Maydoun, Qelaya, Raouda	Dakoue, Deir Ain Ej Jaouze, Deir Tahnich, Jazira, Loussie, Tall Zanoub, Zellaya

2.2 Physical Characteristics

The West Bekaa district has a total surface area of about 470 km^2 stretching from the highlands of Mount Barouk at 1900 m of altitude in the west all the way down to the Bekaa plain and then up again to the highlands of the Anti-Lebanon mountain range[46]. It is located towards the southern part of the Bekaa Valley with a remarkable variation in landscapes and ecosystems. Towards its southern end, the West Bekaa is composed entirely of mountains in which the Litani River cuts a gorge which continues all the way to South Lebanon.

The West Bekaa receives reasonable precipitation in the form of rain and snow. The lower altitude lands and plain areas of the northern and eastern part of the district receive between 500 to 600 mm of rain, whereas the mountain areas, especially the eastern flanks of Mount Lebanon receive from 800 to over 1000 mm of rain and snow[47].

The soils of the West Bekaa are dominated by two types[48]:

- Eutric Cambisols: this soil type dominates the plain region of the district and is considered highly productive[49] which explains the dominance of field crops and the rotation of major agriculture crops such as wheat, potatoes, beetroot, and vegetables among others.

[46] Localiban website (http://www.localiban.org/spip.php?rubrique248)
[47] APIPNM website (http://www.apipnm.org/swlwpnr/reports/y_nr/z_lb/lbmp131.htm)
[48] Darwish, T (1999) Mapping of natural resources using remote sensing for soil studies. National Forum on support of remote sensing techniques to planning and decision-making process for sustainable development. CTM, ERS/RAC, UNEP and CNRS/NCRS. Beirut. 14/10/99:36-41
[49] FAO (2001) Lecture notes on the major soils of the World. 340 pp.

- Lithic leptosols: this soil type dominates the highlands of the district. It is generally poor, shallow and prone to erosion[50]. Intensive agriculture cannot be established on such soils which are more suited to orchards which tend to stabilize the soil over time especially if soil disturbance is avoided by the adoption of protective measures like conservation agriculture. Such soils are largely the domain of grasslands, rangelands and woodlands.

The land capability map produced in 2005 classified Lebanese territories into four classes from the least problematic *Class I* with relatively low erosion, high fertility and wide plant selection possibilities and suitability for agriculture, to *Class IV* characterized by severe limitations requiring significant management and care to avoid erosion and loss of the poor soil layer. Ironically, the lands of West Bekaa are classified as belonging to both class I and class IV with the latter dominating the mountains indicating the suitability of these areas to reforestation and an extreme challenge to agriculture[51].

The National Physical Master Plan classified a significant percentage of West Bekaa lands as prone to landslides, mostly in the hilly and mountainous zones[52].

The Litani River is the most prominent feature of the West Bekaa landscape crossing it from its northern parts and flowing to the largest artificial lake in Lebanon, Lake Qaroun which is located completely within the district. As a result, West Bekaa, its mountains, its plains and many Litani River tributaries play a vital role in the water budget of the country.

2.3 Demographic aspects

Joub Jannine is the capital and urban centre of West Bekaa. It has an estimated population of 12,000 distributed in 4,200 households. It is considered as the economic and commercial hub for West Bekaa[53].

There are 41 schools in West Bekaa, 24 public and 17 private, catering to around 13,000 students. About 7,000 of these students attend private schools. The highest number of schools are in Machghara and Joub Jannine, seven (three public, four private) and six (four public, two private) respectively. There are four hospitals in West Bekaa, one private and three public, located in four different towns[54]. The combined poverty rate of West Bekaa and Rachaya districts is 29%, and this is 1% higher than the national poverty rate[55].

The district of West Bekaa hosts 51,953 registered refugees who reside in 10,919 households, many of which are informal tented settlements[56].

2.4 Biodiversity, Ecosystem Values and Protection

There are three areas of high biodiversity values within West Bekaa District, all of which are designated as IBAs. These are Al Shouf Cedar Nature Reserve (the majority of which lies within the Shouf District, but has an eastern flank within West Bekaa), Aammiq Wetland and Lake Qaraoun (see Figure 1 below).

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[50] Ibid
[51] Darwish, T. Jooma, I. Awad, M. Abou Daher, M. and Msann, J (2005) Inventory and management of Lebanese soils integrating the soil geographical database of Euro- Mediterranean countries. Lebanese Science Journal, Vol. 6, No.2
[52] Counsel for Development and Reconstruction (2005) Schéma Directeur d'Aménagement du Territoir Libanais.
[53] Jeb Jannine Website (http://www.jebjannineonline.com/jebjannine.php)
[54] Localiban Website (http://www.localiban.org/spip.php?rubrique532)
[55] Laithy, H., Abu Ismail, K. and Hamdan, K. (2008) Poverty, Growth and Income Distribution in Lebanon, Published by International Poverty Center: Country Study No. 13
[56] UNHCR Website (http://data.unhcr.org/syrianrefugees/region.php?id=90&country=122)

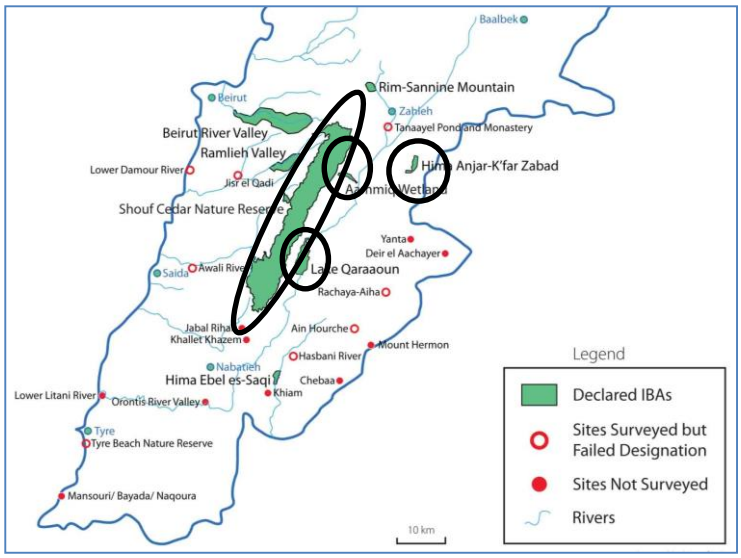

Figure 1. Declared IBAs in West Bekaa and Zahle Districts[57]

Al Shouf Cedar Nature Reserve In 1996, Law No. 532 declared "the communal lands of Niha, Jbeih, Mreste, Khraibe, Maasser, Barouk, Bmohreh, Ain Dara and Ain Zhalta villages, in addition to the Government owned lands on the eastern side of Barouk Mountain" a Nature Reserve, now known as Al Shouf Cedar Nature Reserve. The Reserve is the largest in Lebanon and spreads over an area of 20,000 ha reaching an altitude of 1,750 m above sea level. It is under the authority of the MoE, which manages it through the Appointed Protected Area Committee (APAC).

Al Shouf Cedar Reserve is one of the last remaining areas in Lebanon where mammals, such as the globally threatened wolf (*Canis lupus*), the swamp cat (*Felis chaus*), wild boar and wild cat can still be found. The birdlife of the mountains includes rare or endemic birds such as the Syrian serin (*Serinus syriacus*), the Eagle owl, the Chukar partridge and the Longlegged buzzard. This was the reason why the reserve was designated as an IBA by Birdlife International in 1994.

Its habitat is comprised of forest, grassland and shrubland, with Brant's oak forest on its northeastern slope and juniper and oak on its southeastern slopes, which lie within the Bekaa. Due to its protection status under Lebanese law, there are no identified direct threats to the Reserve[58].

In July 2005, UNESCO declared the Shouf Biosphere Reserve with an area of 50,000 ha, almost 5% of the total area of Lebanon. The Biosphere Reserve includes the Al Shouf Cedar Nature Reserve, the Aammiq Wetland east of the Shouf in the Beqaa Valley, and 24 villages surrounding the reserve from the eastern and western sides of the Barouk and Niha mountains.

According to the Shouf Biosphere Reserve website[59], it has many distinctive features which include:

- 620 ha of *Cedrus libani* forest, the largest expanse of this species in Lebanon and 25% of the remaining cedar forests in the country.
- 520 species of plants, of which 25 are internationally and nationally threatened, 48 are endemic to Lebanon/Syria/Turkey, and 14 are rare species.
- Placed strategically between Europe, Africa, and West Asia, within the migratory route for countless storks, birds of prey and other migrants who pass over it every year and use it as a roosting site.
- 31 species of reptiles and amphibians including chameleon, tortoise, and several species of snakes, lizards, frogs, and toads.

[57] From website of Society for the Protection of Nature in Lebanon www.spnl.org
[58] SPNL Website - http://www.spnl.org
[59] http://www.shoufcedar.org/showinfo.asp?id=1

Some 28,000 tourists visited the Reserve in 2004, however, after the 2006 war the number dropped to 14,000, although it had rebounded again to 40,000 by 2009. Women members of local communities produce some 70 different products using traditional methods, and these are for sale in visitor centres managed by the Reserve. The Reserve also provides employment for 13 permanent and 8 temporary staff all of whom are residents of the Shouf region.

Aammiq Wetland The Aammiq Wetland was internationally recognized as an Important Bird Area in 1995, as a Ramsar Site (site number 978) in 1999, and as a "Man and the Biosphere Reserve" by UNESCO in 2005 (as part of Al Shouf Biosphere Reserve).

With a total area of 280 ha, it is considered the largest natural freshwater wetland in Lebanon. The wetland is a stop-over for two globally threatened spring migrants, the Corncrake and the Great Snipe, and is the winter home to the near-threatened Ferruginous Duck. Over 20,000 soaring birds travel over Aammiq in spring and autumn, including the White Stork, White Pelican, Common Crane and at least 31 species of raptors.

Adding to the diversity of habitats in the area are areas of rough grazing, cultivated land, drainage ditches, and an avenue of trees, all within the areas surrounding Aammiq wetland, where the Syrian Woodpecker (*Dendrocopus syriacus*) and the Syrian Serin (*Serinus syriacus*) have been recorded. In spring and summer, in the shrubby hillsides overlooking the wetland, abound with assorted buntings, wheatears, warblers and shrikes, and in the rocky gorges Rock Nuthatch (*Sitta neumayer*) and Eagle Owl (*Bubo bubo*) can be spotted. Mammals present within the area include the Persian Squirrel, Jackal, Otter, Swamp Cat, Wildcat, Wild Boar and Porcupine.

Major threats to the wetland include hunting, over-grazing, water abstraction, diversion of water, irrigation and agricultural intensification. The Aammiq Wetland and some of the surrounding area are therefore in the process of being declared a Nature Reserve in Lebanon. The main landowning family is very active in ensuring preservation of this ecosystem and cooperates with A Rocha Lebanon to ensure that a hunting ban and controlled grazing are applied. In addition, plans to develop the area for ecotourism have already begun[60].

Lake Qaroun Lake Qaroun is the largest freshwater body in Lebanon and a flyway for over 20,000 raptors, Storks, Pelicans and other soaring birds every year. The Lake was formed by the damming of the Litani River and has a surface area of 1,190 ha. It supplies water for irrigation purposes and power supply, and is managed by the Litani River Authority under the jurisdiction of the Ministry of Energy and Water. The Lake was declared an IBA in 2005.

The Lake is surrounded by agricultural land, scrub and woodland and water levels fluctuate severely throughout the year, with little or no submerged or emergent vegetation. In terms of wildlife, the Swamp Cat (*Felis chaus*), Spur-thighed Tortoise and Chameleon have been sighted within the lake's vicinity.

Major threats to the lake and the surrounding biodiversity include hunting, water pollution, over-grazing and disturbance of birds[61].

As mentioned in Section 1.4, the Government of Lebanon has now embarked on a major programme to protect Lake Qaroun from pollution.

2.5 Land use and production

Forests

Forests in West Bekaa are most prolific on the eastern flanks of the Mount Lebanon Range, but several forest patches, mostly in a degraded state, are also scattered throughout the district. Their

[60] A Rocha Lebanon Website - http://www.arocha.org/lb-en/index.html
[61] Society for the Protection of Nature Website (http://www.spnl.org) accessed on 28/02/2014

importance to the Litani Catchment is far greater than the extent of their surface area because their highest concentration coincides with the sources of many of the Litani's tributaries and they stabilize the soil upstream of Qaroun Lake.

The West Bekaa forests are mostly confined to two vegetation zones out of the 10 identified in Lebanon. These two zones are typical of the Mediterranean and are known as[62]:

- Eumediterranean: situated at an elevation of 500 to 1000 m above sea level, and dominated by oak species, mostly of *Quercus calliprinos* (Palestine oak) and *Quercus infectoria* (Aleppo oak) with lesser occurrence of maple species such as *Acer syriacum* (Syrian maple), and *Arbutus andrachne* (strawberry tree) among other species.
- Supramediterranean: situated at an elevation of 1000 to 1500 m above sea level, also dominated by oak species: *Q. calliprinos*, *Q. infectoria* and *Q. cerris* (Turkey oak) and with the presence of *Acer tauricolum* (Taurus maple) and *Prunus ursina* (bear's plum) among other species.

Above 1500 m lies the Montane Mediterranean region (1500-2000 m)[63] which in West Bekaa is composed of low density degraded forests and scrublands with presence of *Crataegus* spp., *Acer* sp., *Juniperus oxycedrus* and so on. Theoretically, this region could harbour Cedars, however, they are not present in the montane region of the West Bekaa.

Afforestation and reforestation campaigns have been carried out in West Bekaa and are still continuing to this day with varying degrees of success. One of the most prominent afforestation events was conducted in the past century with the green plan in the villages of Lala and Baaloul which overlook Lake Qaroun. The man-made forests cover more than 150 ha of land and were planted in the hope of reducing erosion and preserving the Lake. Most of these forests have survived but they would benefit from management intervention to enhance their vigour.

Under the framework of the National Reforestation Plan (NRP) spearheaded by the MoE, 80 ha of lands were reforested all over the Bekaa including in three villages of West Bekaa, namely, Lala, Baaloul and Khirbet Kanafar[64]. Moreover, in 2010, the MoE planted 65 ha of mixed forests in Joub Jannine, Kamed el Lawz, Baaloul, Lala, Beb Maraa, Aitanit, Ain Zebde, Kefraya , Soultan Yaacoub, Souayri , El Manara, Kellaya and El Qaroun[65]. The success of the reforestation campaigns conducted under the framework of the NRP is still being assessed to determine the validity of the modalities used during implementation.

[62] Abi-Saleh, B. and S. Safi (1988) Carte de la Végétation du Liban. Ecologia Mediterranea XIV (1/2)
[63] Ibid
[64] MoE website. (www.moe.gov.lb)
[65] Localiban website (http://www.localiban.org/spip.php?article5352)

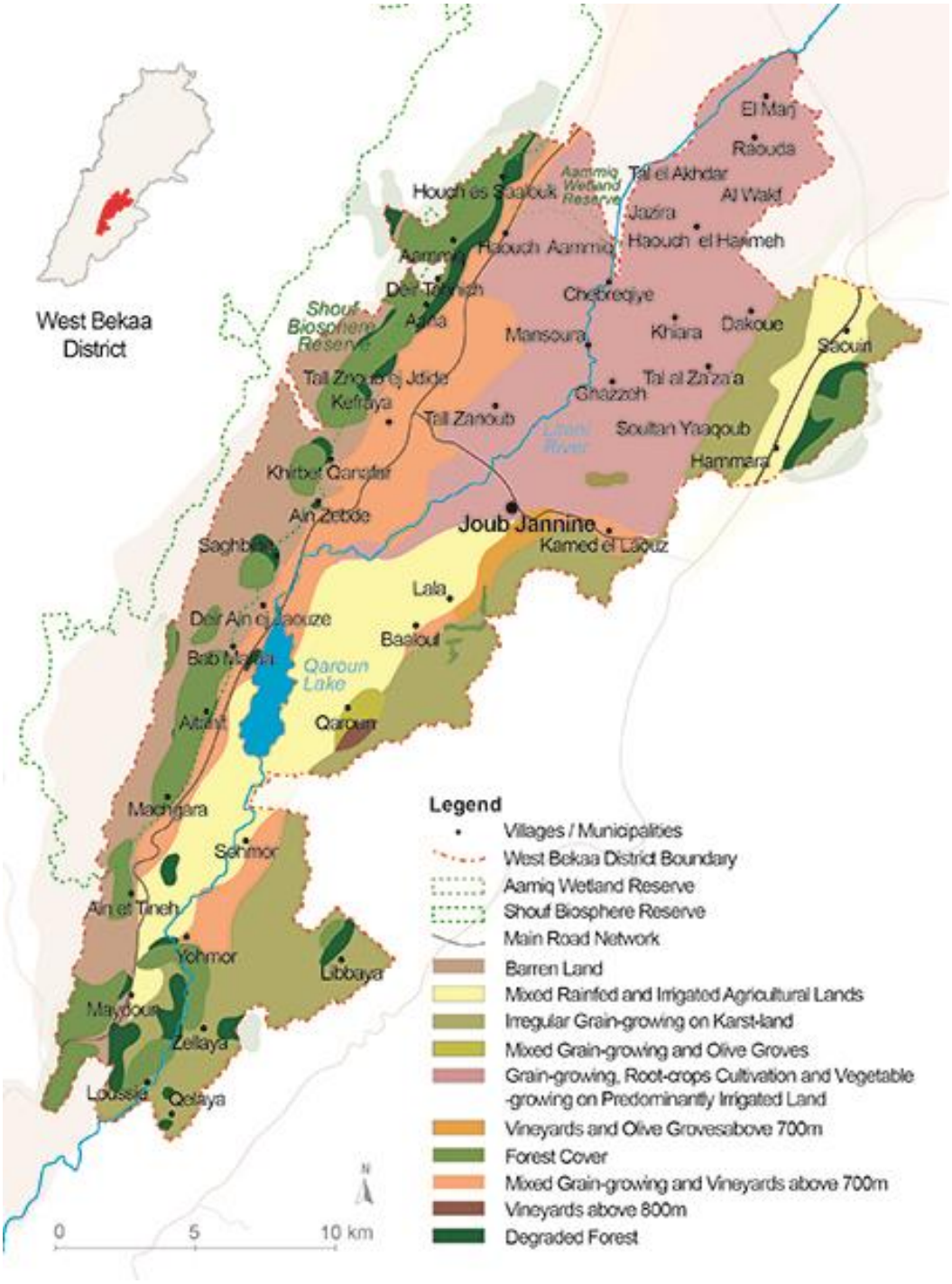

Figure 2. West Bekaa District Land Use

Many local NGOs and civil society groups conducted afforestation and reforestation campaigns but these were mostly on a small scale. Lack of knowledge in reforestation have led some of these actions to be completed with disregard to key factors such as suitability of the planted species to the site, the time of planting and maintenance measures.

Reforestation in West Bekaa, as in the rest of Lebanon, focused on a narrow selection of species with a clear bias towards *Pinus pinea* (stone pine), a sought-after tree. While not denying the economic importance of the tree, this choice does not respect the natural forest landscape that is common in the region dominated by mixture of oak species, most importantly *Quercus calliprinos.*

Unlike other regions within the Litani River Basin, the forests of the western highlands of West Bekaa are mostly connected and form dynamic ecosystems that are able to bounce back from

stressing events if given the chance. A large percentage of these woodlands are now protected as part of the Shouf Biosphere Reserve which limits to a minimum human intervention. Although banning human activities from forests has its advantages, it tends to bring in a new set of problems arising from the lack of interest of local communities towards forests. If well managed, human intervention within forests, especially Mediterranean forests, which have been shaped by humans since millennia, can have a positive impact on forest regeneration and the reduction of major stressors such as forest fires.

The forests of West Bekaa provide several ecosystem services and functions, the most prominent of which are:

- Carbon sequestration: forests are a primary Carbon sink helping to regulate and balance the CO_2 concentration in the atmosphere. A common fact of many of Lebanon's forests, and this is certainly true of the oak dominated forests of West Bekaa, is their rather low Carbon stock explained by their degraded state and the dominance of younger trees as a result of the repeated cutting of broadleaf forests[66]. Proper protection and management will increase the carbon stock within these oak woodlands.
- Protection of soil and water resources: the West Bekaa forests are located within the wettest region of the Bekaa, as such these woodlands are vital in protecting water resources within the region, especially the water flowing into the Litani River through its many tributaries that arise from the district. Additionally, these forests stabilize and protect the soils on the steep slopes of the eastern flanks of Mount Lebanon – over half (59.6%) of the West Bekaa is classified as being at high risk of desertification with an additional 31% at moderate risk[67]. Although the value of protection of soil and water for the Lebanese forests has not been fully estimated, the National Forest Assessment Programme ranked this as foremost among the services that forests provide for Lebanon[68].
- Protection of biodiversity: a complete and specific inventory of the species that grow within the forests of West Bekaa is yet to be completed, nevertheless these woodlands are situated within several bioclimatic zones noted for their species richness.
- Production of wood and charcoal: oak forests are noted for the high quality of the wood they provide and the high calorific value of their burning wood. Additionally, the highest quality charcoal is produced from oak trees[69]. The protection status of the majority of the West Bekaa oak forests has curtailed this human activity.
- Grazing: during periods of the year when green grass become rare, shepherds take their flocks into oak woodlands where goats in particular find their way up trees and graze the green leaves[70]. Again, the protection status of the forests in West Bekaa has imposed limits on shepherds' flocks from grazing within the forests. Grazing is easier to handle and manage on lands classified as other wooded lands (OWL) which are low density forests. As such, studies have shown that grazing is the number one service offered by OWL in Lebanon[71]. The open nature of many oak woodlands of West Bekaa favours this service.
- Production of non-wood forest products: oak forests provide many products beyond wood most importantly honey, especially the highly prized oak honey, medicinal plants and edible plants that are collected by locals. It is worth noting that West Bekaa has some 2,575 beehives[72], and while not all forage within the district's woodlands, a high percentage do.
- Recreation and eco-tourism: owing to their proximity to major urban centres of the Bekaa such as Zahle and the surrounding towns, the beauty of the scenery within the West Bekaa highlands attracts visitors. Places like the West Bekaa Country Club in Khirbit Kanafar and the numerous restaurants in the villages bordering the Lake capitalize on the beauty of the surrounding scenery of forests, lake and placid agricultural fields. Additionally, the Shouf Cedar Biosphere Reserve has made an effort to boost eco-tourism in the region and opened

[66] FAO and MoA (2005) National Forest and Tree Assessment Inventory, Final Report.
[67] MoE (2003) National Action Programme to Combat Desertification.
[68] FAO and MoA (2005) National Forest and Tree Assessment Inventory, Data Analysis Report.
[69] FAO and MoA (2005) National Forest and Tree Assessment Inventory, Final Report
[70] AFDC (2007) State of the Forest Report.
[71] FAO and MoA (2005) National Forest and Tree Assessment Inventory, Data Analysis Report
[72] MoA (2010) Agriculutral Census 2010, website (http://www.agriculture.gov.lb/html/RESULTATS_RECENCEMENT_AGRICULTURE_2010/caza.html).

in collaboration with A Rocha, AFDC, SPNL and RSCN a special eco-restaurant in the village of Aammiq, the first of its kind in Lebanon[73].

Rangelands

Pastures cover a third or so of the lands of West Bekaa, even though the predominant land use within the district remains that of agriculture. Small ruminants such as sheep and goats are the main grazing animals since cattle are not traditionally grazed in open rangelands[74].

As illustrated by Figure 3, there has been a significant change in the number of grazing animals within the district between 1998 and 2010[75].

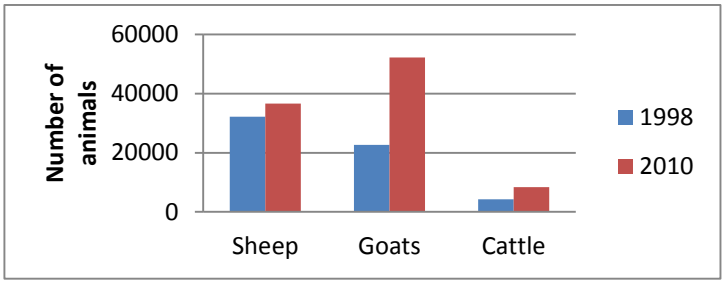

Figure 3. Change in number of animals between 1998 and 2010 in the West Bekaa

Goat numbers have dramatically increased by over 100% whereas the number of cattle nearly doubled. Sheep on the other hand increased only slightly. The reasons behind such changes are difficult to determine, however, it is possible that shepherds and their flocks counted in 2010 were already present but outside West Bekaa during 1998 (Figure 3). Shepherds are mostly nomadic or semi-nomadic and their numbers in a particular region can fluctuate rapidly over space and time. The increase in cattle rearing can be attributed to large scale farms opening in the area.

In West Bekaa, the area of forests and rangeland pastures is 19,030 ha and the number of sheep and goats is 88,930. This is equivalent to an average stocking rate of 4.673 heads/ha. Taking the estimated carrying capacity of rangelands in Lebanon as less than two heads per hectare[76], the pastures and forests in West Bekaa are overgrazed by as much as double the ideal number of animals.

It is clear that the rangelands of the West Bekaa cannot sustain these high numbers of animals. Knowing that a high percentage of the West Bekaa forests are protected, thereby eliminating the chance of grazing, it becomes evident that such high numbers are sustained by external foraging resources. What the rangelands cannot supply, shepherds provide by grazing fallow agricultural lands or by taking their flocks into the heart of the Bekaa plain where they graze on crop residues and plant stubble[77]. One should keep in mind that shepherds do not follow administrative divisions, and if available rangelands are severely limited in a given area in the West Bekaa, the shepherds will take their flocks to richer pastures be it in the West Bekaa or neighbouring districts. Shepherds are sometimes also forced to buy feed to supplement the diet of their animals, especially in drier years where rangelands provide even less for grazing animals.

Despite being overgrazed and mismanaged, the pastures and open woodlands of Lebanon provide the major sheep and goat varieties with a high percentage of their dietary requirements as

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[73] Shouf Biosphere website. (http://shoufcedar.com/press.asp?id=52).
[74] MoA (2010) Agriculutral Census 2010, website (http://www.agriculture.gov.lb/html/RESULTATS_RECENCEMENT_AGRICULTURE_2010/caza.html).
[75] MoA, Agricultural census of 1998 and 2010.
[76] Darwish, T. and Faour, G (2008) Rangeland degradation in two watersheds of Lebanon. Lebanese Science Journal, Vol. 9 (1): 71-80
[77] FAO (2011) Lebanon Pasture/Forage Resources Profile.

presented in Table 3 below which also shows the more suited habitats for these breeds within the West Bekaa district. It should be noted that the most common sheep breed used in Lebanon is the Awassi breed whereas goats come in two main breeds[78] - the Baladi (local) which is a hardy breed but with low milk yields with an average of 150 to 200 litres per head per year; and the Shami a breed with a much higher milking ability ranging between 500 to 700 litres per head per year but which cannot live in the same harsh environments as the Baladi breed[79].

Table 3. Major grazing breeds of Lebanon and suitability of the West Bekaa[80]

BREED	NEEDS PROVIDED BY RANGELANDS AND WOODLANDS	MAJOR HABITAT CHARACTERISTICS	SUITABLE AREAS WITHIN THE WEST BEKAA
Sheep Awassi	Up to 70% of their diet	Coastal plains and mountain foothills. Bekaa valley in areas with 300 to 700 mm of rain and altitude of 800-1000. Cold winters (down to -15 °C) and hot summers (up to 45 °C)	*Eastern highlands* most notably in and between the villages of Souari, Dakwe, Soultan Yaacoub, Kamed el Lawz.
Goats Baladi	Up to 80% of their diet	Mountains from 800-1600 in altitude with a minimum of 300 mm of rain. Cold winters with snow cover.	*Eastern highlands* in villages such Hammara/Manara, Joub Jannine, Lala Baaloul and Qaroun. *Western highlands*, the eastern flanks of Mount Lebanon, however, protection of a large zone by Shouf Biosphere
Goats Shami	Around 50% of their diet	Coastal region up to 700 m in elevation in mixed farming systems or rainfed mountain foothills. Over 600 mm of rain.	Most of the West Bekaa is higher in altitude than is required by the breed
Goats crosses	Around 90% of their diet	Dry steppes with less than 300 mm of rain. Cold winter (down to -10 °C) and hot summers (above 35 °C)	Though this crossbreed can graze in the West Bekaa, however, the more suitable habitat is further to the northeast of Lebanon.

Meat and milk production does not depend entirely on rangelands, however, rangelands influence this sector, especially when considering small ruminants. Agricultural lands, types of grown products, forests and their density and imported feed all need to be considered when assessing the district's ability for meat and milk production.

Cattle, goat and sheep farming and grazing in all of Lebanon, have a primary pursuit of milk production and dairy products processing[81]. Lebanon remains a net importer of meat and the local production of cattle and sheep meat does not meet more than 10 and 20% respectively of the local demand. Goat herding on the other hand supplies most of the local demand for this meat[82] (Figure 4).

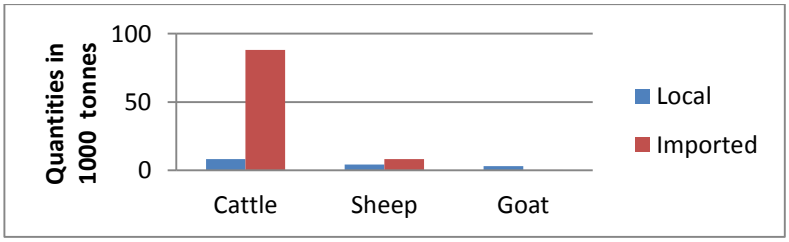

Figure 4. Quantities of meat consumed in 2009 of local and imported origin[83]

[78] Ibid
[79] FAO (2012) Lebanon Recovery Fund Project. In : FAO Achievements in Lebanon 1976 - 2011
[80] Khazaal, K (2005) Small Ruminants Breeds of Lebanon. (L. INIGUEZ editor). Characterization of small ruminant breeds in West Asia and North Africa, Volume 1: West Asia. ICARDA, Aleppo, Syria, pp. 155-181. *(With Adaptation)*
[81] FAO (2011) Lebanon Pasture/Forage Resources Profile.
[82] Ibid
[83] MoA (2009) الزراعة في لبنان في عامي 2008 و 2009

Cattle produce the largest quantities of milk, followed by goats and sheep. The numbers of females in a flock determine its milk producing capacity, however, not all females produce the same volumes and will not produce milk if not fertilized. Taking this into consideration, the figures in Table 4 might overestimate what is actually being produced. The West Bekaa has the second highest milk producing potential among the districts of the Bekaa.

As can be seen from Table 4 below, the economic value of the meat and milk production of the West Bekaa shows higher returns of the milk sector as it remains the main pursuit in cattle, goat and sheep herding.

Table 4. Estimate of the economic value of meat and milk production in West Bekaa

SPECIES	MILK PRODUCTION	UNIT PRICE USD/L[84]	TOTAL VALUE USD	MEAT PRODUCTION TONS	UNIT PRICE USD/KG[85]	TOTAL VALUE USD
Sheep	2,503.9	0.575	1,439,742.5	632.143	3.42	2,161,929.06
Goat	4,528.2	0.62	2,807,484	757.296	2.97	2,249,169.12
Cattle	21,287.2	0.57	12,133,704	1173.458	3.05	3,579,046.9
Total value of milk			**16,380,930.5**	**Total value of meat**		**7,990,145.08**

Agriculture

Agriculture is the main land use within the West Bekaa District and the plain region is home to extensive systems of field crops.

The region enjoys a favourable climate suitable for agriculture with a long growing season and frost free days. In addition, the topography of the district allows for the growth of a multitude of crops. Field crops are concentrated in the lowlands from the centre of the Bekaa plain towards its end near Lake Qaroun. Fruit, olives and vineyards are concentrated in the higher lands on the eastern flanks of Mount Lebanon and the western flanks of the Anti-Lebanon Mountains.

Farmers of the West Bekaa, especially those growing field crops, are skilled and have many years of experience. Agricultural land users, especially in the productive plain areas, are either land investors renting them to grow major field crops or users who own the land and crop it according to its potential[86].

Family workers and seasonal workers provide agriculture with the needed man-power, however, seasonal and non-Lebanese workers are often engaged especially when family workers do not meet the most demanding farming tasks most notably in the case of large agricultural investments where the family labour force is usually insufficient or inexistent.

Compared to other regions in Lebanon, West Bekaa is also relatively rich in water resources which include[87]:

- Litani River: the most prominent of rivers in West Bekaa crossing the district from its northern plains and discharging into Lake Qaroun from which it emerges back again at the villages of Sohmor and Machghara and on to from the lower Litani River Basin
- Litani tributaries: the district is crisscrossed with several of the Litani's main tributaries which include

[84] Ibid
[85] Ibid
[86] FAO and MoA (2006) الاستراتيجية والسياسة الزراعية.المناطق الزراعية المتجانسة،الدراسات الملخصة.مشروع الاحصائي الشامل
[87] UNDP / MOE (2011) Business Plan for Combating Pollution of the Qaroun Lake, prepared by ELARD

    - The Ghzayyel River which originates in Anjar but flows into West Bekaa where it is joined by the Chamsine Spring forming the most prominent Litani tributary along with the Berdawni River.
    - The Jaiir, Hafir, Sbirou, Assafir, Aammiq springs and rivers are minor tributaries that discharge into the Litani River
- Qaroun Lake: covering an area of 12.3 km^2, the lake is the most important artificial one in Lebanon. It has a maximum holding capacity of 420 Mm^3, with a useful volume of 220 Mm^3. It regulates the flow of the Litani River and approximately 160 Mm^3 of its waters are used for irrigation and the production of hydropower.
- Groundwater: the shallow water table in West Bekaa allows the reliance of many locals on groundwater to irrigate their lands and for domestic use.

In spite of the relative water abundance in the West Bekaa, the availability of this resource remains a challenge as it is being stressed by current usage patterns. Agriculture remains the primary user of water and in peak times farmers are forced to use contaminated water to compensate for water shortages[88].

The MoA in its work on the various agricultural regions of the country believes that West Bekaa could be sustainably developed with focus on the following[89]:

- Investment in infrastructure:
    - Complete all the phases of the Litani Irrigtion Project
    - Establish a network of lakes and irrigation canals in El Marj and Kamed el Lawz
    - Enhance the agricultural and side roads network
    - Clean the Litani River bank to prevent flooding and damage to agricultural lands and enhance irrigation water quality
    - Collect rain water through the establishment of barrages and hill lakes which reduce the stress on groundwater resources

- Investment in agricultural works:
    - Renew old orchards with new and more marketable varieties
    - Encourage artificial insemination in animal husbandry
    - Improve packaging and labeling in order to standardize production and increase access to markets
    - Use pheromone traps to combat major insect pests of key crops such as olives and vineyards and reduce reliance on toxic pesticides
    - Invest in fresh water pisciculture in the Litani and its tributaries as well as Lake Qaroun, especially when the problem of wastewater is treated

- Investment in supporting economic activities:
    - Protect some of the riparian forests and river banks as well as Lake Qaroun after treating the wastewater. This should encourage tourism to the area
    - Encourage investment in the agro-industry especially in dairy manufacturing and processing
    - Encourage women's involvement in transforming agricultural products into food items
    - Encourage eco-tourism especially in the eastern flanks of Mount Lebanon
    - Encourage agro-tourism and wine tourism

The majority of agriculture lands in West Bekaa are owned by individuals (77.5%) who either bought or inherited these lands, whereas public land ownership is negligible. Associations (19.1%) and companies (3.3%) hold sizeable agriculture lands in West Bekaa encourage by the food processing sector which is more active in the Bekaa than other Lebanese regions.

The total area of useful agricultural lands in the West Bekaa is slightly over 16,800 ha (Table 5) used by 4,818 users. It should be noted that a user is defined as an individual owner or an

[88] Darwish, T. Jooma, I. Awad, M. Boumetri, R (2008) Preliminary contamination hazard assessment of land resources in central Bekaa plain of Lebanon. Lebanese Science Journal, Vol. 9, No. 2.

[89] FAO and MoA (2006) الاستراتيجية والسياسة الزراعية.المناطق الزراعية المتجانسة،الدراسات الملخصة.مشروع الاحصائي الشامل

association. The two largest groups of users own lands smaller than 2 ha which reflects one of the major problems of agriculture in Lebanon which is the small areas of land holdings and their fragmentation due to inheritance rights. However, the average of 3.4 ha per user is one of the highest in the country.

Table 5. Land holdings and number of users in West Bekaa[90]

Area holdings in hectares	Number of users
less than 0.5	2,163
0.5 to 2	1,489
2 to 6	626
6 to 10	155
10 to 20	201
20 to 50	130
over 50	54
Total area of agricultural lands – 16,818.4 ha	4,818

The lands of West Bekaa are highly productive and the diversity of its landscape is conducive to a variety of agricultural products divided into three main categories, namely, permanent, seasonal, and protected agriculture.

Production is dominated by olives, vineyards (for table grapes and wine production) and fruit crops in the permanent agriculture category.

Lands devoted to seasonal crops prevail in West Bekaa, most notably in the intensely cultivated level terrain of the Bekaa plain. Rotation of crops is commonly practiced by farmers especially among cereals and tuberous crops such as potatoes. Cereals are the dominant seasonal crop in West Bekaa followed by tubers as a distant second.

The area occupied by protected agriculture grown in greenhouses is still quite limited in West Bekaa as shown in Table 6. The most important category in protected agriculture is that of fruits consumed as vegetables such as tomatoes and cucumbers. With the advancement of hydroponic techniques more greenhouses will spread in the district especially for the growth of leafy vegetables such as lettuce. Protected agriculture is more intensified than open field and as such is more detrimental to the environment; however, because of its reduced spread within the region its impact is definitely more limited.

Table 6. Protected agriculture in the districts of the Bekaa Valley[91]

West Bekaa					
Leguminous crops	**Leafy vegetables**	**Fruits consumed as vegetables**	**Tubers**	**Industrial crops**	**Area of seasonal crops (ha)**
10.8%	6.7%	56.3%	15.7%	10.5%	38.2
Zahle					

[90] MoA (2010) Agricultural Census 2010, website (http://www.agriculture.gov.lb/html/RESULTATS_RECENCEMENT_AGRICULTURE_2010/caza.html).
[91] MoA (2010) Agricultural Census 2010, website (http://www.agriculture.gov.lb/html/RESULTATS_RECENCEMENT_AGRICULTURE_2010/caza.html).

3.8%	39.3%	42.2%	1.8%	12.9%	44.9

Agriculture is still a main activity in West Bekaa and has an important socio-economic impact on the mostly rural population of the district. There are 4,803 known farmers (users of agricultural land) in West Bekaa and these translate into 24,859 family members being involved in agriculture – an average of 5.175 family members for each agricultural user. Family structures still play a role in rural agriculture as family members take part and help out each other in all of the activities needed especially during critical times such as seeding or harvesting. Family labour, be it permanent (5,030) or seasonal (5,970), is still critical in the West Bekaa. However, despite the importance of family labour, hired workers, especially on temporary basis (186,383 man-days) still form the backbone of labour in the agriculture of the West Bekaa.

Like most districts of the country, West Bekaa agriculture suffers from many problems. Until recently, a state extension service was lacking and the private sector was left to provide most of the extension work farmers required. Additionally, the high cost that farmers incur during production is considered a primary hurdle that prevents Lebanese produce from becoming more competitive even at the local market. Many knowledgeable farmers complain that their biggest problem would be their inability to commercialize their products at a fair and reasonable price.

Vineyards

The lands of the West Bekaa are well known for producing top quality wines and wine making is as ancient as history in Lebanon. The Phoenicians which inhabited a region equivalent roughly to modern day Lebanon were one the first civilizations to have a deep influence on wine making[92]. Under the Ottoman rule, winemaking was banned except for religious purposes which permitted the Lebanese tradition of winemaking to survive in Catholic and Greek Orthodox monasteries[93]. During modern times, it was only after the lengthy civil war that forward thinking individuals decided to tap into Lebanon's capacities to produce high quality wine that reflect a unique blend of soil and climate characteristics. In 1991, there were only four wine producers, nowadays there are approximately 40[94]. The taste for Lebanese wine grew in the domestic and export markets and nowadays Lebanon produces around 8 million bottles annually from over 2000 ha of lands with some 40% of production heading towards foreign markets[95].

Lebanon has several *terroirs* or what winemakers refer to as unique lands in which vines grow. The primary wine terroir of Lebanon is the Bekaa valley, which monopolizes 90% of local production, especially in the areas located between the hills of Zahle and the hills of West Bekaa. Batroun is Lebanon's second most important terroir of wine making[96]. The box below lists the most prominent wineries of West Bekaa and Zahle.

WINERIES OF WEST BEKAA AND ZAHLE DISTRICTS

Chateau Ksara: its headquarters are located in the Zahle district but its vineyards are distributed between the West Bekaa (Masoura, Khirbet Kanafar, Tel Dnoub, Tal el Der) and Zahle (Ksara and Taanayel)[97]. It is Lebanon's leading wine producer and together with Chateau Kefraya it controls 66% of Lebanon's wine production[98].

Chateau Kefraya: located in the West Bekaa village of Kefraya. It is Lebanon's second producer of wine and promotes its wine under the title of "Terroir, Soul and a Great Wine". It produces a wide assortment of products of red, white, rosé and sweet wines and arak[99].

[92] Johnson, H (1989) Vintage: The Story of Wine. Simon and Schuster.
[93] Union Vinicole du Liban Website. (http://www.lebanonwines.com/)
[94] Karam, M (2013) Lebanese Wines, an Independent Guide. 292 pp.
[95] Ibid
[96] UNDP (2010) Many Faces of The Lebanese Wine Industry.
[97] Ksara Website. (http://www.ksara.com.lb.)
[98] UNDP (2010) Many Faces of The Lebanese Wine Industry.
[99] Chateau Kefraya website. (http://www.chateaukefraya.com)

Chateau Musar: located in West Bekaa with vineyards in Aammiq, Aana and Kefraya producing red wines and even higher in the mountains of the West Bekaa, Chateau Musar produces white wine from grapes of local varieties (Obaideh and Merwah) suited to colder temperatures. Chateau Musar has produced certified organic wine for over a decade[100].

Clos St. Thomas: located in the Zahle district in Qabb Elias. It is one of the leading wineries of Lebanon[101].

Domaines Wardy: located in the Zahle district, it has three vineyards, two on the western mountains of the district and one in Kfar Zabad on the eastern highlands of the district[102].

Massaya: located in the Zahle district in the village of Taanayel. In addition to wines, Massaya produces arak[103].

Chateau Ka: located in the Zahle district and is part of the large family of Kassatly Chtaura range of products. Many of its vineyards are located within the district of Baalbeck. It is a rapidly growing wine and has captured a fair share of the market in a short period of time[104].

Domaines des Tourelles: located in Chtaura-Zahle district, it is the second oldest winery of Lebanon after Chateau Ksara. The Domaines is making a name for itself with its wines winning several awards in recent years. In addition to wines, the Domaines produce arak and spirits[105].

Chateau Omsiyat: located in West Bekaa between the villages of Kefraya and Mansoura[106].

Chateau Kanafar: located in the village of Khirbet Qanafar in West Bekaa, with vineyards at 1,100 m above sea level[107].

Coteaux du Liban: a small winery in the hills overlooking the city of Zahle[108].

Chateau Heritage: located in Qabb Elias in the Zahle district, the chateau produces several wines some of which have won international awards[109].

The Lebanese wine industry's contribution to the Lebanese economy is still limited as it generates around USD40 million annually. In recent years, there has been a growing trend of consumption of Lebanese wines and the export quantities and value are also on the increase (Figure 5 and 6).

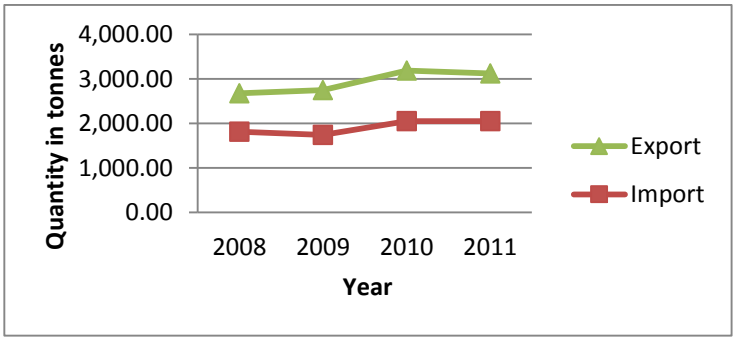

Figure 5. Import and export of wine between the years 2008 and 2011[110]

In 2012, the main export markets were the United Kingdom (30%); France (17%); the United States (13%); Canada (5%) and the United Arab Emirates (5%)[111].

[100] Chateau Musar website. (http://www.chateaumusar.com.lb)
[101] Clos St. Thomas website. (http://www.closstthomas.com/)
[102] Domaines Wardy website. (http://www.domainewardy.com/)
[103] Massaya website. (http://www.massaya.com/)
[104] Kassatly Chtaura website. (http://www.chateauka.com/)
[105] Domaines des Tourelles website. (http://www.domainedestourelles.com/home%20en.htm)
[106] Chateau Omsiyat website. (www.chateauoumsiyat.com)
[107] Chateau Qanafar website. (www.chateauqanafar.com)
[108] Coteaux du Liban website. (www.coteauxduliban.com)
[109] Vin Heritage website. (www.vinheritage.com)
[110] FAOSTAT Website. (http://faostat3.fao.org/faostat-gateway/go/to/home/E)
[111] Karam, M (2013) Lebanese Wines, an Independent Guide. 292 pp

Figure 6. Value of imported and exported wine between the years of 2008 and 2011[112]

The wine industry fuelled an emerging tourism sector of wine and fine cuisine in regions traditionally out of the Lebanese tourist map. The most famous and well established wineries and chateaux organize tours to their domains and receive visitors interested in the history of the domain, its cellars, and finest wine years and bottles. Additionally, some of these chateaux have established restaurant facilities[113].

Lebanese wines are playing an important role that exceeds their contribution to the economy which is that of promoting Lebanon and changing the many stereotypes that still haunt the Lebanese abroad.

The emerging wine industry indicates the importance agriculture can play in the Lebanese economy if managed in a smart and efficient way and it emphasizes the centrality of the Bekaa governorate, especially the districts of Zahle and West Bekaa for Lebanon's production sectors.

Industry

The town of Mansoura has the highest number of registered businesses, 180 businesses out of 207 businesses in all of the West Bekaa[114]. The Qaroun business plan included a survey of 15 factories located in the district. Of these factories, eight are in the food industry, three produce construction material, two produce sponges, and the remaining two produce fertilizer and plastic sheets. There are 6 large scale factories in West Bekaa and all of these factories produce food-related items except one factory which produces sponges. In total, the surveyed factories discharged 550 m^3/day of wastewater. Two arak and wine producers generate 350 m^3/day, which comprises 65% of the total wastewater discharged. The remaining factories all produce less than 100 m^3/day each[115].

3 Zahle District

The Zahle District will serve as the locality for arable lands activities and possibly for forests activities by the project.

3.1 Locality and Administration

Zahle district is located north of West Bekaa, with its capital Zahle-Maallaqa 54 km east of Beirut.

The district is home to 29 municipalities, 12 villages with no municipality and three unions, Zahle Union of Municipalities, Central Bekaa Union of Municipalities and East Zahle Union of Municipalities (Table 7).

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[112] FAOSTAT Website. (http://faostat3.fao.org/faostat-gateway/go/to/home/E)
[113] Union Vinicole du Liban Website. (http://www.lebanonwines.com/)
[114] Localiban Website (http://www.localiban.org/spip.php?rubrique532)
[115] UNDP / MoE (2011) *Business Plan for Combating Pollution of the Qaroun Lake*. Prepared by ELARD

Table 7. Municipalities, Unions, and Villages of Zahle

The Central Bekaa Union of Municipalities	The Zahle Union of Municipalities	The East Zahle Union of Municaplities	Independent Municipalities	Village (no municipality)
Bouarej, Makseh, Mrayjat, Qabb Elias-Wadi Ed Delm	Ablah, Chtaura, Fourzol, Hazerta, Jdita, Niha, Saadnayel, Taalabaya, Zahle-Maallaqa	Aali En Nahri, Ain Kfar Zabad, Deir El Ghazal, Haret El Fikani, Kfar Zabad, Massa, Qoussaya, Raait, Riyaq,Terbol	Aanjar, Barr Elias, Majdel Anjar, Nabi Ayla, Qaa Er Rim, Taanayel	Al Mazraa, Al Nasriye, Chouberkie, Tabel Mandara Delhamie, Haouche El Ghanam, Haouch El Omara, Haouch Kaissar, Ksara, Hochemoche, Mazraat El Ramtanieh, Nasiriyat Rizk, Tall El Akhdar, Tchiflik Kikano, Touaite, Wadi el Arayeche, Zebdol

3.2 Physical Characteristics

The district of Zahle of the Bekaa Governorate covers a surface area of nearly 418 km^2. It is locked between Lebanon's two mountain ranges: Mount Lebanon and the Anti-Lebanon. The western part of the district is composed by the eastern flanks of Knaisse and Sannine Mountain peaks at an altitude nearing 2,000 m above sea level. From the high mountains, the land descends into the Bekaa plain, to an average elevation of 850-950 m where the prominent land feature is its agglomeration of most of its economic and urban centres. The eastern part of the district is formed by the Anti-Lebanon mountain range bordering Syria and which rise to 1,100-1,450 m above sea level[116].

Administratively the Zahle district is bordered to its north by the governorate of Baalbek-Hermel, to its west by the governorate of Mount Lebanon, to its south by the West Bekaa district and to its east by Syria.

The district receives on average between 500 mm of rain in its eastern parts and up to 1000 mm and above it its western highlands which remain covered with snow for up to 5 months of the year[117].

The soils of Zahle are dominated by two types[118]:

- Eutric Cambisols: this soil type dominates the plain region of the district and is considered highly productive which explains the dominance of field crops and the rotation of major agriculture crops such as wheat, potatoes, beetroot, and vegetables among others.
- Lithic leptosols: this soil type dominates the highlands of the district. It is generally poor, shallow and prone to erosion. Intensive agriculture cannot be established on such soils more suited to orchards which tend to stabilize the soil over time especially if soil disturbance is avoided by the adoption of conservative measures like conservation agriculture. Such soils are largely the domain of grasslands, rangelands and woodlands.

The land capability map produced in 2005 classified Lebanese territories into four classes from the least problematic *class I* with regards to erosion, fertility and plant selection and suitability to agriculture to the *class IV* characterized by severe limitations requiring significant management and care to avoid erosion and loss of the poor soil layer. Ironically, the lands of the Zahle district are

[116] Localiban website (http://www.localiban.org/spip.php?rubrique247)
[117] APIPNM website (http://www.apipnm.org/swlwpnr/reports/y_nr/z_lb/lbmp131.htm)
[118] Darwish, T (1999) Mapping of natural resources using remote sensing for soil studies. National Forum on support of remote sensing techniques to planning and decision-making process for sustainable development. CTM, ERS/RAC, UNEP and CNRS/NCRS. Beirut. 14/10/99:36-41

classified as belonging to class I and class IV with the latter dominating the mountains indicating the suitability of these areas to reforestation and its extreme challenge to agriculture[119].

The National Physical Master Plan of the Lebanese territories classified a significant percentage of the Zahle district lands as prone to landslides, mostly in the hilly and mountainous zones[120].

The district of Zahle is strategically located between the Lebanese coastal region and the Lebanese interior but most importantly it is the primary gateway of Lebanon to the Arab World. As such, its economy is influential at the national level and is the most developed part of the Bekaa concentrating a great deal of its service industries such as schools, universities, hospitals and hotels[121]. Additionally, the district is home to many of the Litani's tributaries, most prominently the Anjar, Berdawni, Chamsine, Chtoura, Qabb Elias and Jdita rivers and springs. Therefore, the district plays a major role in the water flow within the Upper Litani River Basin[122].

3.3 Demographic aspects

The district of Zahle has 102 schools, 52 of them public and 50 private. There are about 22,346 students in private schools and 13,078 in public schools. The municipality of Zahle-Maallaqa hosts the highest number of schools, 26 (13 public and 13 private) that cater to about 9,500 children. There is only one public hospital located in Zahle – Maallaqa, in addition to 6 private hospitals in the same town. There are four other private hospitals in different towns within the district[123]. The poverty rate of Zahle is 22%; 6% less than the national poverty rate of 28%[124].

During the past three years of the Syrian civil war, Zahle became host to the largest number of refugees in the Bekaa, with 140,151 registered refugees in 29,081 households, many of whom live in informal tented settlements on rented agricultural land[125].

3.4 Biodiversity and ecosystem values

The area most recognized for its biodiversity in Zahle is Hima Anjar-Kfar Zabad, a designated IBA as well as a Hima (protected area) by the municipalities of Anjar and Kfar Zabad. It occupies an area of 326 ha.

At least 15 breeding pairs of the globally threatened Syrian Serins (*Serinus syriacus*) were recorded at the site in the spring of 2005. The area is also the site of Lebanon's second only record of Bearded Tit. The number of bird species observed at Anjar-Kfar Zabad is more than 138. Other resident wildlife includes the Common Otter (*Lutra lutra*) and the Wild Cat (*Felis sylvestris*).

In Kfar Zabad, publicly owned wetlands, the last remaining in the Bekaa valley, depend on two main springs: Ma'asaya & Shamsein. The springs later combine as the Ghzayil River, one of the tributaries of Litani River, and provide drinking water to over 30 surrounding villages.

The main threats to the site are: hunting, disturbance of birds, water abstraction, diversion of water/canalization, irrigation, agricultural intensification and grazing.

Protection measures currently adopted by the municipalities include a hunting ban, access restriction and habitat creation / restoration[126].

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[119] Darwish, T. Jooma, I. Awad, M. Abou Daher, M. and Msann, J (2005) Inventory and management of Lebanese soils integrating the soil geographical database of Euro- Mediterranean countries. Lebanese Science Journal, Vol. 6, No.2
[120] Counsel for Development and Reconstruction (2005) Schéma Directeur d'Aménagement du Territoir Libanais
[121] Localiban website (http://www.localiban.org/spip.php?rubrique247)
[122] UNDP / MOE (2011) Business Plan for Combating Pollution of the Qaroun Lake, prepared by ELARD
[123]Localiban Website - http://www.localiban.org/spip.php?rubrique534
[124] Laithy, H., Abu Ismail, K. and Hamdan, K. (2008) *Poverty, Growth and Income Distribution in Lebanon*. Published by International Poverty Center: Country Study No. 13
[125] UNHCR Website (http://data.unhcr.org/syrianrefugees/region.php?id=90&country=122)

3.5 Land use and production

Forests

Of all the districts within the Qaroun Catchment, Zahle is the least forested. The high population density, the dominance of agriculture and the geographic location of the district as the entry gate to the Arab world favoured other land uses than that of forests and woodlands. Nowadays, forests and OWL are found mostly in scattered pockets within the district mostly in:

- The southern eastern corner of the district between the villages of Masnaa, Anjar and the border with Syria.
- The eastern highlands of the villages of Ain Kfarzabad and Koussaya
- The western highlands of the villages of Qaa el Rim and Hazerta

The forests and OWL are mostly confined to two vegetation zones out of the 10 identified in Lebanon. These two zones are typical of the Mediterranean and are known as[127]:

- Eumediterranean: situated at an elevation of 500 to 1000 m above sea level, and dominated by oak species, mostly of *Quercus calliprinos* (Palestine oak) and *Quercus infectoria* (Aleppo oak) with lesser occurrence of maple species such as *Acer syriacum* (Syrian maple), and *Arbutus andrachne* (strawberry tree) among other species.
- Supramediterranean: situated at an elevation of 1000 to 1500 m above sea level, also dominated by oak species: *Q. calliprinos*, *Q. infectoria* and *Q. cerris* (Turkey oak) and with the presence of *Acer tauricolum* (Taurus maple) and *Prunus ursina* (bear's plum) among other species.

Like all over Lebanon many afforestation and reforestation projects were conducted within the district of Zahle. The National Reforestation Plan conducted by the MoE reforested in 2003-2004 two sites in the villages of Qaa El Rim and Jdita[128]. The most significant reforestation projects conducted in the district of Zahle result from the work of LRI who planted 50.91 and 27.76 ha of mixed species in Anjar in Kfar Zabad respectively[129].

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[126] Society for the Protection of Nature Website - http://www.spnl.org
[127] Abi-Saleh, B. and S. Safi (1988) Carte de la Végétation du Liban. Ecologia Mediterranea XIV (1/2)
[128] MoE website. (www.moe.gov.lb)
[129] LRI website. (http://lri-lb.org/#home)

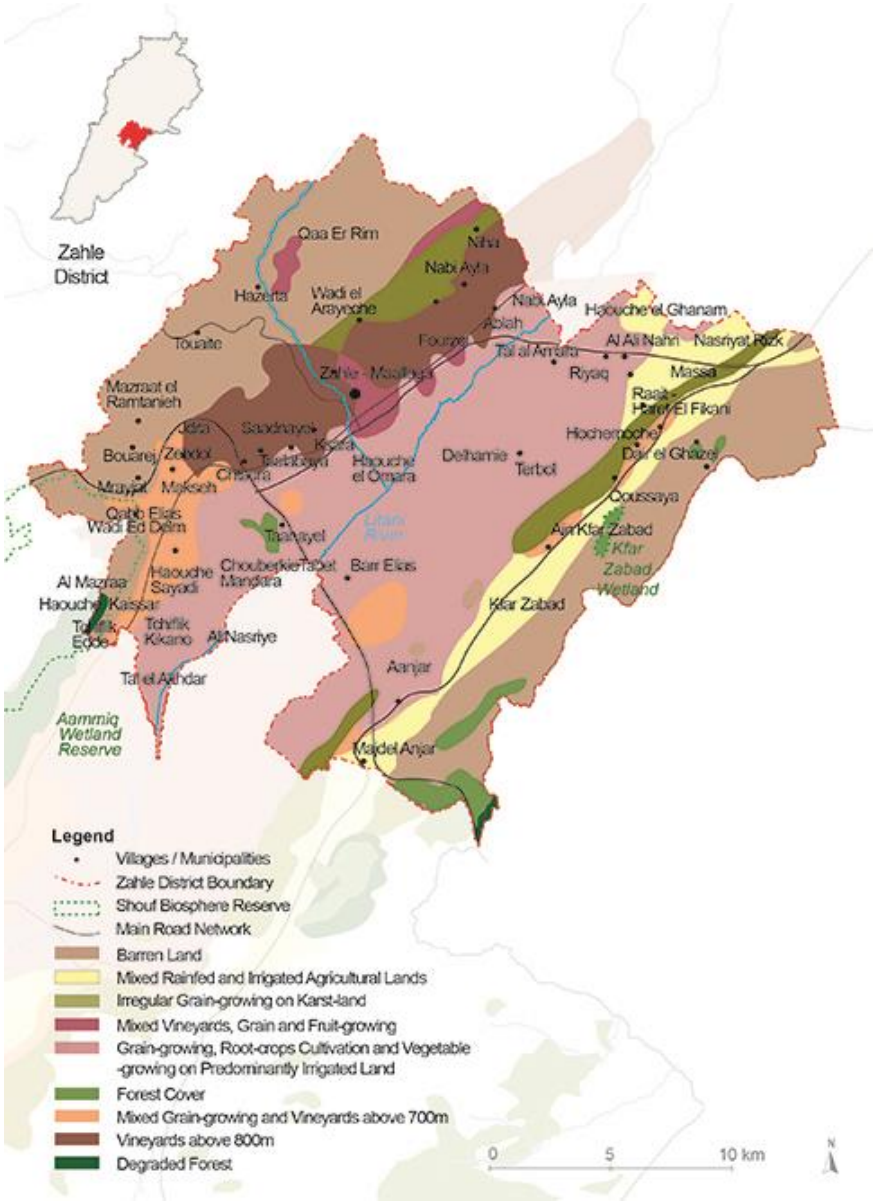

Figure 7. Zahle District Land Use

Due to their limited size and degraded state, the forests and OWL of Zahle offer limited functions and services:

- Soil and water conservation: One of the most important functions of Lebanon's forests is their protection of soil and water resources[130]. The surviving forests within the Berdawni River valley towards the villages of Qaa el Rim and Wadi el Aarayich help to maintain the soils and the water quality within the watershed.
- Grazing: As many of the district's forests are more appropriately OWL, grazing is an important service that these woodlands provide.
- Recreation and eco-tourism: forests are not influential in the recreation and eco-tourism sector of the Zahle district. Some efforts to promote eco-tourism were conducted by SPNL in the Kfar Zabad region with the small wetland found there as the main point of attraction[131]. The reforestation conducted by LRI in that village aims to increase the village's attractiveness and complements the work done by SPNL.

[130] Sattout, E., Talhouk, S., Kabbani, N (2005) Lebanon Case Study, in Valuing Mediterranean Forests Towards Total Economic Value. Editors Maurizio Merlo *and* Lelia Croitoru. CABI Publishing. 414 pp, 161-175

[131] SPNL website. (www.spnl.org)

Rangelands

With just a third of its lands considered as rangelands, Zahle is the district with the lowest percentage of this land use within the Qaroun Watershed.

Small ruminants such as sheep and goats comprise almost all of the grazing animals within the district. However, its number of cattle is the highest among all the districts of the Bekaa Governorate.

The number of farm and grazing animals within the district has been somewhat stable over the years in comparison to Rachaya and West Bekaa (Figure 8)[132]. Again, unlike Rachaya and the West Bekaa, goats do not constitute the largest flocks of animals, but sheep do, probably because of its geographical proximity to the northern and drier parts of the Bekaa Valley where sheep dominate.

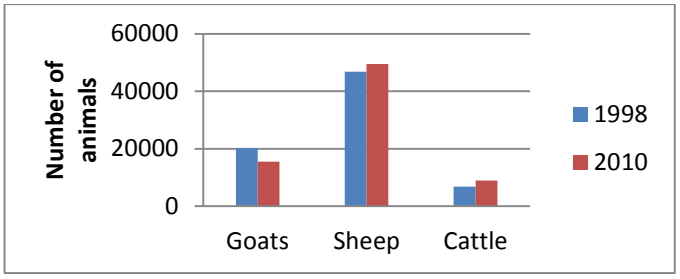

Figure 8. Change in number of animals between 1998 and 2010 in Zahle District

The estimated carrying capacity of rangelands in Lebanon is less than two heads/ha and this is exceeded in Zahle District. There are just over 15,235 ha of rangelands and forests in the District, and 69,675 heads of sheep and goats making a stocking density of 4.573/ha. However, given the District's large agricultural area, it is certain that agricultural lands are supplementing these flocks with an important percentage of their diet.

The pastures of Zahle provide the major sheep and goat varieties with a fair percentage of their dietary requirements as presented in Table 8 which also gives the more suited habitats for these breeds within the district.

Table 8. Major grazing breeds of Lebanon and suitability of the Zahle District for their rearing[133]

BREED	DIETARY NEEDS PROVIDED BY RANGELANDS AND WOODLANDS	MAJOR HABITAT CHARACTERISTICS	SIMILAR AREAS WITHIN ZAHLE
Sheep Awassi	Up to 70% of their diet	Coastal plains and mountain foothills. Bekaa valley in areas with 300 to 700 mm of rain and altitude of 800-1000 m. Cold winters (down to -15°C) and hot summers (up to 45°C)	Most of foothills of the eastern highlands from the southern part of the district to its northern borders with the Baalbeck district
Goats Baladi	Up to 80% of their diet	Mountains from 800-1,600 m in altitude with a minimum of 300 mm of rain. Cold winters with snow cover.	Mostly in the western highlands bordering Mount Lebanon.
Goats Shami	Around 50% of their	Coastal region up to 700 m in elevation in	Most of the district is higher in

[132] MoA. Agricultural Census of 1998 and 2010

[133] Khazaal, K. (2005) Small Ruminants Breeds of Lebanon. (L. INIGUEZ editor). Characterization of small ruminant breeds in West Asia and North Africa, Volume 1: West Asia. ICARDA, Aleppo, Syria, pp. 155-181. *(With Adaptation)*

	diet	mixed farming systems or rainfed mountain foothills. Over 600 mm of rain.	altitude than is required by the breed
Goats crosses	Around 90% of their diet	Dry steppes with less than 300 mm of rain. Cold winter (down to -10°C) and hot summers (above 35°C)	Can be encountered in various parts of the district, but best towards the drier northeastern parts.

Meat and Milk production

The meat and milk production estimates for the Zahle District show that Zahle leads among the three districts in terms of milk production, and is second in meat production. The value of these two sectors is estimated in the table below which clearly demonstrates the superiority of the revenues generated by the milk sector.

Table 9. Estimated economic value (in USD) of meat and milk production in Zahle

SPECIES	MILK PRODUCTION TONNES	UNIT PRICE USD/L	TOTAL VALUE	MEAT PRODUCTION TONNES	UNIT PRICE USD/KG	TOTAL VALUE
Sheep	3,400.734	0.575	1,955,422.05	846.627	3.42	2,895,464.34
Goat	1,817.43	0.62	1,126,806.6	274.356	2.97	814,837.32
Cattle	24,263.8	0.57	13,830,366	1,135.039	3.05	3,461,868.95
Total value of milk			**16,912,594.65**	**Total value of meat**		**7,172,170.61**

Agriculture

Agriculture is a main land use in Zahle District and this reflects the favourable conditions. The district has a favourable climate with a long growing season and deep rich soils within the central Bekaa plain. The soils of the plain are cropped with a wide assortment of field crops whereas its eastern and western highlands are cultivated with fruit crops, olives and vineyards. Additionally, many agricultural industries are concentrated within the district leveraging the area's position with respect to other districts of the Bekaa.

Water resources are plentiful including[134]:

- Litani River: the river crosses the Zahle district from its northern parts to its southern ends before entering to the West Bekaa District
- Litani tributaries: the district is crisscrossed with several of the Litani's main tributaries which include:
    - El Berdawni which flows from the western highlands of the district and cuts through the heavily urbanized Zahle city and its suburbs
    - Aanjar Spring which flows from the eastern highlands and then goes into the agricultural lands of the West Bekaa before flowing into the Litani
    - Chamsine which flows from the eastern highlands then joins the Aanjar spring forming the Ghzayel River, a major tributary of the Litani
    - Chtaura which flows from the Western highlands and then joins the Litani
    - Jdita which flows from the edge of the western highlands and runs for 31 km before discharging into the Litani River. However, the water flow of this resource is quite low.
- Underground water resources: the water table is close to the surface making its extraction much easier than in other parts of the Bekaa.

[134] UNDP / MOE (2011), Business Plan for Combating Pollution of the Qaroun Lake, prepared by ELARD

According to FAO, the district has valuable expertise in agricultural industries, in wine and arak making, in growing major field crops especially potatoes and wheat, and in modern cattle and poultry farming[135]. However, FAO continues that the agricultural roads network is often too narrow and in bad state and this slows and hampers access to and from agricultural fields; lack of proper sewage treatment is polluting surface waters which in turn affects the quality of crops and there is misuse of agricultural chemicals causing pollution of both surface and underground water resources[136].

The incursion of urban development onto agricultural land is a serious threat to agriculture notably in the highly urbanized Zahle district and if land zoning does not restrict development in prime agricultural lands, the value of the central Bekaa plain would be irreversibly lost[137].

The MoA in its work on the various agricultural regions of the country believes that the Zahle district could be developed sustainably with focus on the following[138]:

- Investment in infrastructure:
    - Establish irrigation canals for the Berdawni and Jdita springs
    - Enhance the agricultural and side roads network
    - Clean the Litani River bank and major tributaries to prevent flooding and damage to agricultural lands and enhance irrigation water quality
    - Collect rain water through the establishment of barrages and hill lakes which reduce the stress on groundwater resources

- Investment in agriculture:
    - Renew old orchards with new and more marketable varieties such as apples in the Anjar region and vineyards in and around Zahle and encourage the use of varieties amenable to longer storage periods.
    - Improve packaging and labeling in order to standardize production and increase access to markets
    - Use pheromone traps to combat major insect pests of key crops such as vineyards, cherries and others and reduce chemical inputs
    - Investigate the potential of new crops in the region such as kiwi and pistachio

- Investment in supporting economic activities:
    - Encourage investment in the agro-industry especially in dairy manufacturing and processing
    - Centralize the agricultural wholesale market and create new high tech packaging and storage centres
    - Invest in olive oil presses that operate according to high standards and have little impact on water pollution
    - Establish an slaughter house in Zahle with high standards of operation
    - Encourage eco-tourism and agro-tourism

According to the MoA census[139], the majority of agriculture lands in the Zahle district are owned by individuals (89.2%) who either bought or inherited these lands; associations formed by groups of farmers or investors hold a sizeable portion (10.6%) of agriculture lands; whereas public land ownership is negligible.

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[135] FAO and MoA (2006) الاستراتيجية والسياسة الزراعية.المناطق الزراعية المتجانسة،الدراسات الملخصة.مشروع الاحصائي الشامل
[136] UNDP / MOE (2011) Business Plan for Combating Pollution of the Qaroun Lake, prepared by ELARD
[137] Commission for Development and Reconstruction. 2005. Schéma Directeur d'Aménagement du Territoir Libanais
[138] FAO and MoA (2006) الاستراتيجية والسياسة الزراعية.المناطق الزراعية المتجانسة،الدراسات الملخصة.مشروع الاحصائي الشامل
[139] MoA (2010) Agriculutral Census 2010, website (http://www.agriculture.gov.lb/html/RESULTATS_RECENCEMENT_AGRICULTURE_2010/caza.html)

The total area of useful agricultural lands (including land that is fallow or has agricultural potential) in the Zahle district is slightly above 18,925 ha (Table 10) and is used by 4,575 farmers. The two largest groups of users own lands smaller than 2 ha which reflects one of the major problems of agriculture in Lebanon already mentioned above for West Bekaa.

Table 10. Land holdings and number of users in the Zahle District[140]

LAND HOLDING SIZE (HA)	NUMBER OF FARMERS
less than 0.5	1,504
0.5 to 2	1,497
2 to 6	922
6 to 10	258
10 to 20	220
20 to 50	112
over 50	62
Total area of agricultural lands - 18925.8 ha	**4,575**

The lands of the Zahle District are highly productive and the diversity of its landscape is conducive to a variety of agricultural products divided into three main categories:

- permanent
- seasonal
- protected agriculture

Permanent agriculture includes all sort of fruit orchards, vineyards, olives and other crops that are cropped on the same lands. Within the district of Zahle, stone fruits (*e.g.* cherries, plums, apricots, peaches, nectarines) occupy the largest percentage of permanent agricultural lands followed by vineyards which fuel the nascent wine industry and which have made Zahle well-known for its wine and arak, in a similar way to West Bekaa. Fruit is competitively priced and is also attractive because it allows the use of more marginal lands, reducing its ecological footprint.

The central Bekaa has been cultivated with seasonal crops since ancient times and nowadays it is still dominated by this type of agriculture. Cereal crops such as wheat as well as tubers such as potatoes occupy an important part of the yearly calendar of many farmers within the Zahle plains. A breakdown of these crops shows the prevalence of cereals and leguminous crops followed by major vegetables and tubers which include the all-important potatoes. Leafy vegetables and vegetables in general are found to be more polluting than other seasonal crops.[141]

The area occupied by protected agriculture in greenhouses is still quite limited in the Zahle District. The most important category in protected agriculture is that of the fruits consumed as vegetables such as tomatoes and cucumbers. Protected agriculture is more intensive than open field and as such could be more detrimental to the environment, however, because of its limited spread within the region its overall impact is definitely more limited.

The animal production sector in the Zahle District centres on grazing animals such as cattle and goats. Table 11 presents the main mammals raised within the district. Cattle rearing is an important sector that powers the dairy industry within the region *e.g.* Chtaura and Taanyal farms. The MoA worked to foster the growth of this sector with the help of the FAO and UNDP by providing support

[140] Ibid
[141] Darwish, T. Jooma, I. Awad, M. Boumetri, R (2008) Preliminary contamination hazard assessment of land resources in central Bekaa plain of Lebanon. Lebanese Science Journal, Vol. 9, No. 2.

to small farmers[142]. Sheep and goats are mainly used for the production of milk with meat production coming in only as a second priority (refer to the rangelands section).

Table 11. Main farm mammals raised within the district of Zahle[143]

	CATTLE	SHEEP	GOATS	PIGS
Stock units	8,916	49,520	20,155	671
Number of owners	338	413	279	6

Agriculture is still a key economic activity within Zahle district with important socio-economic impact especially in the more rural parts of the district outside the main urbanized centre of Zahle and neighbouring towns. Families still play a vital role in rural agriculture as family members take part and help out each other especially during critical times such as seeding or harvesting. There are an estimated 5,116 permanent family workers in Zahle District, and 3,321 occasional family workers. This compares with 4,396 hired permanent workers while occasional hired workers provide 384,450 man days of labour. The 4,575 farmers and other agricultural land users support 21,893 family members, an average of 4.78 family members for each agricultural user[144].

As in most districts in the country, Zahle agriculture suffers from many problems. The high cost of production is considered a primary hurdle that prevents Lebanese produces from becoming more competitive even at the local market. Perhaps interlinked with this problem is the lack of an extension service which affects production costs and increases the ecological footprint of agriculture making local produce less competitive and less appealing in foreign markets such as the EU.

Industry

Zahlé District has the highest number of industries in the Bekaa Valley. There are an estimated 723 businesses and factories all over Zahle and most towns in the District have between two and 50, with the highest number, 322 businesses, located in Zahle-Maallaqa[145].

The Business Plan[146] surveyed 111 industries in this district and the result of the survey showed that 63 industries specialized in food related-products and 25 factories produced construction-related materials. The remaining factories specialized in various products such as agricultural machinery, paper and detergents. Of the surveyed industries, 24 were considered large scale and 12 of these were food-related while six produced construction-related material, four made plastic products, one produced sanitary paper and one company produced recycled board. The industrial sector of Zahle generates about 7,998 m^3/day of wastewater and more than half of this amount is produced by just eight of the 111 factories surveyed. The highest discharge, 1,200 m^3/day, comes from the recycled board factory. This is followed by 750 m^3/day from a producer of wine, concentrated syrups, and fruit, and 500 m^3/day from a factory that produces sanitary paper.

Unlike the other districts in the Bekaa that resort to open dumping, Zahle has a landfill that serves 15 towns within the district. In addition, Zahlé also has a health waste management treatment unit operated by Arc-en-Ciel which treats about 332 kg of waste per day[147].

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[142] Lebanon Knowledge Development Gateway website. (http://lkdg.org/node/5100)
[143] MoA (2010) Agriculutral Census 2010, website (http://www.agriculture.gov.lb/html/RESULTATS_RECENCEMENT_AGRICULTURE_2010/caza.html)
[144] Ibid
[145] Localiban Website (http://www.localiban.org/spip.php?rubrique532)
[146] UNDP / MOE (2011) Business Plan for Combating Pollution of the Qaroun Lake, prepared by ELARD
[147] UNDP / MOE (2011) Business Plan for Combating Pollution of the Qaroun Lake, prepared by ELARD

4 Rachaya District

The Rachaya District will serve as the locality for land use planning, rangelands and pasture as well as forests activities for the project.

4.1 Locality and administration

Rachaya is located in the southeast of the Bekaa Valley with its capital, Rachaya Town, located about 100 km southeast of Beirut at an elevation of 1,250 m above sea level.

There are 25 municipalities in this district and all but three are organized into two unions, the Union of Municipalities of Jabal Al Sheikh and the Union of Municipalities of Independence Citadel. These Unions were established in 2012. For political reasons, the municipality of Yanta opted not to join either of the two unions. There are also thre villages without municipality or where the status is still in dispute. Table 12 below lists the municipalities and corresponding unions.

Table 12. Municipalities of Rachaya

Union of Municipalities of Jabal Al Sheikh	Union of Municipalities of Independence Citadel	Independent Municipalities	Villages without municipality or areas under litigation
Aaqabet, Aayha, Ain Aata, Ain Horcheh, Bakkifa, Beit Lahia, Dahr El Ahmar, Haouch El Qinnaabeh, Kaoukaba Bou Aarab, Kfar Qouq, Majdel Balhis, Rachaya, Tannoura	Ain Aarab, Bakka, Bireh, Deir El Aachayer, Heloueh, Kfar Denis, Khirbet Rouha, Mdoukha, Mhaiydtheh, Rafid	Aita el Foukhar, Kfar Mechki, Yanta	Mazrat Deir el Aachayer, Mazret al Chmis, Nabi Safa

4.2 Physical Characteristics

The district of Rachaya of the Bekaa Governorate covers around 5.2% of Lebanon's total area, i.e., 545 km^2 [148]. Pastures, rangelands or barren lands make up the majority of the Rachaya District which is home to Lebanon's second highest peak Mount Hermon/Jabal Ec Cheikh at 2,800 m above sea level. As a result, a large percentage of the district is above the dense tree line situated at around 1,800 to 2,000 m. The lands of the district are mostly mountainous with some flat plains that form an extension of the Bekaa plain between the villages of Bireh, Mhaidseh, Rafid and Khirbet Rouha. The plain found between the villages of Aiha and Kfarkouk is cultivated with wheat and other agricultural crops irrigated by the many springs found within it. These springs flood the plain on exceptionally wet years transforming it into a wetland[149].

Administratively the Rachaya District is bordered by the District of Zahle in the north, the District of West Bekaa in the west and northwest, the Governorate of Nabatiyeh in the south and Syria in the east.

The annual rainfall in the district averages from 500 mm in northeastern parts to above 1,000 mm in the highlands of Mount Hermon which is snow covered for over 6 months of the year[150].

The soils of Rachaya are composed of three main types[151]:

[148] Localiban website (http://www.localiban.org/spip.php?rubrique249)
[149] FAO (2012) Country Study on Status of Land Tenure, Planning and Management in Oriental Near East Countries, Lebanon case.
[150] APIPNM website (http://www.apipnm.org/swlwpnr/reports/y_nr/z_lb/lbmp131.htm)
[151] Darwish, T. Jooma, I. Awad, M. Abou Daher, M. and Msann, J (2005) Inventory and management of Lebanese soils integrating the soil geographical database of Euro- Mediterranean countries. Lebanese Science Journal, Vol. 6, No.2

- Eutric Cambisols: this soil type dominates the plain region of the district and is considered highly productive which explains the dominance of field crops and the rotation of major agriculture crops such as wheat, potatoes, beetroot, and vegetables among others.
- Lithic leptosols: this soil type dominates the highlands of the district. It is generally poor, shallow and prone to erosion. Intensive agriculture cannot be established on such soils which are more suited to orchards which tend to stabilize the soil over time especially if soil disturbance is avoided by the adoption of conservation agriculture. Such soils are largely the domain of grasslands, rangelands and woodlands.
- Terric Anthrosols: which include soils that have been formed or profoundly modified through long-term human activities, such as through the addition of organic materials or household wastes, irrigation or cultivation[152]. They are suitable for orchard cultivation.

As already noted above, the 2005 Land Capability map classified Lebanese territories into four classes from the least problematic *class I* with low erosion, high fertility suitable for agriculture to the *class IV* characterized by severe limitations. Some of the lands of Rachaya are classified as belonging to class I but the majority belong to classes III and IV. Class III lands are rocky, have poor soils and are not suitable for agriculture unless reclamation works remove large boulders and terrace and level the landscape thereby creating favourable conditions to orchard cultivation[153].

The National Physical Master Plan classified a significant percentage of the Rachaya lands, mostly in the hilly and mountainous zones, as prone to landslides. Additionally, the plan classified the southeastern parts of the District at the foothills and highlands of Mount Hermon along with vast parts of the Hasbaya District as one of the three Lebanese regions of special cultural identities[154].

4.3 Demographic aspects

The total population in Rachaya District is 73,000, with 7,500 residing in the capital in winter, increasing to about 10,000 in summer. A survey conducted in 2002 designated Rachaya as one of nine poverty prone areas within Lebanon[155]. As already noted above, the combined poverty rate of Rachaya and West Bekaa is 29%[156].

There are 27 schools in Rachaya District, 20 public and 7 private that host about 6,000 students. Dahr El Ahmar and Rachaya have the highest number of schools, five (one public, four private) and four (three public, one private), respectively. There are two governmental hospitals in the municipality of Rachaya[157].

4.4 Land use and production

Forests

The natural green cover of Rachaya is composed of forests and other wooded lands (OWL) which are low density and often degraded forests. Unlike the West Bekaa, the forests of Rachaya do not form a continuum but exist in isolated pockets. Two main regions of the district have important forest and OWL cover:

- Northeastern parts of the district between the Syrian border and the villages of Haloua, Bakka, Deir el Aachayer, Mazraat Deir el Aachayer, Kfarkouk and Yanta. The forests

[152] FAO (2001) Lecture notes on the major soils of the World. 340 pages.
[153] Darwish, T. Jooma, I. Awad, M. Abou Daher, M. and Msann, J (2005) Inventory and management of Lebanese soils integrating the soil geographical database of Euro- Mediterranean countries. Lebanese Science Journal, Vol. 6, No.2
[154] Counsel for Development and Reconstruction (2005) Schéma Directeur d'Aménagement du Territoir Libanais
[155] YMCA Lebanon (2005) *Environmental Impact Assessment Report: Wastewater treatment plant in Rashaya*. Prepared by CEE
[156] Laithy, H., Abu Ismail, K. and Hamdan, K (2008) *Poverty, Growth and Income Distribution in Lebanon*. Published by International Poverty Center: Country Study No. 13
[157] Localiban Website http://www.localiban.org/spip.php?rubrique533

confined within this area are typical high mountain forests of the eastern part of Lebanon, at this elevation (between 1300 m and 1700 m above sea level).

- Southeastern parts of the district between the villages of Ain Hircha, Ain Aata and Mazraat Jaafar. These villages are mostly confined between the elevations of 900 m to 1300 m above sea level. Planted pine forests of the productive *Pinus pinea* make up a seizable percentage of the forests of Ain Hircha and Ain Aata.

Between these two forests zones there are scattered areas of forests and OWL of limited area and mostly in an advanced state of degradation.

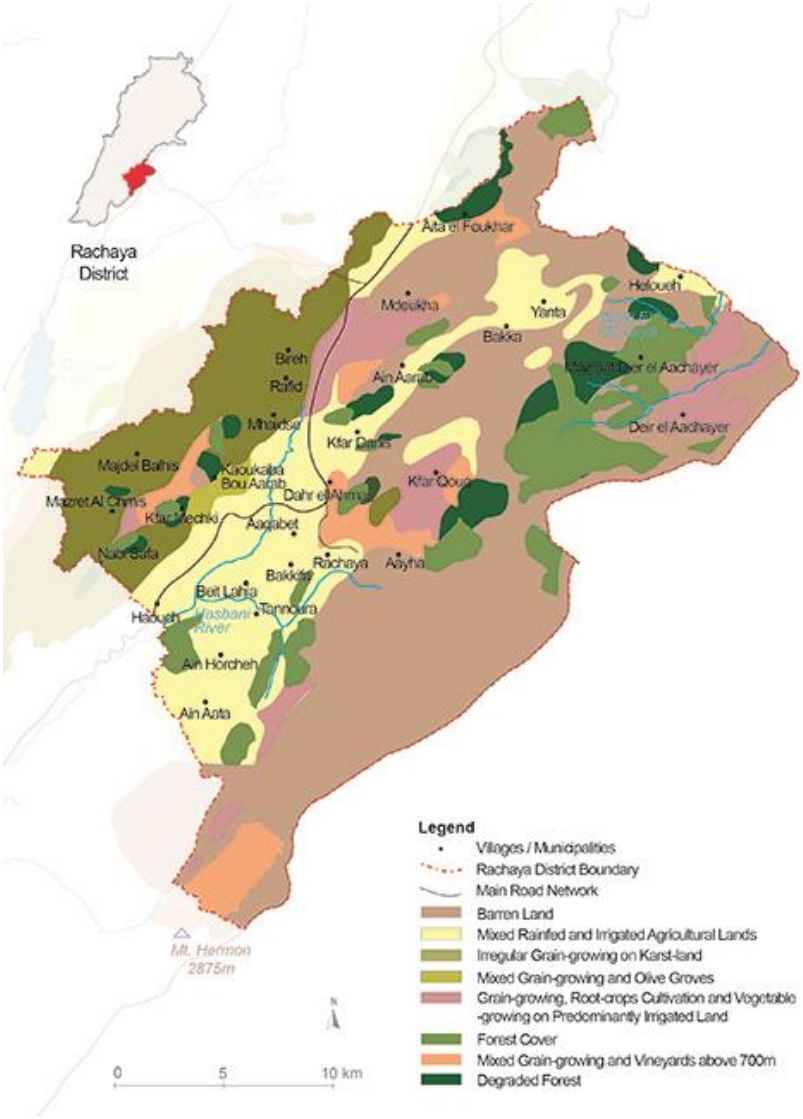

Figure 9. Rachaya District Land Use

Owing to its high altitudinal range, the district of Rachaya has several bioclimatic or vegetation zones of the typical Mediterranean types, including[158]:

- Eumediterreanan: situated at an elevation of 500 to 1,000 m above sea level, this area is dominated by its oak species, mostly of *Quercus calliprinos* (Palestine oak) and *Quercus*

[158] Abi-Saleh, B. and S. Safi (1988) Carte de la Végétation du Liban. Ecologia Mediterranea XIV (1/2)

infectoria (Aleppo oak) with lesser occurrence of maple species such as *Acer syriacum* (Syrian maple), and *Arbutus andrachne* (strawberry tree) among other species.

- Supramediterranean: situated at an elevation of 1,000 to 1,500 m above sea level, this area is dominated by oak species: *Q. calliprinos*, *Q. infectoria* and *Q. cerris* (Turkey oak), with the presence of *Acer tauricolum* (Taurus maple) and *Prunus ursina* (bear's plum) among other species.
- Montane (mountainous) Mediterranean: sitatuated at an elevation of 1,500 and 2,000 m above sea level, this area is dominated by oak species most notably *Q. calliprinos* and *Q. brantii*. Additionally, *Crataegus* spp., *Acer* spp. and *Juniperus excelsa* are also encountered.
- Oromediterranean: this region contains lands beyond the 2,000 m altitude and is characterized by low density forests of *Juniperus excelsa*, grasslands and barren lands. Alpine and endemic species are found within the region. A notable example is *Ferula hermonis* which is endemic to the highlands of Mount Hermon and has been extensively used and promoted as an aphrodisiac.

Afforestation and reforestation campaigns were conducted in the Rachaya district and are still being conducted to this day with varying degree of success. One of the most prominent afforestation events was conducted last century with the green plan in the village of Rachaya el Wadi aiming to create a large mixed artificial forest. This man-made forest covers some 70 ha and is composed mainly of pine and cedar.

Under the framework of the National Reforestation Plan spearheaded by the MoE three main sites were planted in the district of Rachaya in the villages of Bireh, Kfarkouk and Rachaya el Wadi with 5 ha being planted in each site[159]. The success of the reforestation campaigns conducted under the framework of the NRP is being assessed to determine the validity of the modalities used.

The Lebanon Reforestation Initiative (LRI) with the AFDC planted arguably one of Lebanon's largest single site reforestation campaigns in recent history in the town of Rachaya el Wadi over a surface area of 93 ha. The site was planted with a mixture of pine, cedar, local maple species, wild almond and oak species among others. A good survival rate has been recorded among the various species noting that wild almonds showed an impressive ability to grow fast with little maintenance and supplemental irrigation[160].

Among the salient services provided by the Rachaya forests are the following:

- Soil and water conservation: One of the most important functions of Lebanon's forests is their protection of soil and water resources. The forests of Rachaya consist mostly of dispersed blocks and their collective impact is rather difficult to assess. However, given the district's high elevation and the dominance of poorer soil types gives more value to preserving what little forests remain and enhancing their degraded state.
- Grazing: As many of the district's forests are more appropriately OWL, grazing is an important service that these woodlands provide. The combination of vast expansive grasslands and open forests encourage unmanaged grazing within the district with all of the accompanying impacts[161].
- Carbon sequestration: forests are a primary Carbon sink helping to regulate and balance CO_2 in the atmosphere. A common fact of many of Lebanon's forests, and this is certainly true of the oak dominated forests of the Rachaya district, is their rather low Carbon stock explained by the degraded state of many forests and the dominance of younger trees as a result of the repeated cutting of broadleaf forests and frequent grazing[162].
- Production of non-wood forest products: oak forests provide a variety of products beyond wood and charcoal. In right condition, oak forests favour the production of oak honey which is highly prized among the Lebanese, in addition, the forest and woodlands are home to a

[159] MoE website. (www.moe.gov.lb)
[160] LRI website. (http://lri-lb.org/#home)
[161] Sattout, E., Talhouk, S., Kabbani, N (2005) Lebanon Case Study, in Valuing Mediterranean Forests Towards Total Economic Value. Editors Maurizio Merlo *and* Lelia Croitoru. CABI Publishing. 414 pp, 161-175
[162] FAO and MoA (2005) National Forest and Tree Assessment Inventory, Data Analysis Report

large variety of edible, aromatic and medicinal plants used by many locals[163] to supplement their diets and improve their health.

- Recreation and eco-tourism: forests are not influential in the recreation and eco-tourism sector of the Rachaya district. Rather, the district's grandiose landscapes of open spaces and high mountains, snow-capped for several months of the year, are its true capital and its main source of attraction.

It should be noted that the district of Rachaya is one of the most threatened by desertification at the national level with over 77 % of its lands being exposed to a high level of desertification[164]. Therefore, preserving the integrity of its forests and OWL is a pressing matter that contributes to the national efforts to combat desertification.

Rangelands

Rachaya is the district with the highest level of rangeland pastures within the Qaroun Catchment. In fact, around 75% of its lands are considered as rangelands. Sheep and goats account for virtually all the grazing animals within the district. The number of cattle is the lowest among the districts in the catchment.

A significant change in the numbers of grazing animals within the district was recorded between the 1998 and 2010[165]. Goat numbers have decreased significantly while the number of sheep remained low compared to other districts. Cattle on the other hand gained some ground. The reasons behind such changes are difficult to determine, however, as shepherds are mostly nomadic or semi-nomadic, their numbers in a particular region can fluctuate rapidly over space and time, and it is possible that shepherds recorded in 1998 left for other regions by 2010.

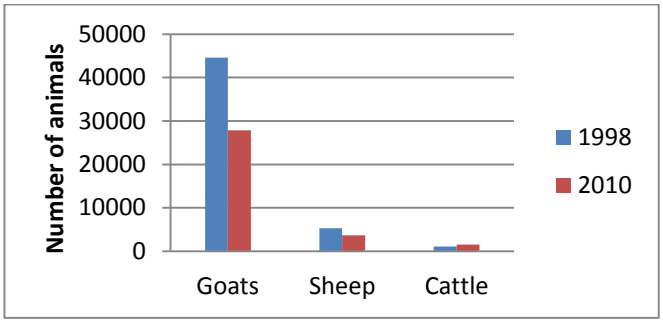

Figure 10. Change in number of animals between 1998 and 2010 in Rachaya

There are 46,727 ha of rangelands and forests in Rachaya District and 31,550 sheep and goats. This is an average of 0.675 animals per hectare, well below the estimated carrying capacity of two heads per hectare. Theoretically, the Rachaya rangelands could support around 93,000 heads of stock. However, one should take into consideration that the Rachaya District, as a border region hosts many shepherds from neighbouring Syria and while official estimates take into account Lebanese users and land holders, data about Syrian shepherds are not recorded. Given the higher risk of desertification in the district[166], it is wise to limit the numbers of small ruminants and manage their movement within the natural pastures and woodlands to avoid further damage to the region's fragile ecosystems.

It is also important to keep in mind that shepherds do not follow administrative boundaries, and shepherds from neighbouring Hasbaya region could easily transfer their flocks into Rachaya open territories and graze unchecked especially in the remote highlands.

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[163] AFDC (20070 State of the Forrest Report.
[164] MoE (2003) National Action Programme to Combat Desertification.
[165] MoA, Agricultural census of 1998 and 2010
[166] MoE (2003) National Action Programme to Combat Desertification.

Even with overgrazing and mismanagement, the pastures and open woodlands of Lebanon provide the major sheep and goat varieties with a high percentage of their dietary requirements as seen in Table 13 which also considers the more suited habitats for these breeds within the District.

Table 13. Major grazing breeds of Lebanon and suitability of the Rachaya district for their rearing[167]

BREED	DIETARY NEEDS PROVIDED BY RANGELANDS AND WOODLANDS	MAJOR HABITAT CHARACTERISTICS	SIMILAR AREAS WITHIN RACHAYA
Sheep Awassi	Up to 70% of their diet	Coastal plains and mountain foothills. Bekaa valley in areas with 300 to 700 mm of rain and altitude of 800-1000. Cold winters (down to -15°C) and hot summers (up to 45 °C)	Mostly in the middle and southern central parts of the district such as in Rafid, Mhaidse, Kaoukaba, Qnaabe, Maazrat Jaafar, Beit Lahia
Goats Baladi	Up to 80% of their diet	Mountains from 800-1600 in altitude with a minimum of 300 mm of rain. Cold winters with snow cover.	Most of the district, except for the high elevation region at the foothills of Mount Hermon
Goats Shami	Around 50% of their diet	Coastal region up to 700 m in elevation in mixed farming systems or rainfed mountain foothills. Over 600 mm of rain.	Most of the district is higher in altitude than is required by the breed
Goats crosses	Around 90% of their diet	Dry steppes with less than 300 mm of rain. Cold winter (down to -10 °C) and hot summers (above 35 °C)	Can be encountered in various parts of the district, but mostly suited towards the drier northern eastern parts neighbouring Syria.

The meat and milk production potential within the district of Rachaya were given above. As in all Bekaa districts, milk production remains the primary goal of mammalian animals farming. This is borne out by Table 14 below which records the economic impact of meat and milk production in Rachaya using the price per unit provided by the MoA in 2009.

Table 14. Estimated economic value (in USD) of meat and milk production in Rachaya District

SPECIES	MILK PRODUCTION IN TONNES	UNIT PRICE USD/L	TOTAL VALUE	MEAT PRODUCTION IN TONNES	UNIT PRICE USD/KG	TOTAL VALUE
Sheep	246.924	0.575	141,981.3	65.919	3.42	225,442.98
Goat	2433.97	0.62	1,509,061.4	389.34	2.97	1,156,339.8
Cattle	3915.5	0.57	2,231,835	205.896	3.05	627,982.8
		Total value of milk	**3,882,877.7**		**Total value of meat**	**2,009,765.58**

Agriculture

Agriculture is an important land use in the Rachaya District with an agricultural profile that is somewhat different from that of the West Bekaa and Zahle. It is a mountainous region with limited plains and the intensive agriculture that is found in West Bekaa and Zahle is not common in Rachaya, a land dominated by rainfed irrigation with all the limitation that this entails[168].

[167] Khazaal, K (2005) Small Ruminants Breeds of Lebanon. (L. INIGUEZ editor). Characterization of small ruminant breeds in West Asia and North Africa, Volume 1: West Asia. ICARDA, Aleppo, Syria, pp. 155-181. *(With Adaptation)*

[168] FAO and MoA (2006) الاستراتيجية والسياسة الزراعية.المناطق الزراعية المتجانسة،الدراسات الملخصة.مشروع الاحصائي الشامل

Water resources in Rachaya are more limited in comparison to West Bekaa and Zahle although every village has a fountain or spring to meet its needs with an increasing number of farmers and municipalities digging wells to tap into the groundwater resources[169].

The agricultural profile of the district centres on crops that usually do well in rainfed conditions such as olives, vineyards, cereals and grains. But the district's dominant feature is its vast open expanses that have been used for many years as rangelands[170].

The Rachaya district produces quality olives and olive oil, exquisite grape molasses and excellent honey. Several villages in the district specialize in producing honey, especially the district's capital, Rachaya el Wadi. It is no surprise that it is the leading district in the Bekaa Governorate in terms of beekeeping with over 3,680 beehives[171]. The average production per hive is 7.8 kg giving a total yield of 28,727 kg worth USD537,202. In addition to honey, beekeeping can produce a wide range of products such as wax, propolis, royal jelly, honey soaps and honey based medicines.

The honey sector benefits from the varied landscapes, open rangelands and woodlands of Rachaya District and an agriculture that is more traditional and less reliant on chemical inputs that are detrimental to the bees. The sector has potential for sustainable growth which could, in turn, raise awareness of the need to protect natural resources and the environment. This could encourage agricultural practices that foster the use of pest management techniques that are not detrimental to bees and the environment.

Grape molasses is an additional interesting product that the region is famous for, however, information is severely lacking to be able to estimate its impact. Nevertheless, it remains an important axis of development that showcases the unique relationship the people of Rachaya have with their beautiful landscape.

The openness of the landscape has encouraged the grazing of goats and sheep and the keeping of bees. As such, the dairy products of Rachaya such as goat labneh (strained yoghurt) are famous for their quality and the exquisite taste of its honey is sought after[172].

The MoA in its work on the various agricultural regions of the country believes that the Rachaya district could be sustainably developed with focus on the following[173]:

- Investment in infrastructure:
    - Enhance the agricultural and side roads' network
    - Collect rain water through the establishment of barrages and hill lakes which reduce the stress on groundwater resources
    - Dig wells in a well-studied and suited manner to avoid overuse of underground water resources

- Investment in agriculture:
    - Create a label for grape molasses that would support this typical local product
    - Create a label for honey which certifies the place of origin as this would support the beekeepers of Rachaya and discourage abusers
    - Investigate the potential of new crops in the region such as chestnuts, hazelnuts and pistachios suitable for the district's mountainous terrains

- Investment in supporting economic activities:
    - Modernize olive oil presses and insure that their operation has little impact on water pollution

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[169] Ibid
[170] FAO (2012) Country Study on Status of Land Tenure, Planning and Management in Oriental Near East Countries, Lebanon case
[171] MoA (2010) Agriculutral Census 2010, website (http://www.agriculture.gov.lb/html/RESULTATS_RECENCEMENT_AGRICULTURE_2010/caza.html).
[172] FAO and MoA (2006) الاستراتيجية والسياسة الزراعية.المناطق الزراعية المتجانسة،الدراسات الملخصة.مشروع الاحصائي الشامل
[173] Ibid

- Upgrade the value chain of grape molasses manufacturing in order to optimize quality and profitability
- Encourage eco-tourism and agro-tourism
- Encourage gender equity through the involvement of women in processing of rural products typical of the region

The majority (89.1%) of agricultural lands in Rachaya District are owned by individuals who either bought or inherited these lands; the rest (10.8%) is owned by associations formed by groups of farmers or investors. There is also a minor holding by religious groups.

The total area of useful agricultural lands (including lands that are fallow or have agricultural potential) in the Rachaya district is slightly above 5,904 ha (Table 15) and this is used by 3,123 farmers. The two largest groups of users own lands which are smaller than 2 ha which reflects the major problem of fragmentation alluded to already above.

Table 15. Land holdings and number of users in the Rachaya district[174]

LAND HOLDING SIZE (HA)	NUMBER OF FARMERS
less than 0.5	1,099
0.5 to 2	1,308
2 to 6	527
6 to 10	88
10 to 20	73
20 to 50	22
over 50	6
Total area of agricultural lands - 5904.7 ha	**3,123**

The lands of the district allow for two main types of agriculture – permanent and seasonal.

Permanent agriculture includes all sorts of fruit orchards, vineyards and olives among others and within the district two crops dominate the permanent agriculture group: olives and vineyards. Other fruit crops make up the rest of the lands. It is therefore more important to focus on means of developing and optimizing olive and vineyard cultivation and explore the cultivation of forest-like crops such as chestnuts and hazelnuts as the lands of the district are amenable to their cultivation. Additionally, support could be given to reduce the ecological footprint of these farms with special focus on protecting the fragile soil layer and optimize the use of water resources.

Rachaya's cultivated lands are mostly not irrigated and seasonal leafy vegetables, tuberous crops, and fruits consumed as vegetables cannot be extensively grown like in West Bekaa and Zahle. This is noticeable in the low percentages these seasonal crops occupy. On the other hand, wheat, barley and other cereals that are grown as winter crops are extensively cultivated since yield is dependent primarily on precipitation. The second most important group of seasonal crops are the leguminous family such as chickpeas and fava beans which are usually grown in the wet season and mature during spring time.

Protected agriculture is hardly present in the Rachaya District covering a mere 3 ha mostly with tomatoes, cucumbers and leafy vegetables.

The animal production sector in the Rachaya District centres on grazing animals such as goats. Table 16 presents the main mammals raised within the district and it shows that goats are the most abundant animal species. Sheep and goats are allowed to graze in natural rangelands of the district whose lands are dominated by open and expansive pastures.

[174] MoA (2010) Agriculutral Census 2010, website (http://www.agriculture.gov.lb/html/RESULTATS_RECENCEMENT_AGRICULTURE_2010/caza.html)

Table 16. Main farm mammals raised within the district of Rachaya[175]

	CATTLE	SHEEP	GOATS	PIGS
Stock numbers	1,507	3,699	27,851	0
Number of owners	167	92	209	0

Agriculture is still a main economic activity within the Rachaya district with important socio-economic impacts. There are 3,123 farmers and other land workers and on average, there are 4.56 family members for each agricultural user. This means that over 14,200 family members play a role in rural agriculture in Rachaya District. Family members tend to help each other out on the land especially during critical times such as seeding or harvesting. However, and despite the importance of family labour, hired workers, especially on a temporary basis still form the backbone of labour in the agriculture of the region of Rachaya totalling some 81,212 man-days per year.

Like most other districts in Lebanon, agriculture in Rachaya District suffers from a number of problems. Farmers complain the most about the lack of a national extension service which is more problematic in regions far from the main urban centres as in the remote parts of Rachaya. Finding suitable and reliable water sources for irrigation is even more of a problem in this district than in West Bekaa and Zahle, with their richer water sources. However, the greatest barrier that is keeping the agricultural sector in Rachaya from reaching its full potential is probably the lack of a clear vision to capitalize on the district's agricultural assets such as quality olives and olive oil, honey, grape molasses and dairy products.

Industry

Rachaya District has the smallest industry out of the 4 districts in the Bekaa and its economy is mainly based on agriculture, services and tourism. There are about 47 registered businesses and companies that have more than 5 employees in the district[176], including two olive oil presses and three grape molasses factories[177]. The business plan for Qaroun Catchment only surveyed two factories from this district: A midsized rock cutting factory and a large scale olive oil press. Together they produce a mere 55 m^3 of wastewater per day[178].

[175] MoA (2010) Agriculutral Census 2010, website (http://www.agriculture.gov.lb/html/RESULTATS_RECENCEMENT_AGRICULTURE_2010/caza.html)
[176] Localiban Website http://www.localiban.org/spip.php?rubrique533
[177] YMCA Lebanon (2005) Environmental Impact Assessment Report: Wastewater treatment plant in Rashaya, prepared by CEE
[178] UNDP / MOE (2011) Business Plan for Combating Pollution of the Qaroun Lake, prepared by ELARD

ANNEX 6 CAPACITY ASSESSMENT SCORECARD

SUSTAINABLE LAND MANAGEMENT IN THE QAROUN CATCHMENT, LEBANON - CAPACITY ASSESSMENT SCORECARD

ORGANIZATION: Districts and Unions in Rachaya and West Bekaa	FILLED IN BY: Lama Bashour (in cooperation with Nancy Awad from CDR)	DATE: 17/04/2014

STRATEGIC AREA OF SUPPORT	ISSUE	SCORECARD	INITIAL SCORE	COMMENTS / OBSERVATIONS
1. Capacity to conceptualize and formulate policies, legislations, strategies and programmes	The "sustainable land use" agenda is being effectively championed / driven forward	0 -- There is essentially no sustainable land management agenda; 1 -- There are some persons or institutions actively pursuing a sustainable land management agenda but they have little effect or influence; 2 -- There are a number of sustainable land management champions that drive the sustainable land management agenda, but more is needed; 3 -- There are an adequate number of able "champions" and "leaders" effectively driving forwards the sustainable land management agenda	**0**	The institutional set up for land use planning in Lebanon has primarily focussed on urban planning, i.e. regulating construction activities and delineating areas for urban development. Sustainability issues do not contribute directly to this process.
	There is a strong and clear legal mandate for the integration of sustainable land management into land use planning	0 -- There is no legal framework for integration of sustainable land management into land use planning; 1 -- There is a partial legal framework for integration of sustainable land management into land use planning but it has many inadequacies; 2 – There is a reasonable legal framework for integration of sustainable land management into land use planning but it has a few weaknesses and gaps; 3 -- There is a strong and clear legal mandate for integration of sustainable land management into land use planning	**1**	Article 38 of Law 444 for Environmental Protection addresses the issue of land degradation and set forth a legal requirement for sustainable use of land and water resources. A framework setting mandate, responsibilities and procedures for application of this article have not yet been developed.
	There is an institution or institutions responsible for land use planning in Lebanon	0 – Development Zone Authorities/Governorates have no land use plans or strategies; 1 -- Development Zone Authorities/Governorates do have land use plans, but these are old and no longer up to date or were prepared in a totally top-down fashion; 2 -- Development Zone Authorities/Governorates have some sort of mechanism to update their land use plans, but this is irregular or is done in a largely top-down fashion without proper consultation; 3 – Development Zone Authorities/Governorates have relevant, participatory prepared, regularly updated land use plans	**1**	The institutional responsible for planning (urban) in Lebanon is the Directorate General for Urban Planning (DGUP). Its responsibility is to support municipalities, districts and governorates to develop master plans for their areas. Due to lack of financial resources at the municipal level, the plans have thus far been dictated by DGUP in a top-down fashion. Due to lack of technical resources at DGUP, master plans have not been prepared at the district or

STRATEGIC AREA OF SUPPORT	ISSUE	SCORECARD	INITIAL SCORE	COMMENTS / OBSERVATIONS
				governorate level. Due to lack of financial resources at DGUP, these plans are no longer up to date.
2. Capacity to monitor compliance and enforce land use plans	There are adequate skills for land use planning, monitoring and enforcement	0 -- There is a general lack of land use planning, monitoring and enforcement; 1-- Some skills exist but in largely insufficient quantities to guarantee effective land use planning, monitoring and enforcement; 2 -- Necessary skills for effective land use planning, monitoring and enforcement do exist but are stretched and not easily available; 3 -- Adequate quantities of the full range of skills necessary for effective land use planning, monitoring and enforcement are easily available	**1**	Land use planning skills are mostly available at the central level.
	There is a fully transparent oversight authority (there are fully transparent oversight authorities) for the implementation of land use plans	0 -- There is no oversight at all of land use plans; 1 -- There is some oversight, but only indirectly and in a non-transparent manner; 2 -- There is a reasonable oversight mechanism in place providing for regular review but lacks in transparency (e.g. is not independent, or is internalized) ; 3 -- There is a fully transparent oversight authority for the land use plans.	**2**	DGUP has regional offices throughout Lebanon and cooperate with the Internal Security Forces to ensure that land use plans that are in place are being implemented properly. Some infringements are noted.
	Land Use management institutions[179] are effectively led	0 -- Land use management institutions have a total lack of leadership; 1 -- Land use management institutions exist but leadership is weak and provides little guidance; 2 -- Some land use management institutions have reasonably strong leadership but there is still need for improvement; 3 -- Land use management institutions are effectively led	**2**	CDR prepares land use plans at the national and regional level (depending on funding) while DGUP is responsible for preparing and enforcing them at the local level. Both work with unions and municipalities.
	Human resources for land use management are well qualified and motivated	0 -- Human resources are poorly qualified and unmotivated; 1 -- Human resources qualification is spotty, with some well qualified, but many only poorly and in general unmotivated; 2 -- HR in general reasonably qualified, but many lack in motivation, or those that are motivated are not sufficiently qualified; 3 -- Human resources are well qualified and motivated.	**1**	Land use planning activities in Lebanon are typically contracted out to local or international consultants. Universities in Lebanon do not offer sustainable land use planning degrees and thus the country relies more on Urban Architects to fill that role.
	Land use management institutions are able to adequately mobilize sufficient quantity of funding, human and material resources to effectively implement	0 -- Land use management institutions typically are severely underfunded and have no capacity to mobilize sufficient resources; 1 -- Land use management institutions have some funding and are able to mobilize some human and material resources but not enough to effectively implement their mandate; 2 -- Land use management institutions have reasonable capacity to mobilize funding or other resources but not always in sufficient quantities for fully effective implementation of their mandate; 3 -- Land use management institutions are able to adequately mobilize sufficient quantity	**0**	DGUP has not had government funding for local land use plans in years. The regional land use plans that are currently being prepared in Lebanon are funded by international donors.

[179] Land Use Management Institutions include all institutions that are involved in the regulation, planning and enforcement of land use in the context of conserving biodiversity across the landscape.

STRATEGIC AREA OF SUPPORT	ISSUE	SCORECARD	INITIAL SCORE	COMMENTS / OBSERVATIONS
	their mandate	of funding, human and material resources to effectively implement their mandate		
	Land use management institutions are effectively managed, efficiently deploying their human, financial and other resources to the best effect	0 -- While the land use management institutions exist, they have no management; 1 -- Institutional management is largely ineffective and does not deploy efficiently the resources at its disposal; 2 -- The institution(s) is (are) reasonably managed, but not always in a fully effective manner and at times does not deploy its resources in the most efficient way; 3 -- The Land use management institutions are effectively managed, efficiently deploying its human, financial and other resources to the best effect	**0**	-
	Land use management institutions are highly transparent, fully audited, and publicly accountable	0 -- Land use management institutions totally untransparent, not being held accountable and not audited; 1 – Land use management institutions are not transparent but are occasionally audited without being held publicly accountable; 2 -- Land use management institutions are regularly audited and there is a fair degree of public accountability but the system is not fully transparent; 3 -- The land use management institutions are highly transparent, fully audited, and publicly accountable	**3**	The annual budgets of all government institutions in Lebanon are audited by the Audit Bureau once every year. In addition, all donor-funded projects (such as land use plans) are closely audited by the donor organization on a regular basis.
	Legal mechanisms on sustainable land management through land use plan monitoring and enforcement	0 -- No enforcement of land use plans is taking place or no land use plans in place; 1 -- Some enforcement of land use plans but largely ineffective and external threats remain active; 2 – Land use plans are regularly enforced but are not fully effective and external threats are reduced but not eliminated; 3 – Land use plans are highly effectively enforced and all external threats are negated	**1**	The main thrust of enforcement is on zoning of urban land and creation of protected nature reserves. Outside city/town/village boundaries, little is done on actual land use.
	Individuals working in land use regulation, planning and enforcement are able to advance and develop professionally	0 -- No career tracks are developed and no training opportunities are provided; 1 -- Career tracks are weak and training possibilities are few and not managed transparently; 2 -- Clear career tracks developed and training available; HR management however has inadequate performance measurement system; 3 -- Individuals are able to advance and develop professionally	**1**	
	Individuals working in land use regulation, planning and enforcement are appropriately skilled for their jobs	0 -- Skills of individuals do not match job requirements; 1 -- Individuals have some or poor skills for their jobs; 2 -- Individuals are reasonably skilled but could further improve for optimum match with job requirement; 3 -- Individuals are appropriately skilled for their jobs	**2**	This applies to central government employees who are in charge of land use planning activities in Lebanon.
	Individuals working in land use regulation, planning and enforcement are highly motivated	0 -- No motivation at all; 1 -- Motivation uneven, some are but most are not; 2 -- Many individuals are motivated but not all; 3 -- Individuals are highly motivated	**1**	

STRATEGIC AREA OF SUPPORT	ISSUE	SCORECARD	INITIAL SCORE	COMMENTS / OBSERVATIONS
	There are appropriate systems of training, mentoring, and learning in place to maintain a continuous flow of new staff working in land use regulation, planning and enforcement	0 -- No mechanisms exist; 1 -- Some mechanisms exist but unable to develop enough and unable to provide the full range of skills needed; 2 -- Mechanisms generally exist to develop skilled professionals, but either not enough of them or unable to cover the full range of skills required; 3 -- There are mechanisms for developing adequate numbers of the full range of highly skilled land use planning professionals	**0**	
3. Capacity to engage and build consensus among all stakeholders	The integration of biodiversity conservation into land use management has the political commitment	0 -- There is no political will at all, or worse, the prevailing political will runs counter to the interests of conserving sustainable land use management; 1 -- Some political will exists, but is not strong enough to make a difference; 2 -- Reasonable political will exists, but is not always strong enough to fully implement sustainable land management; 3 -- There are very high levels of political will to support sustainable land use.	**0**	Despite the priorities described in the National Biodiversity Strategy and Action Plan and the government's national communication to the CBD, there has been no political will to mainstream biodiversity conservation in land use management as focus has been primarily on economic development, poverty alleviation and urbanization.
	The integration of sustainable land management into land use management has the public support they require	0 -- The public has little interest in conserving biodiversity in the wider landscape outside protected areas; 1 -- There is limited support for conserving biodiversity outside protected areas; 2 -- There is general public support for conserving biodiversity in the wider landscape outside protected areas and there are various lobby groups such as environmental NGO's strongly pushing them; 3 -- There is tremendous public support in the country for conserving biodiversity in the wider landscape outside protected areas	**1**	Some NGOs and private entities are active with regards to biodiversity conservation in the Bekaa. These include the Society for the Protection of Nature in Lebanon who have been working in Kfar Zabad and Anjar in Zahle to create protected areas and register the wetland as a Ramsar site. Another is the family Skaff in the West Bekaa, whose privately owned lands are protected and registered as a Ramsar site.
	Land use management institutions can establish the partnerships needed to achieve the objective of sustainable land use within the wider landscape	0 – Land use management institutions operate in isolation; 1 -- Some partnerships in place but significant gaps and existing partnerships achieve little; 2 -- Many partnerships in place with a wide range of agencies, NGOs etc, but there are some gaps, partnerships are not always effective and do not always enable efficient achievement of objectives; 3 – Land use management institutions establish effective partnerships with other agencies and institutions, including provincial and local governments, NGO's and the private sector to enable achievement of objectives in an efficient and effective manner	**1**	The main partnership at the national level is the Higher Council for Urban Planning (HCUP), which is constituted of representatives from various relevant ministries and public institutions. The HCUP are currently only concerned with approving zoning plans at the local levels. At the local level, unions of municipalities exist and have the mandate to undertake land use planning. However, cooperation

STRATEGIC AREA OF SUPPORT	ISSUE	SCORECARD	INITIAL SCORE	COMMENTS / OBSERVATIONS
				between municipalities within the unions have thus far been minimal with much political wrangling impeding their development.
4. Capacity to mobilize information and knowledge	Land use management institutions have the information they need to develop and monitor land use plans for sustainability	0 -- Information is virtually lacking; 1 -- Some information exists, but is of poor quality, is of limited usefulness, or is very difficult to access; 2 -- Much information is easily available and mostly of good quality, but there remain some gaps in quality, coverage and availability; 3 -- Land use management institutions have the information they need to develop and monitor land use plans for the conservation of biodiversity	**1**	Information obtained during preparation of the NLUMP is available on a GIS database and is used by both CDR and DGUP. However, this data is from 2004 and has not been updated since. Other information sources are outdated, not available or not reliable.
	Individuals working with land use management, work effectively together as a team	0 -- Individuals work in isolation and don't interact; 1 -- Individuals interact in limited way and sometimes in teams but this is rarely effective and functional; 2 -- Individuals interact regularly and form teams, but this is not always fully effective or functional; 3 -- Individuals interact effectively and form functional teams	**1**	Most interactions are informal and on a project or ad hoc basis.
5. Capacity to monitor, evaluate, report and learn	Society monitors the state of biodiversity in both protected areas and in the wider landscape outside protected areas	0 -- There is no dialogue at all; 1 -- There is some dialogue going on, but not in the wider public and restricted to specialized circles; 2 -- There is a reasonably open public dialogue going on but certain issues remain taboo; 3 -- There is an open and transparent public dialogue about the state of biodiversity conservation in the country	**1**	-
	Land use management institutions are highly adaptive, responding effectively and immediately to change	0 -- Institutions resist change; 1 -- Institutions do change but only very slowly; 2 -- Institutions tend to adapt in response to change but not always very effectively or with some delay; 3 -- Institutions are highly adaptive, responding effectively and immediately to change	**1**	
	Land use management institutions have effective internal mechanisms for monitoring, evaluation, reporting and learning	0 -- There are no mechanisms for monitoring, evaluation, reporting or learning; 1 -- There are some mechanisms for monitoring, evaluation, reporting and learning but they are limited and weak; 2 -- Reasonable mechanisms for monitoring, evaluation, reporting and learning are in place but are not as strong or comprehensive as they could be; 3 -- Institutions have effective internal mechanisms for monitoring, evaluation, reporting and learning	**2**	CDR prepares an annual review of its activities, including that regarding land use planning. In addition, the NLUMP has its own committee with representatives from various ministries and institutions that is required to meet twice a year to follow up on its implementation.

STRATEGIC AREA OF SUPPORT	ISSUE	SCORECARD	INITIAL SCORE	COMMENTS / OBSERVATIONS
	Individuals working in land use management institutions are adaptive and continue to learn	0 -- There is no measurement of performance or adaptive feedback; 1 -- Performance is irregularly and poorly measured and there is little use of feedback; 2 -- There is significant measurement of performance and some feedback but this is not as thorough or comprehensive as it might be; 3 -- Performance is effectively measured and adaptive feedback utilized	**0**	-
		TOTAL SCORE	**24**	
		OUT OF A MAXIMUM OF	**72**	
		Percent (%)	**33.3**	

ANNEX 7 TERMS OF REFERNCE FOR KEY PROJECT PERSONNEL

a) Project Manager

Project Title	**Sustainable Land Management in the Qaroun Catchment, Lebanon**
Post Title	**Project Manager**
Location	**Lebanon – Beirut and project localities**
Grade	**SC10**

1 Introduction

Over a period of 4 years and for a cash cost of approximately $3-4 million and a further estimated $15 million in co-financing, the project on Sustainable land Management in the Qaroun Catchment will set a goal of wise land use on a sustainable long-term basis for the Qaroun Catchment. It will do this by developing institutional tools upstream at national level which will provide the Ministry of the Environment and the Ministry of Agriculture as well as related agencies such as the Commission for Development and Reconstruction (CDR), the Ministry of Interior and Municipalities, the Bekaa Governorate, and District Administrations and Municipalities in West Bekaa, Zahle and Rachaya Districts with the know-how, means and mechanisms for promoting sustainable land use as in the best interest of the land owners, farmers and communities as well as the nation. Land-use plans at the landscape level will benefit from the project through the identification of land productivity values and ecosystem services and how they can be protected, and an effective monitoring system will be established to maintain all data up to date and discover any worrying trends before they become irreversible. At site-specific level, forests, rangelands and arable land that are currently weakly managed and poorly funded will benefit from comprehensive land use plans that will provide information and education as well as livelihoods and financial security.

The implementation of the proposed project will have an immediate global environmental benefit, albeit on a small scale, through the increased management efficiency of arable land and rangelands and the expansion of the area under forests through land use plans, buffer zones, and riparian strips. This will lead to the restoration of natural productivity and conservation of the habitats of a number of plant and animal species and valuable ecosystems and will secure migratory bird pathways. As a result, globally significant biodiversity will be conserved and valuable ecosystem services will be safeguarded.

As a result of the significant effort that the project will make on institutional capacity building and the mainstreaming of a sustainability ethic into land use, these benefits will be sustainable.

The project aim is to make the consideration of sustainability a fundamental part of everyday planning and development for land use in the Qaroun Catchment. More specifically, the **Project Objective** is:

Sustainable land and natural resource management alleviates land degradation, maintains ecosystem services, and improves livelihoods in the Qaroun Catchment

This Objective will be achieved through three inter-related Outcomes, viz. –
Outcome 1: *Landscape level uptake of SLM measures avoids and reduces land degradation, delivering ecosystem and development benefits in the Qaroun Catchment*

Outcome 2: *Pressures on natural resources from competing land uses in the Qaroun Catchment are reduced*

Outcome 3: *Institutional strengthening and capacity enhancement for promoting sustainable forest and land management in the Qaroun Catchment through an INRM approach across the landscape*

The UNDP Lebanon CO seeks to employ a full-time Project Manager (PM) to lead the Project Coordination Unit which will be based in the Ministry of the Environment in Beirut. The PM will work closely with the UNDP Environment Programme Analyst and report to the Project Executive Board (PEB).

2 Objective of the Project Manager position

The ultimate Objective of the Project Manager is to achieve the Project Objective and Outcomes through leadership of the Project Team across all implementing partners and effective use of project resources. It is estimated that the Project Manager will spend some 25% of his/her time in administration and management, with the rest of the time being spent on providing technical input.

3 Key Results and Measurable Outputs Expected from the PM

Working under the overall supervision of the Project Executive Board to whom he/she will report, and in partnership with the UNDP Environment Programme Analyst who will channel overall policy and technical advice from the UNDP Country Office, the PM will have the responsibility for the delivery of the project outcomes and activities in accordance with the project document and agreed work plan. He/she will lead the Project Team in the day-to-day implementation of the Project, coordinate and supervise the implementation of the Project and manage Project resources[180] effectively and efficiently so as to achieve the Project Objective and Outcomes within the set timescale and available budget. More specifically, the PM will perform the following duties:

A) Project personnel management

A.1) Assume the ultimate responsibility for all project personnel (fulltime Staff, Consultants and Contractors) engaged through project funds directly, and for all other personnel indirectly (through the relevant Implementing Partners); this includes drafting of terms of reference, technical specifications and other documents as necessary; and the identification and advice on the recruitment of project consultants to be approved by the PEB, as well as coordination and quality control of consultants and suppliers

A.2) Endeavour to create a strong team spirit, cohesive and mutually supportive, across the various Implementing Partners; encourage collaboration between individuals, the sharing of experiences and the solving of problems as a group; organize regular (monthly) meetings for this purpose (via telecommunications if necessary)

A.3) Assist with the clarification of specific duties and tasks by specific individuals at each of the project localities according to their Terms of Reference; ensure their full understanding of what is expected through agreement on deliverables and timescales; and agree on the resources and support that will be provided by the Project

A.4) Undertake individual performance assessments on an annual basis (or other period for Consultants/Contractors), acknowledging achievements and providing analysis and advice on problem aspects

A.5) While giving all professional personnel the "space" to carry out their professional duties, ensure that guidance and support are available whenever needed

A.6) Ensure that Project personnel enjoy the conditions of employment as stipulated by UNDP, together with the responsibilities of their positions

[180] UNDP will serve as budget holder under the National Execution modality.

A.7) Require regular (as agreed), formal and informal reporting on progress with the achievement of assigned tasks

B) Financial resources management

B.1) Support the Project Admin/Finance Assistant in his/her role as financial manager but retain the ultimate responsibility for financial resources for accountability purposes

B.2) Ensure total accuracy and the highest level of transparency in the management of the Project financial resources in accordance with UNDP and national regulations and procedures

B.3) Work with the Project Admin/Finance Assistant to prepare all necessary financial reports to accompany Project quarterly and annual work plans and reports

C) Project outreach

C.1) Serve as the Project's ambassador and advocate within the broader Central and Local Government systems and with local communities

C.2) Create and foster a good working relationship with the media (print, radio and television)

C.3) Represent and promote the Project at national and international meetings

C.4) Contribute to the production and publication of public information material

C.5) Establish and maintain good working relationships and cooperation with peer project managers from other related projects within Lebanon and the region

C.6) Provide coordination of duty travel, seminars, public outreach activities and other project events

D) Project planning and implementation

D.1) Lead the process of quarterly and annual planning of project activities, with the participation of all Project personnel; retain the ultimate responsibility for the finished plans and submit them to the Project Board and UNDP for their concurrence

D.2) As noted under A.5 above, professional staff should be given the "space" to carry out their assigned tasks; but be alert to needs for support and advice; require progress reporting and accountability for resources used

D.3) In cooperation with relevant Project personnel build effective working relationships with the Project's key partners at the local level (Local Government, village leaders, communities, local NGOs, the private sector, etc)

D.4) Work closely with co-funding partners to ensure that their activities/programmes are integrated and complementary with those of the GEF project

D.5) Maintain effective working contacts with project partners at the central and local levels

E) Monitoring and adaptive management

E.1) Lead the implementation of the Project M&E Plan

E.2) Carry out monitoring visits to Project sites on a regular basis; survey (informally) the intended beneficiaries and other stakeholders

E.3) Collate the results of monitoring, analyze them, and formulate proposals for adaptive management measures for consideration by the PEB

E.4) Implement the decisions and advice of the PEB

F) Reporting and accountability

F.1) Provide a report to each PEB meeting noting progress and achievements, acknowledging difficulties and proposing possible solutions for consideration and guidance by the PEB

F.2) Assume the lead responsibility for the preparation and content of the annual Project Implementation Review (PIR), with the full participation of relevant Project and UNDP personnel

F.3) Delegate to the Project Admin/Finance Assistant the task of preparation of implementation reports for UNDP (such as Atlas reports) but retain a supportive role

F.4) Jointly with the Project Admin/Finance Assistant, prepare quarterly and annual project plans and reports and present them to the PEB

F.5) Respond to request for reports on Project management and performance from any key stakeholders, through the PEB

F.6) Report to the PEB and the UNDP on any aspect of Project management whenever required

4 Time-frame

The PM is a full time employee of the Project and the initial contract will be for a period of one year. The contract will be renewed, subject to a satisfactory performance assessment, for a further year with a maximum of four years or until project closure, whichever is the earliest.

5 Duty station and travel arrangements

The PM will be based in the Ministry of the Environment in Beirut. In addition, he/she is expected to travel as necessary to various parts of the country to stay in touch with the Implementing Partners and to where the Project is implementing Activities.

6 Qualifications and Experience

- **Education:** PhD or MSc in Environmental Policy, Environmental or Natural Resource Management, or Land Use Planning
- **Experience:** Minimum of ten years management experience in implementing development projects in the field of environment, preferably within the UN system or other development agencies. Experience in forestry, agriculture or rangelands project management an advantage.
- **Language requirements:** Proficient in both written and oral English and Arabic.
- **Computer skills** : Demonstrable skills in office computer use - word processing, spread sheets, etc

7 Skills and Competencies

- Good manager of people and resources to obtain best results and be accountable
- Strong managerial skills, results-orientation, team-building, motivational and leadership skills

- Demonstrable knowledge of the forestry/agriculture sector in Lebanon; technical expertise to appreciate project aims; ability to speak the “language” with experts; dedicated and committed to Project aims
- Excellent communication, presentation, negotiation and facilitation skills
- Excellent inter-personal skills; good communicator at all levels from political decision-makers to grassroots communities
- Good analytical and planning skills (including financial); ability to set forecasts and refine/review them in the light of experience and further analysis
- Broad experience working at the central and local levels in Lebanon
- Decisiveness, independence, good judgement, ability to work under pressure
- Excellent networking and partnering competencies and negotiating skills
- Ability to use information technology as a tool and resource

b) Project Administration/Finance Assistant

Project Title	**Sustainable Land Management in the Qaroun Catchment, Lebanon**
Post Title	**Project Administration/Finance Assistant**
Location	**Lebanon – Beirut**
Grade	**SC6**

1 Introduction

Over a period of 4 years and for a cash cost of approximately $3-4 million and a further estimated $15 million in co-financing, the project on Sustainable Land Management in the Qaroun Catchment will set a goal of wise land use on a sustainable long-term basis for the Qaroun Catchment. It will do this by developing institutional tools upstream at national level which will provide the Ministry of the Environment and the Ministry of Agriculture as well as related agencies such as the Commission for Development and Reconstruction (CDR), the Ministry of Interior and Municipalities, the Bekaa Governorate, and District Administrations and Municipalities in West Bekaa, Zahle and Rachaya Districts with the know-how, means and mechanisms for promoting sustainable land use as in the best interest of the land owners, farmers and communities as well as the nation. Land-use plans at the landscape level will benefit from the project through the identification of land productivity values and ecosystem services and how they can be protected, and an effective monitoring system will be established to maintain all data up to date and discover any worrying trends before they become irreversible. At site-specific level, forests, rangelands and arable land that are currently weakly managed and poorly funded will benefit from comprehensive land use plans that will provide information and education as well as livelihoods and financial security.

The implementation of the proposed project will have an immediate global environmental benefit, albeit on a small scale, through the increased management efficiency of arable land and rangelands and the expansion of the area under forests through land use plans, buffer zones, and riparian strips. This will lead to the restoration of natural productivity and conservation of the habitats of a number of plant and animal species and valuable ecosystems and will secure migratory bird pathways. As a result, globally significant biodiversity will be conserved and valuable ecosystem services will be safeguarded.

As a result of the significant effort that the project will make on institutional capacity building and the mainstreaming of a sustainability ethic into land use, these benefits will be sustainable.

The project aim is to make the consideration of sustainability a fundamental part of everyday planning and development for land use in the Qaroun Catchment. More specifically, the **Project Objective** is:

Sustainable land and natural resource management alleviates land degradation, maintains ecosystem services, and improves livelihoods in the Qaroun Catchment

This Objective will be achieved through three inter-related Outcomes, viz. –
Outcome 1: *Landscape level uptake of SLM measures avoids and reduces land degradation, delivering ecosystem and development benefits in the Qaroun Catchment*

Outcome 2: *Pressures on natural resources from competing land uses in the Qaroun Catchment are reduced*

Outcome 3: *Institutional strengthening and capacity enhancement for promoting sustainable forest and land management in the Qaroun Catchment through an INRM approach across the landscape*

The UNDP Lebanon CO seeks to employ a full-time Project Administration/Finance Assistant (PAFA) to support the Project Manager who will be based in the Ministry of the Environment in Beirut.

2 Objective of the Project Administration/Finance Assistant position

The ultimate Objective of the National Project Administration/Finance Assistant is to provide all necessary support (administrative, financial, and some technical) to the PM so that he/she can achieve the Project Objective and Outcomes.

3 Key task and responsibilities

Working under the supervision of the Project Manager to whom he/she will report, and the UNDP Environment Programme Analyst, the PAFA will be responsible for running the Project Office on a day-to-day basis and managing Project resources in partnership with the PM so as to achieve the Project Objective and Outcomes within the set timescale and available budget. More specifically, the PAFA will perform the following duties:

A) Administrative responsibilities (approx. 50% of time)

A.1) Assist in all administrative aspects of the project.

A.2) Schedule workshops and meetings, and arrange their logistics.

A.3) Draft and type minutes of meetings and correspondence in English and/or Arabic.

A.4) Follow-up on correspondence with relevant stakeholders, Implementing Partners, the Project Board, UNDP and GEF, etc.

A.5) Assist the PM in maintaining continuous liaison with UNDP

A.6) Maintain up-to-date soft and hard filing systems.

A.7) Undertake secretarial duties such as maintaining contact information (tel., fax, e-mail) of all project stakeholders including work teams.

A.8) Support the PM in the Projects' tasks as the Secretariat for the Project Executive Board and the Technical Advisory Group (calling for meetings, preparing and distributing an agenda, keeping of minutes of meetings, follow-up on decisions, keep members informed on the progress, etc.).

A.9) Assist the PM to develop and submit progress and financial reports to UNDP in accordance with the reporting schedule.

B) Financial resources management (approx. 30% of time)

B.1) On delegation from the Project Manager, assume the first level of responsibility for management of Project financial resources including the preparation/updates of project work and budget plans, record keeping, accounting and reporting by the key Implementing Partners; share accountability.

B.2) Ensure total accuracy and the highest level of transparency in the management of the Project financial resources in accordance with UNDP and national regulations and procedures

B.3) Under the guidance of the Project Manager prepare all necessary financial reports to accompany Project quarterly and annual work plans and reports

C) Project planning and other technical tasks (approx. 20% of time)

C.1) Participate fully in the process of quarterly and annual planning of project activities, sharing with the Project Manager the responsibility for the finished plans

C.2) In cooperation with relevant Project personnel build effective working relationships with the Project's key partners at the local level (Local Government, village leaders, communities, locals NGOs, the private sector, etc)

C.3) Work closely with co-funding partners to ensure that their activities/programmes are integrated and complementary with those of the GEF project

C.4) In collaboration with the Project Manager, report to each PEB meeting noting particularly from the administrative perspective, the progress and achievements made, acknowledging difficulties and proposing possible solutions for consideration and guidance by the PEB

C.5) Participate fully in the preparation and content of the annual Project Implementation Review (PIR)

C.6) On delegation from the Project Manager, assume responsibility for the task of preparation of implementation reports for UNDP (such as Atlas reports)

C.7) Jointly with the Project Manager, prepare quarterly and annual project plans and reports and present them to the PEB

C.8) Respond to request for reports on Project administration and performance from any key stakeholders, through the Project Manager

4 Qualifications, Experience and Competencies

Education: University degree (B.Sc) in environment, business administration, management information systems or related fields.
Experience: A minimum of 2-3 years experience in administration and financial responsibilities works. Experience in donor-funded projects is an asset.
Abilities: Proven ability to work with a variety of people including government officials, international and national NGOs, local stakeholders, experts and consultants; ability to manage budgets; Self-motivated with good interpersonal skills; Dedicated to work
Work ethic: Good organizational and planning skills; proven ability to adhere to deadlines; committed to deliver high quality work in a timely manner; Flexible and adaptive to challenging work conditions (deadlines, conflict, etc.).
Language: Excellent communication (oral and written) skills in Arabic and English. Report writing in English with fluency is absolutely necessary
Computer skills: Excellent computer skills (Microsoft Office and internet essential)
Nationality: Lebanese

5 Duration of Service

Duration of this contract is for one year renewable for a maximum of four years.

c) Local Team Leader (X2)

Project Title	**Sustainable Land Management in Qaroun Catchment, Lebanon**
Post Title	**Local Team Leader (LTL) - 2 positions** **a) LTL Land Use Planning Team** **b) LTL Forests, Rangelands and Agriculture**
Location	**At Lebanese Agricultural Research Institute (LARI), Tal Amara**
Grade	**SC7**

1 Introduction

Over a period of 4 years and for a cash cost of approximately $3-4 million and a further estimated $15 million in co-financing, the project on Sustainable Land Management in the Qaroun catchment will set a goal of wise land use on a sustainable long-term basis for the Qaroun Catchment. It will do this by developing institutional tools upstream at national level which will provide the Ministry of the Environment and the Ministry of Agriculture as well as related agencies such as the Commission for Development and Reconstruction (CDR), the Ministry of Interior and Municipalities, the Bekaa Governorate, and District Administrations and Municipalities in West Bekaa, Zahle and Rachaya Districts with the know-how, means and mechanisms for promoting sustainable land use as in the best interest of the land owners, farmers and communities as well as the nation. Land-use plans at the landscape level will benefit from the project through the identification of land productivity values and ecosystem services and how they can be protected, and an effective monitoring system will be established to maintain all data up to date and discover any worrying trends before they become irreversible. At site-specific level, forests, rangelands and arable land that are currently weakly managed and poorly funded will benefit from comprehensive land use plans that will provide information and education as well as livelihoods and financial security.

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Outcome 3: *Institutional strengthening and capacity enhancement for promoting sustainable forest and land management in the Qaroun Catchment through an INRM approach across the landscape*

The UNDP Lebanon CO seeks to employ two full-time Local Team Leaders (LTL), one to lead the Land Use Planning Team (Outcome 2) and one to lead the Forests, Rangelands and Agriculture Team (Outcome 3). Both positions will be hosted by the Lebanese Agriculture Research Institute (LARI) at Tal Amara, and serve as extensions of the PMU in outlier positions. As a member of the PMU, each LTL will report to the Project Manager.

2 Objective of each of the Local Team Leader (LTL) positions

The ultimate Objective of each Local Team Leader is to coordinate and support the implementation of project activities at their respective locality and provide necessary technical input so as to achieve the Project Outputs and Outcomes.

3 Key task and responsibilities

Working under the day-to-day supervision of the Project Manager to whom he/she will report, each LTL will serve as the communication link with the PMU for the respective thematic area and facilitate the implementation of project Activities. Each LTL will also be responsible for collating various reports (technical, financial, progress, etc) and other required information and transmitting them to the PM and the PAFA to ensure the smooth running of the project. More specifically, each LTL will perform the following duties:

A) Project planning, monitoring and implementation (approx. 70% of time)

A.1) Participate fully in the process of quarterly and annual planning of project activities at the respective locality, accepting the responsibility for relaying the finished plans to the PM

A.2) Foster good working relationships with the Project's key partners at the local level (Local Government, village leaders, communities, local NGOs, the private sector, etc)

A.3) Provide technical guidance and advice to consultants and other project personnel working in the relevant thematic area

A.4) Work closely with co-funding partners to ensure that their activities/programmes are integrated and complementary with those of the GEF project

A.5) Provide the PM with regular reports in preparation for each PEB meeting noting particularly the progress and achievements made, acknowledging difficulties and proposing possible solutions for consideration and guidance by the PEB

A.6) Contribute the local content for the annual Project Implementation Review (PIR)

A.7) Prepare quarterly and annual project plans and reports and convey them to the PM

A.8) Respond to request for reports on Project administration and performance from any key stakeholders, through the PM

B) Administrative (including financial) responsibilities (approx. 30% of time)

B.1) Assist as required, at the local level, with administrative aspects of the project

B.2) In collaboration with the PAFA, help organize workshops and meetings at the respective locality

B.3) Prepare and submit progress and financial reports to UNDP in accordance with the reporting schedule

4 Qualifications, Experience and Competencies

Education: University degree (B.Sc or equivalent) in planning or forestry/agriculture/rangelands, environment, conservation, land use, or related fields.

Experience: A minimum of 5 years experience in implementing development projects in the field of environment, land use, preferably within the UN system or other development agencies. Broad experience working at the central and local levels in Lebanon. Experience in either land use planning or forestry/agriculture/rangelands project management an advantage

Technical expertise: Good knowledge of land use planning or forestry/agricylture/rangelands in Lebanon; adequate expertise to appreciate project aims; ability to speak the "language" with experts

Abilities: Proven ability to work with a variety of people including government officials, international and national NGOs, local stakeholders, experts and consultants; ability to manage budgets; Self-motivated, independent, good judgement, ability to work under pressure;

Interpersonal skills: Excellent inter-personal skills; good communicator at all levels from political decision-makers to grassroots communities; good presentation, networking and partnering competencies, negotiation and facilitation skills

Work ethic: Good organizational and planning skills; proven ability to adhere to deadlines; committed to deliver high quality work in a timely manner; flexible and adaptive to challenging work conditions (deadlines, conflict, etc.)

Language: Excellent communication (oral and written) skills in Arabic and English. Fluency in report writing in English.

Computer skills: Excellent computer skills (Microsoft Office). Ability to use information technology as a tool and resource

Nationality: Lebanese

5 Duration of Service

Duration of this contract is for one year renewable for a maximum of four years.

d) Other Consultants and Contractors

Position Title	*Duration/ Deployment*	*Cost (est.)*	*Relevant Output and tasks to be performed*
Legal Consultant	50 days	35,000	**Output 1.1** Coordinate a Working Group which will seek clarifications in the mandates of the different agencies responsible for enforcement and prosecution; review of current legal provisions and procedures covering land use planning and management and regulating land use and the farming industry with the aim to identify gaps or inconsistencies in legislation; propose amendments and updating of relevant legislation and other remedies reflecting a sustainable approach to land use; develop a Discussion Paper which will be distributed widely with an invitation for comments; facilitate workshops to consider the Discussion Paper; test the proposed improved system locally and refine it before proposing it to the Ministry of Justice for adoption by government.
Environmental Economist/Finance	50 days	25,000	**Output 1.2** Working with a Working Group, the consultant will develop and propose for adoption, a range of attractive and positive economic "rewards" which the agriculture industry can get for implementing sustainable land use measures. Conversely, it will also develop a range of economic "deterrents" which will apply to actions and developments that have an impact on land and its natural resources – in effect, this will promote adherence by the industry to the reformed policies and regulations leading to wise and sustainable land use. The WG will work closely with the establishment and implementation of an action plan for introducing Environmental Fiscal Instruments and financing mechanisms, by the STREG project.
Capacity Building Coordinator	60 days	30,000	**Output 1.3** The Coordinator will lead the development of a strategic, long-term approach to individual capacity building in SLM for professional staff of national, district and municipal administrations as well as NGOs and community leaders following an assessment of the key gaps and requirements in knowledge. This will involve the design of a formal certifiable SLM training programme (with competence standards / accreditations) in agreement with one or more academic institutions through formal cooperation agreements for delivery of training and capacity building. A series of training modules will be developed and delivered at various levels during the period of the project, supported by manuals, presentations, advance study materials and written hand-outs for field learning, as well as tests to determine competency standards. At district, municipal and village level SLM short-training courses will be organized on various aspects of land use planning, agriculture, forestry and rangeland management, efficient use of water resources and/or animal health care improvement.
Information Management Experts	1 team	100,000	**Output 2.1** The team will develop the Land Use Information Management System (LUIMS) to serve as a repository for data and information, inform Land Use Plans, provide a platform for decision-making, and serve as a source of up-to-date knowledge on land use. The LUIMS will be developed on a GIS platform, possibly allied to and integrated with existing complementary databases. It will also develop the procedures and protocols for inputting and accessing information.
Strategic Environmental Assessment Experts	2 teams	170,000	**Output 2.2** One team will work in West Bekaa District, the other in Rachaya District and will clearly identify those priority aspects of the environment that could present significant constraints or opportunities to the development of the region. Each will then explore comparative scenarios for land use and identify impacts that must be avoided and determine necessary compensatory and mitigatory measures for impacts which are unavoidable. Having benefited from the input of a wide range of

Position Title	*Duration/ Deployment*	*Cost (est.)*	*Relevant Output and tasks to be performed*
			stakeholders, the draft SEA will be put up for public debate in a search for the scenario with the greatest benefit and the minimum impact, on a sustainable basis. Public input will be taken into account fully and consensus will be sought on the desirable way forward.
Socio-Economic/Ecological/Land Use Surveys (baseline, mid and final)	3 teams	240,000	**Output 2.2** A Team will be deployed at each of project Inception (to establish baselines), Mid-Term, and project End to carry out diagnostic Land Use, Ecological and Socio-Economic surveys of West Bekaa and Rachaya Districts based primarily on available information supplemented as necessary to fill significant gaps. The surveys will also adopt the work on current legal provisions and procedures for land use planning and management and for regulating land use and the farming industry. In many cases, these surveys will provide the first comprehensive recording of land use, ecological resources and socio-economic situation in Lebanon. Since this will serve to set a number of baselines for the project it will be carried out as one of the first Activities and then repeated. It will complete its setting of the baseline by identifying the ongoing environmental mechanisms in the project localities, and how they link with the environmental and socio-economic trends. It will gain an understanding of current land uses and the ecological resources and ecosystem services that require protection and management.
Land Use Planning Contractors	2 teams	180,000	**Output 2.3** One team will work in the West Bekaa District, the other in Rachaya District building on and updating any existing plans prepared by national, territorial and development authorities. The plans will set development limits so as to protect land from degradation, reduce/avoid impacts on ecosystem services, safeguard biodiversity and enhance livelihoods. They will define spatial areas where development should be avoided; where it may be permitted subject to management controls; and what mitigation and offset requirements are needed. Provisions will apply to Protected Forests and other Protected Areas and their buffer zones, remnant and degraded forests, rangelands, agricultural productive lands (arable lands), water bodies, urban areas, and the commons, including recreation spots. The methodology and approach will take cognizance of the work carried out by CDR, UN-HABITAT. The Working Group will produce a draft proposed Land Use Management Plan for each district, which will be put out for comments and discussion including extensive public consultation meetings at various levels. Each of the drafts will be amended in the light of comments received. The final outputs will be presented to DGUP and/or CDR and provide support in seeking formal approval of the plans by government. Following the adoption of the LUPs at the District level, the teams will assist Municipalities (individually or in Unions) to develop Land Use Action Plans which will reflect the LUP at District level and provide for the implementation of the relevant LUP within their area of jurisdiction. As noted above, the Land Use Planning work will go hand-in-hand with the Strategic Environmental Assessment.
Land Use Monitoring Expert	50 days	25,000	**Output 2.4** The Land Use Monitoring Expert will lead a Working Group to develop a monitoring system which will maintain the LUIMS and help identify trends and ensure that any changes remain within pre-determined, acceptable limits. The approach and methodology to be used, the principles and objectives, and the capacity and know-how requirements will be developed by the WG and tested at each of the participating Districts following training and capacity enhancements of local personnel. After implementing any necessary refinements and adjustments, the Monitoring System for each District will

Position Title	*Duration/ Deployment*	*Cost (est.)*	*Relevant Output and tasks to be performed*
			be handed over to local responsibility, after any further necessary training and capacity building to enhance sustainability. In developing the system, the WG will explore the use of remote sensing together with on-ground measurements and observations, including indicator species. The WG will also develop a handbook for land use/ecological/biodiversity monitoring.
Compliance/Enforcement Expert	30 days	15,000	**Output 2.5** The Expert will coordinate a WG to enhance operational, surveillance, interception and prosecution capabilities of agencies implementing and enforcing the Land Use Plans. The WG will clarify the respective roles of operative enforcement agencies, propose the rationalization of the enforcement framework and enhance its effectiveness. The WG will develop and implement a training package (including Training of Trainers) for compliance and enforcement with a focus on the project localities.
Knowledge Management/Awareness Contractor	1 team	50,000	**Output 2.6** The task of the Knowledge Management/Awareness Contractor is to develop a knowledge management and outreach plan during the Inception Phase, and then coordinate its implementation during the project life so as to provide a strong knowledge base and knowledge sharing mechanisms among government decision-makers (national and local), professionals, practitioners, receptive communities and individual farmers. The Plan will be based on the following elements: **Land Use Information Management System (LUIMS)** comprising the web-based portal arising from Output 2.1, established at national level, with pages for each District to ensure maximum coordination and sharing of information about the overall SLM programme. This will make available policies, plans, guidelines, technical documentation, as well as information on capacity building and events, etc. **SLM network** for professionals and practitioners (including individual farmers) to arrange and be supported by a range of activities including: regular e-newsletters; the documentation of indigenous knowledge; Field/Demonstration Days to demonstrate and share learning experiences in the application of different SLM techniques. **Regular Workshops/Seminars** for disseminating information related to SLM with its commitment to a participatory and inclusive approach. The events will share best practices, encourage private investors in SLM, share research findings of local research institutes, and support participation by key champions. **Awareness raising** on desertification issues and SLM through user-friendly SLM materials in the form of leaflets, brochures, and fact sheets targeting local farming communities, with a focus on issues related to land management and degradation. These materials will be prepared in Arabic. The project will also work with local media (TV, radio and newspapers) to disseminate information about the project and the benefits of SLM approaches.
Forest Ecologist	50 days	25,000	**Output 3.1** The Forest Ecologist Consultant will work with respective PA managers, with the full participation of communities including shepherds and land owners, to consolidate and improve the remaining forest resources in the Catchment with a focus on the forests in the higher altitudes of the West Bekaa District, including those protected as part of the Al Shouf Biosphere Reserve. Activities will also target remnant patches of degraded forest in the higher altitudes of Rachaya District where the work will be coordinated with the rangelands activities and possibly Zahle District especially the land above Kfar

Position Title	*Duration/ Deployment*	*Cost (est.)*	*Relevant Output and tasks to be performed*
			Zabad Wetland. The project will seek the improved management of protected forests, the establishment of ecological corridors, and the rehabilitation and restored integrity of degraded forests. More specifically, activities will include a review and updating of existing PA Management Plans so as to reflect the findings of the SEA and the principles espoused in the new Land Use Plans and the benefits from the new LUIMS and Monitoring System; the drafting and adoption of management plans where none exist; an investigation of the potential for extension of the PAs to enhance ecological corridors and further protect ecosystem services; planting and protecting reforested areas; fencing off and providing protection for natural regeneration of degraded areas.
Rangeland Management Expert	50 days	25,000	**Output 3.2** The Rangeland Management Expert will focus on the rangelands at the higher altitudes of Rachaya District and will build on the data and information obtained through the surveys and SEA and will be in line with the ILUMPs. Management and protection regimes will be developed, tested and evaluated together with the appropriate infrastructure, such that the approach can be replicated to other rangeland environments within the catchment. In addition, remnant patches of degraded forest in and among the grazing rangelands, will be identified and rehabilitation and protection provided. The Expert will work in collaboration with MoA and MoE and in a participatory approach with land owners, shepherds, local government administration and communities to reach a consensus on the best approach so as to achieve sustainable use of the rangelands in perpetuity. The work may include a reduction in stock numbers, finding alternative grazing, applying a seasonal approach, and adopting exclusion zones for valuable areas providing ecosystem services (such as remnant forests).
Agriculture and arable land Expert	50 days	25,000	**Output 3.3** The Expert will have a special focus on localities in West Bekaa and Zahle Districts and possibly at a lesser scale also in Rachaya District, and, with the assistance of LARI and MoA, will explore and discover ways and means to reduce the impacts that current land uses are having on soil fertility, water quality and other ecosystem services. The Expert will work with individual landowners and farmers to experiment, on a pilot scale, with innovative approaches to fruit and vegetable production (including irrigated lands, rain-fed production, glasshouses, etc) which enhance productivity and lower the impact on land and water. Among the approaches to be trialled will be conservation agriculture, organic farming, integrated crop management, drip-irrigation, recycling compost and other natural fertilizer, cover crops, soil enrichment, natural pest and predator controls, bio-intensive integrated pest management and other techniques which will arise from participatory brainstorming with community members.
Community Facilitation Expert	50 days	25,000	**Outputs 3.1, 3.2 and 3.3** The Community Facilitation Expert will serve as the project's "gateway" to communities and individual farmers and shepherds as and when required. The Expert will work in close collaboration with the Knowledge Management/Awareness Contractor as well as with each of the Experts working on Forestry, Rangelands and Agriculture production. In particular, the Expert will design and implement the Alternative Income Generation Scheme, with the full participation of relevant communities, so as to mitigate any impacts that the project may have on the livelihoods of those who may be required to change their land use practice.
Evaluation experts for Mid-Term Evaluation and Terminal Evaluation	2 teams of 2 (one international	65,000	The standard UNDP/GEF project evaluation ToRs will be used. This will include: forming part of the evaluation team; working with the project team and stakeholders in

Position Title	*Duration/ Deployment*	*Cost (est.)*	*Relevant Output and tasks to be performed*
	and one local)		order to assess the project progress, achievement of results and impacts; delivering preliminary findings; developing draft Evaluation Report and putting it out for comments; producing the Final Evaluation Report taking into account the comments received.

Complete and more thorough ToRs for these positions will be developed by the Project Management Unit in a timely manner, for review and adoption by the PEB, as and when required.

ANNEX 8 DRAFT LETTER OF AGREEMENT AND DESCRIPTION OF UNDP COUNTRY OFFICE SUPPORT SERVICES

STANDARD LETTER OF AGREEMENT
BETWEEN UNDP AND THE GOVERNMENT FOR THE PROVISION OF SUPPORT SERVICES

Excellency,

1. Reference is made to consultations between officials of the Government of *Lebanon* (hereinafter referred to as "the Government") and officials of UNDP with respect to the provision of support services by the UNDP country office for nationally managed "Sustainable Land Management in the Qaraoun Catchment, Lebanon" Project ID 00090788. UNDP and the Government hereby agree that the UNDP country office may provide such support services at the request of the Government through its institution the Ministry of Environment designated in the relevant programme support document or project document, as described below.

2. The UNDP country office may provide support services for assistance with reporting requirements and direct payment. In providing such support services, the UNDP country office shall ensure that the capacity of the Government-designated institution the Ministry of Environment is strengthened to enable it to carry out such activities directly. The costs incurred by the UNDP country office in providing such support services shall be recovered from the administrative budget of the office.

3. The UNDP country office may provide, at the request of the designated institution, the following support services covered by the Direct Project Costs, for the activities of the programme/project:

i. Payments, disbursements and other financial transactions
ii. Recruitment of staff, project personnel, and consultants
iii. Procurement of services and equipment, including disposal
iv. Organization of training activities, conferences, and workshops, including fellowships
v. Travel including visa requests, ticketing, and travel arrangements
vi. Shipment, custom clearance, vehicle registration, and accreditation
vii. Security management service and Malicious Acts Insurance Policy
viii. External access to ATLAS for project managers and other staff, Payroll management services and Medical Clearance Services for all staff.

4. The UNDP country office will also provide the following general oversight and management services for the activities of the project which include the following:

i. General oversight and monitoring, including participation in project reviews
ii. Briefing and de-briefing of project staff and consultants
iii. Resource management and reporting
iv. Thematic and technical backstopping

5. The procurement of goods and services and the recruitment of project and programme personnel by the UNDP country office shall be in accordance with the UNDP regulations, rules, policies and procedures. Support services described in paragraphs 3 & 4 above shall be detailed in an annex to the programme support document or project document, in the form provided in the attachment hereto. If the requirements for support services by the country office change during the life of a programme or project, the annex and related section in the programme support document or project document is revised with the mutual agreement of the UNDP resident representative and the designated institution.

6. The relevant provisions of the Standard Basic Assistance Agreement with the Government (the "SBAA") dated 10 February 1986, including the provisions on liability and privileges and immunities, shall apply to the provision of such support services. The Government shall retain overall responsibility for the nationally managed programme or project through its designated institution the Ministry of Environment. The responsibility of the UNDP country office for the provision of the support services described herein shall be limited to the provision of such support services detailed in the annex to the programme support document or project document.

7. Any claim or dispute arising under or in connection with the provision of support services by the UNDP country office in accordance with this letter shall be handled pursuant to the relevant provisions of the SBAA.

8. The manner and method of cost-recovery by the UNDP country office in providing the support services described in paragraphs 3 & 4 above shall be specified in the annex to the programme support document or project document.

9. The UNDP country office shall submit progress reports on the support services provided and shall report on the costs reimbursed in providing such services, as may be required.

10. Any modification of the present arrangements shall be effected by mutual written agreement of the parties hereto.

11. If you are in agreement with the provisions set forth above, please sign and return to this office two signed copies of this letter. Upon your signature, this letter shall constitute an agreement between your Government and UNDP on the terms and conditions for the provision of support services by the UNDP country office for nationally managed programmes and projects.

Yours sincerely,

_____

Signed on behalf of UNDP
Luca Renda
Country Director

_____

For the Government
Name/title: H.E. Mr. Mohamad Al Mashnouk, Minister
Date:

DESCRIPTION OF UNDP COUNTRY OFFICE SUPPORT SERVICES

1. Reference is made to consultations between *the Ministry of Environment*, the institution designated by the Government of Lebanon and officials of UNDP with respect to the provision of support services by the UNDP country office for the nationally managed programme or project ID 00090788 "Sustainable Land Management in the Qaraoun Catchment, Lebanon", the "project".

2. In accordance with the provisions of the letter of agreement signed on *June 2015* and the programme support document *or project document*, the UNDP country office shall provide support services for the Programme or Project ID 00090788 as described below.

3. Support services to be provided:

Support services	Schedule for the provision of the support services	Cost to UNDP of providing such support services based on UNDP Universal Price List (UPL)	Method of reimbursement of UNDP (Annually)
1. Financial Services	Project Duration: 48 Months (from June 2015 through May 2019)	US$ 7,502.82	GLJE
2. Human Resources Services	Project Duration: 48 Months (from June 2015 through May 2019)	US$ 2,503.16	GLJE
3. Procurement services	Project Duration: 48 Months (from June 2015 through May 2019)	US$ 8,653.74	GLJE
4. Travel Services	Project Duration: 48 Months (from June 2015 through May 2019)	US$ 872.06	GLJE
5. General Administration Services	Project Duration: 48 Months (from June 2015 through May 2019)	US$ 378.83	GLJE
6. Revenue Management Services	Project Duration: 48 Months (from June 2015 through May 2019)	US$ 1,051.20	GLJE
Total		**US$ 20,980**	

4. Description of functions and responsibilities of the parties involved:

Support services	Description
Financial Services	- Payment process - Issue check - Vendor profile
Human Resources Services	- Staff selection and recruitment process (advertising, short-listing, interviewing) - Staff HR & Benefits Administration & Management (at issuance of a contract, and again at separation) - Recurrent personnel management services: staff Payroll & Banking Administration & Management (Payroll validation, disbursement, performance evaluation, extension, promotion, entitlements, leave monitoring) - Interns Management
Procurement services	- Consultant recruitment (advertising, short-listing and selection, contract issuance) - Procurement process involving local CAP and/or ITB, RFP requirements (Identification & selection, contracting/issue purchase order, follow-up) - Procurement not involving local CAP; low value procurement (Identification & selection, issue purchase order, follow-up) - Disposal of equipment
Travel Services	- Travel authorization - F10 settlement
General Administration Services	- Issue/Renew IDs (UN LP, UN ID, etc.) - Shipment, customs clearance, vehicle registration - Issuance of visas, telephone lines
Revenue Management Services	- AR Management Process (Create/apply receivable pending item, Issue/Apply Deposit)