Reduction of UPOPs Through Waste Management in a Circular Economy (P172770)

FINAL

Environmental and Social Management Framework (ESMF)

April 27, 2022

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LIST OF ACRONYMS AND ABBREVIATIONS

AGL	Above Ground Level
ALI	Association of Lebanese Industrialists
AP	Affected Peoples
AQMN	Air Quality Monitoring Network
ASPLANTE	Association of Importer and Distributors of Supplies for Agriculture Production in Lebanon
AUB	American University of Beirut
BAT	Best Available Techniques
BEP	Best Environmental Practices
BGL	Below Ground Level
BMI	Body Mass Index
BOD	Biological Oxygen Demand
C/N	Carbon-to-Nitrogen ratio
CAS	Central Administration of Statistics
CBA	Cost-Benefit Analysis
CBD	Convention on Biological Diversity
CDC	Center for Disease Control
CDR	Council for Development and Reconstruction
CDW	Construction and Demolition Waste
CFU	Colony Forming Unit
CNRS-L	Conseil National de la Recherche Scientifique – Liban
COD	Chemical Oxygen Demand
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DO	Dissolved Oxygen
E&S	Environmental & Social
EC	Elemental Carbon
EDL	Electricité du Liban
EEE	Electrical and Electronic Equipment
EHS	Environment, Health, and Safety
EIA	Environmental Impact Assessment
EPC	Environmental Protection Contract
EPR	Extended Producer Responsibility
ERML	Environmental Resources Monitoring in Lebanon
ES	Environmental and Social
ESA	Environmental and Social Audits
ESCP	Environmental and Social Commitment Plan
ESCWA	Nations Economic and Social Commission for Western Asia
ESF	Environmental and Social Framework
ESHS	Environment, Social, Health, and Safety
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan

ESS	Environmental and Social Standards
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FCI	Finance, Competitiveness, and Innovation
FEIA	Full Environmental Impact Assessment
GBV	Gender-based Violence
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gases
GIIP	Good International Industry Practice
GIS	Geographic Information Systems
GOL	Government of Lebanon
GPP	Green Public Procurement
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
HCB	Hexachlorobenzene
HMS	Hazardous Municipal Sludge
HW	Hazardous Waste
HWM	Hazardous Waste Management
IBA	Important Bird Area
ICR	Implementation Completion Report
IEE	Initial Environmental Examination
IEIA	Initial Environmental Impact Assessment
IF	Implementation Framework
IHCW	Infectious Healthcare Waste
ILO	International Labor Organization
IP	Indigenous Peoples
IRI	Industrial Research Institute
ISWM	Integrated Solid Waste Management
LAEC	Lebanese Atomic Energy Commission
LARI	Lebanese Agriculture Research Institute
LAU	Lebanese American University
LBP	Lebanese Pounds
LC	Labor Code
LDN	Land Degradation Neutrality
LFF	Lebanon Financing Facility
LLB	Lower Litani Basin
LMP	Labor Management Procedure
LPD	Land Productivity Dynamics
LRB	Litani River Basin
LRF	Livelihood Restoration Framework
LRP	Livelihood Restoration Plan
M&E	Monitoring & Evaluation
MCM	Million Cubic Meters
MOA	Ministry of Agriculture
MOE	Ministry of Environment

MOET	Ministry of Economy and Trade
MOEW	Ministry of Energy and Water
MOF	Ministry of Finance
MOI	Ministry of Industry
MOIM	Ministry of Interior and Municipalities
MOL	Ministry of Labor
MOPH	Ministry of Public Health
MOSA	Ministry of Social Affairs
MPA	Marine Protected Area
MRF	Materials Recovery Facility
MS	Municipal Sludge
MSW	Municipal Solid Waste
NGO	Non-government Organization
NIP	National Implementation Plan
NMHC	Non-Methane Hydrocarbons
NPTP	National Poverty Targeting Program
NSDSL	National Social Development Strategy
NSEQ	National Standards for Environmental Quality
NSWCC	National Solid Waste Coordination Committee
NSWMA	National Solid Waste Management Authority
OEA	Order of Engineers and Architects
OECD	Organization for Economic Co-operation and Development
OHS	Occupational Health and Safety
OMSAR	Office of the Minister of State for Administrative Reform
PAH	Polycyclic Aromatic Hydrocarbons
PAoI	Project Area of Influence
PAP	Project-affected People
PBDE	Polybrominated diphenyl ethers
PCB	Polychlorinated Biphenyl
PCDD/Fs	Polychlorinated dibenzo-p-dioxins and polychlorinated dibenzo-p-furans
PDO	Project Development Objective
PFOS	Perfluorooctane Sulfonic Acid
PINR	Palm Island Nature Reserve
PM	Particulate Matter
PMU	Project Management Unit
POM	Project Operation Manual
POPs	Persistent Organic Pollutants
PPE	Personal Protective Equipment
PPP	Public–Private Partnership
RDF	Refuse-derived fuel
REP	Roads and Employment Project
RF	Results Framework
SAF	Social Accountability Framework
SC	Steering Committee
SC	Steering Committee
SEA	Sexual Exploitation Abuse

SEP	Stakeholders Engagement Plan
SH	Sexual Harassment
SIA	Social Impact Assessment
SOER	State of the Environment Report
SOP	Standard Operating Procedures
SPA	Specially Protected Areas
SPAMI	Specially Protected Areas of Mediterranean Importance
SPNL	Society for the Protection of Nature in Lebanon
SW	Solid Waste
SWI	Saltwater Intrusion
SWM	Solid Waste Management
TA	Technical Assistance
TCNR	Tyre Coast Nature Reserve
TDS	Total Dissolved Solids
TN	Total Nitrogen
TP	Total Phosphorous
TSS	Total Suspended Solids
ULB	Upper Litani Basin
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UPOPs	Unintentionally released Persistent Organic Pollutants
US EPA	United States Environmental Protection Agency
USAID	United States Agency for International Development
USD	US Dollars
USJ	University of Saint-Joseph
VAC	Violence Against Children
WB	World Bank
WBG	World Bank Group
WFP	World Food Programme of the United Nations
WHO	World Health Organization
WWTP	Wastewater Treatment Plant
β-HCH	beta-Hexachlorocyclohexane

NON-TECHNICAL SUMMARY

PROJECT BACKGROUND

Open burning of Municipal Solid Waste (MSW) emits Unintentional Persistent Organic Pollutants (UPOPs), including dioxins and furans, which are highly toxic to human beings. Most UPOPs emissions can be reduced by improving waste management in a circular economy. Circular economy1 principles offer Lebanon major opportunities for improving resource productivity, stimulating job-creation, and improving competitiveness in the global market. This can only be achieved through investments in technology and legislative change. 3Rs (reduce, reuse, and recycle) of waste management, highlighted as a key principle in law 80/2018, play the major role in the circular economy. Implementing 3R practices in industry value chains supported by improved regulation and economic instruments, investments, and technical assistance will reduce waste entering the economy and valorise waste collected and sorted in the market therefore avoiding entering dumpsites and open burning. Rehabilitating existing dumpsites can also control open burning.

To respond to the need to better manage MSW, MOE and the World Bank prepared the project entitled "Reduction of UPOPs Through Waste Management in a Circular Economy (P172770)" along with the "Environmental and Social Management Framework (ESMF)". Implementation of this project will be done in close coordination with other waste management initiatives and complementary projects.

WORLD BANK'S ENVIRONMENTAL AND SOCIAL FRAMEWORK

Since this project is managed by the World Bank, it has to comply with the requirements of the World Bank's Environmental and Social Framework (ESF). The ESF requires the preparation, consultation and disclosure of several Environmental and Social studies and instruments. These include an Environmental and Social Management Framework (ESMF), a Stakeholder Engagement Plan (SEP) and an Environmental and Social Commitment Plan (ESCP).

The ESMF is a management tool whose format is in line with the requirements of the World Bank's ESF, more specifically ESS1 (Assessment and Management of Environmental and Social Risks and Impacts), and the laws and regulations in Lebanon, to frame the management of potential environmental and social risks associated with the project implementation.

An ESMF has been required now rather than an Environmental and Social Impact Assessment (ESIA) or Environmental and Social Management Plan (ESMP) because the exact types of interventions and their locations have not yet been finalized.

The ESMF along with the Stakeholders Engagement Plan (SEP), will ensure proper, meaningful, and inclusive consultation is carried out with project beneficiaries and any identified vulnerable groups during project preparation and throughout project implementation with an adequately functioning

[1] According to the US Environment Protection Agency (EPA), a circular economy reduces material use, redesigns materials to be less resource intensive, and recaptures "waste" as a resource to manufacture new materials and products. (https://www.epa.gov/recyclingstrategy/what-circular-economy#:~:text=A%20circular%20economy%2C%20as%20defined,their%20highest%20value%20for%20as).

Grievance Mechanism (GM). Additional/separate consultations may also be considered to be undertaken as part of the ESMF with identified vulnerable groups to help inform project design.

The ESCP summarizes all the environmental and social binding commitments that the Government of Lebanon, through the MOE, will implement as part of the project.

PROJECT DESCRIPTION

The proposed project is designed to address the identified barriers to sustainable waste management and to reduce UPOPs emitted from the waste disposal and open burning processes in Lebanon. The project will support combined policy actions, capacity building activities, and demonstrations for promoting the circular economy, especially 3Rs (reduce, reuse, and recycle) of waste management and improving open dumpsites, following the best available techniques (BAT)2 and best environmental practices (BEP)3 guidance adopted by the Stockholm Convention (2007; rev 2019)4, and in line with the World Bank Group Environmental Health and Safety Guidelines. Climate change-responsive techniques to maximize environment and climate co-benefits will be considered and used.

PROJECT SCOPE

The project development objective is to assist Lebanon in reducing unintentionally produced persistent organic pollutants through promoting circular economy and improving open dumpsites in the waste sector.

The Project consists of four (4) components that will be implemented over a six-year period, namely:

Component 1: Strengthen Regulatory Framework and Capacities for Sustainable Waste Management in the Circular Economy

This component aims to improve the policy framework, build capacity and long-term planning for applying a circular economy model in waste management and enhance the technical know-how for UPOPs assessment and measurement through a series of technical assistance (TA) activities. In addition, it will aim to establish a cooperation framework between Government and academia/research centers thus UPOPs research supports policy making. This action is necessary to ensure optimal allocation of national resources and the development of science-based legislative decisions. This component will include three sub-components:

- Sub-component 1.1: Policy framework and capacity building for applying circular economy in waste management;
- Sub-component 1.2: Long-term planning for circular economy in waste management; and
- Sub-component 1.3: Long-term improvements in the management of UPOPs.

[2] "Best available techniques" means the most effective and advanced stage in the development of activities and their methods of operation which indicate the practical suitability of particular techniques for providing in principle the basis for release limitations designed to prevent and, where that is not practicable, generally to reduce releases of chemicals listed in Part I of Annex C and their impact on the environment as a whole.

[3] "Best environmental practices" means the application of the most appropriate combination of environmental control measures and strategies.

[4] http://chm.pops.int/Implementation/BATBEP/BATBEPGuidelinesArticle5/tabid/187/Default.aspx

Component 2: Demonstrations on 3R Practices and BATs/BEPs at Open Dumpsite in Selected Geographic Areas

This component aims to provide investments to demonstrate: (i) 3R practices to reduce waste entering dumpsites/landfills in selected SW service zones; and (ii) BATs/BEPs to eliminate open burning at selected dumpsites. Local authorities, NGOs and private sector stakeholders will be involved and selectively supported with technology transfer/production change, technical trainings, and networking to improve their overall material flows, profitability, viability and reduce their impacts on the environment and people. This component will include two sub-components.

This component will include two sub-components.

- Sub-component 2.1: Design and implementation of 3R practices in key waste streams (reducing the amount of waste disposed of via open dumpsites/open burning); and
- Sub-component 2.2: Implementation of BAT/BEP at selected open dumpsites

Component 3: Project Monitoring and Evaluation

This component will support the implementation of the monitoring & evaluation (M&E) plan and ensure timely and efficient implementation of the M&E plan of the project at the level of the outcome indicators and results by collecting evidence-based information and data, and reporting to the World Bank and the GEF, as well as a mid-term and technical evaluations following the World Bank and GEF guidance. This will also include support for related activities including the project launch and completion workshops.

Component 4: Project Management

This component will support operating costs associated with day-to-day project management and implementation including procurement, financial management, and environmental and social management functions to be carried out by the PMU. The Project will also finance incremental costs in relation to coordination and collaboration with other government agencies, non-government agencies, and the industries and private sector.

SITE SELECTION FOR THE IMPLEMENTATION OF 3R PRACTICES AND BAT/BEP AT SELECTED OPEN DUMPSITES

The selection of the sites is based on the open dumps' survey of 2017 (MOE/UNDP) which surveyed, assessed, and categorized all existing dumps in Lebanon, the analysis included updates on latest developments in the last 4 years (from 2017 to 2021). The dumps survey results were complemented with the following information:

- Status of the dumps: some dumps have already been closed, rehabilitated, or removed.
- Update the volume of waste in dumps by adding the volume generated over the last 4 years assuming same management scenarios still apply.

Other important site selection criteria included the following : (i) Volume of waste at site (m^3): Dumps with volume of waste less than 5,000 m^3 or larger than 200,000 m^3 were considered either as too small or too big for the intervention and thus were excluded; (ii) Distance to rivers and streams: Dumps distance to rivers or streams that is less than 150 m was considered in the narrowing down

exercise; (iii) Distance to urban areas :The distance of dumpsites to urban agglomeration that are less than 500 m were retained in the narrowing down exercise; (iv) Availability of a solid waste management (SWM) system in the area served by the dump after 2017 and any future plans to further the SWM system to confirm funding availability and commitment of municipalities.

A detailed methodology for the sites selection allowed the identification of five (05) service zones and 10 dumpsites as demonstrations sites as indicated in Table 1 below. This preliminary selection of the proposed zones and dumpsites will be subject to further in-depth assessments to confirm the technical, financial, and institutional feasibility of the interventions which will be proposed at the level of the dumpsites as well as within the service zones. These will be based on i) MSW generation rates and waste composition, ii) the distribution of MSW management facilities including collecting, sorting, recycling and composting companies and dumpsites/landfills, iii) the current situation of sorting, recycling and composting facilities and the characteristics, risks/impacts of open dumpsites and potential for their upgrade/improvement, iv) municipalities' engagement in 3R practices and improvement of dumpsites, v) other factors as needed.

Table I. Potential service zones to be covered by the project

Service area	Caza/Mohafaza	SWM Facility	Type of Facility	Open Dumps with open burning
Union of Municipalities of Tyre	Tyre/South	Ain Baal	Sorting and Composting (not operational)	Qana
				Deir Qanoun
Municipality of Abbasiyeh	Tyre/South	Abbasiyeh	Sorting hangar at dump	Abbasiyeh
Union of Municipalities of Iqlim el Touffah	Nabatieh/ Nabatieh	Iqlim el Touffah	Sorting, Composting and Landfilling (planned)	Houmine el Faouka
				Siddiqine
Union of Municipalities of Sahel el Zahrani	Saida/South	Sarafand	Sorting, Composting and Landfilling (planned)	Sarafand
				Marwaniyeh
				Saksakiyeh
Union of Municipalities of Jurd El Kaiteh	Akkar/North	Srar and Jurd El Kaiteh	Sorting, Composting and Landfilling	Fnaydeq
				Mishmesh

DESCRIPTION OF SITE ACTIVITIES

Closure and Rehabilitation of Dumps

The Project will target the selected dumps to rehabilitate and close where a sustainable solid waste management system is in place to prevent the formation of a new dump as soon as an old one is closed.

The dumps can be closed and rehabilitated, either off-site (excavating and transferring the waste to another location) or on-site (in-situ rehabilitation and closure) as follows:

- Off-site:
  - Excavate, treat and transfer waste to a sanitary landfill;
  - Excavate and transfer waste directly to a sanitary landfill;
  - Convert the existing dump to a sanitary landfill.
- On-site:
  - In-situ grading, capping of the waste and managing gases and leachate;
  - In-situ excavation, lining, grading, capping of the waste, managing gases and leachate.

In order to decide which option to adopt, a detailed site assessment will be conducted. This should include visual inspection, topographic survey, initial assessment study, sampling, waste characterization, volume calculation, shop drawings, as built drawings and all necessary work needed to assess conditions of the dump and determine the actual volume of the waste.

Key Waste Streams to be Addressed

The key criteria for implementing 3R practices and circular economy is to transition from a comingled waste collection system towards a separate collection system in which different types of waste are collected and managed separately. These include:

- 3-way streams segregation at the source in compliance with MOE Decree 5605 /2019. The three (03) streams are the following:
  - Dry recyclable materials (plastic, metal, glass, paper, cardboard, etc.)
  - Wet materials (Organic material and food waste)
  - Waste Residues
- Food waste through implementing of home composting initiatives in selected rural communities and households that possess a garden or a backyard
- Agricultural waste from pruning, tree clipping, cutting, mowing, etc. These can be collected separately, shredded, and transformed into compost along with organic waste
- E–waste (phones, laptops, PCs, TVs, fridges, washing machines, etc.), textiles and clothing, furniture, tires, C&D waste, etc.

3R Activities (Reduce, Reuse, Recycle) that can be Implemented

The Project will support a menu of 3R practice options as proposed below to show how a Circular Economy presents key opportunities for green growth and job creation, while also addressing the critical problems of resource degradation and environmental contamination.

In each service area where open burning of dumpsites is taking place, a Solid Waste Management plan will be established and implemented based on the 3R practices through the following:

a) Waste characterization analysis for the selected geographic areas and exploration of best opportunities for adoption of 3R
b) Identify sources and pathways of UPOPs in the waste streams and ensure that appropriate measures are in place for their recovery and proper management.
c) Sorting waste at household level and from commercial establishments to maximize recyclable recovery rates: a three-bin system could be a suitable solution to start with (recyclable waste, organic waste, and residual waste).
d) Upgrade of existing sorting and recycling facilities, including trucks for different waste types, use of sensor technology and automation of dismantling and sorting, etc.

The Project will specifically address waste collection and sorting systems with a potential for economic feasibility and cost recovery such as extraction of paper products from waste streams, production of liquid fertilizer and biogas in target agribusiness and manufacturing facilities, making biodegradable or compostable packaging, and recycling of glass waste.

ENVIRONMENTAL AND SOCIAL IMPACT OF THE PROJECT

Overall, the project is expected to be beneficial to the country and the people by reducing pollution and protecting the environment, with significantly positive environmental and social benefits through the introduction of circular economy principles and tools. The successful implementation of the project will effectively improve collection, reduction, and disposal of solid waste in the targeted geographical areas and accordingly reduce UPOPs. The expected environment and health benefits that accrue from the reduction of dioxins emissions from the waste disposal and open burning processes.

Circular economy will bring major economic, environmental, and social benefits[5] to industries, contributing to innovation, growth, and job creation. Implementing 3R practices in the targeted geographic areas will bring such benefits to the local communities. It is expected to significantly contribute to diverting wastes from landfills, which is critical in Lebanon whereby land is scarce and there is substantial competition for land and an acute NIMBY (Not in my backyard) syndrome.

Though the project will reduce pollution and protect and improve the environment, it is possible that potential environmental and social impacts and risks may still come out with varying degrees during the specific activities of the project. Since many specific activities in this project need to be determined during the implementation process, this framework document only makes a qualitative analysis of environmental and social risks and impacts based on the existing preliminary suggestions of the project. Detailed analysis, assessment and rating of potential adverse environmental and social risks will be undertaken under sub-component-specific environmental and social due diligence.

The project is foreseen to create various job opportunities particularly for villages in close vicinity to the landfills. This may include jobs for daily operations at the dumpsite, waste sorting at the material

[5] Key benefits include: resource efficiency in industries' global supply chain – producing quality, quantity and consistency of a secondary raw material and creating value and brand image; risk management – raw material shortage, disruption in the supply chain; and environmental efficiency – eliminating toxic material, reducing waste, pollution, CO_2 footprint, etc.

recovery facility, composting facility, collection, and other areas along the waste management chain. Operations will require jobs for various backgrounds and qualifications including for poor people with low and medium skills. The project will spread awareness of job opportunities within surrounding communities with consideration for the poor and vulnerable groups, and will prioritize local sourcing of supplies and materials whenever possible.

The main environmental and social risks and mitigation measures during the construction/rehabilitation and operational phases of the project are presented in the tables below.

Table II Environmental Risks and Mitigation Measures – Construction/Rehabilitation Phase

Impact	Description	Mitigation Measures
Air quality	Civil works will be required in case of closing/rehabilitation/ MRF, composting facility, access road, and other facilities. Construction activities can cause temporary ambient air pollution, and may cause additional uncontrolled release of gas.	• Monitor air quality in residential areas during construction phase to be put in place • Monitor possible gas release • Limit construction hours (day times) • Stabilize the exposed surfaces • Minimize activities that suspend dust particles • Apply water to the areas to be excavated, loading and unloading areas and unpaved roads • Develop a wheel wash at the entrance to public roads or exit of the landfill construction site • Implement speed controls on-site • Maintain enough loading capacity of lorries and barges to avoid spillage • Cover soil stockpiles with erosion control blankets • Use hoarding to avoid wind-blown dust • Apply good construction practices
Noise	Civil works will be required for closing/ rehabilitation, MRF, composting facility, access road, and other facilities. Construction activities can cause temporary noise pollution.	• Generally, it is expected that the noise will not be high enough to interrupt sleep or disrupt normal activity. • It is anticipated that construction activities will not be operational during the late hours; therefore the impact on evening averages of ambient noise will be little. • Optimize the use of machines and noisy equipment • In case of receiving complaints from neighboring areas regarding noisy operations acoustic barriers can be placed • Construction works should be stopped at night-time
Storage of excavated soil and daily waste cover	Soil will need to be excavated for cover of dumpsites or rehabilitation works	• The area allocated for soil storage should be selected so that no un-favored pattern of surface water collection should be developed (e.g. stagnant water ponds for long times). • Ensure that the height of the spoil will not cause unaccepted visual impacts to adjacent areas • Use excavated soil in the landfill development and daily operations: usage as daily cover of waste, or usage in establishing side embankments for containing the waste. • Use excavated soil for coverage for closing of dumps (re-cultivation layers of the final cover) • Soil excavated in the direct vicinity of the existing dump site has to be sampled to assess the extent of contamination. If found contaminated, it shall only be used for daily operation

Impact	Description	Mitigation Measures
Waste Management	Construction and dumpsite rehabilitation activities will lead to the generation of wastes	• Prepare Construction waste management plans as part of ESIA/ESMPs • Segregate construction wastes • Ensure construction wastes are collected and disposed of in appropriate facilities

Table III Environmental Risks and Mitigation Measures – Operation Phase

Impact	Description	Mitigation Measures
Dumpsite leachate	Existing dumpsites all lack leachate collection and treatment systems, thus causing severe pollution to the environment. Project will strongly reduce pollution due to rehabilitation/ closure of existing sites.	• Lining and leachate collection and treatment if practical • Waste placement and daily cover • Ensure access to safe water supply for local communities • Ground water quality monitoring
Dumpsite gas	Existing dumpsites all lack gas collection and treatment systems, thus causing air pollution. Project will significantly reduced emissions.	• Waste coverage • Gas collection and treatment if practical • Disposing organic waste in composting facilities
Ecosystems, water, biodiversity	All current sites are developed and operated as open dumpsite, without any measures in place to prevent pollution.	• Waste coverage • Leachate collection and treatment if practical • Installation of lining systems • Zoning of vital habitats and ecosystems • Monitoring of species presence and pollution • Flood protection measures • Not accepting hazardous waste
Odor	Existing sites cause significant odour due to operations as open dumpsite. Project activities will significantly reduce odour compared to current status.	• Waste coverage • Well-designed and operated Material recovery and composting facility
Hazardous waste	Currently no monitoring of disposal of hazardous waste at existing sites. Reduced risk for disposal of hazardous waste mixed with municipal waste due to improved operations and regulations.	• Regulations for dumpsite and landfill operation to provide a list of acceptable and non-acceptable waste. Non-acceptable waste needs to be strictly forbidden from admission • Awareness to avoid a mixing of waste • All workers to be provided with protection equipment, training in waste handling, and strict supervision. • Prepare emergency response plan
Visual impacts and aesthetics	Rehabilitation of the current sites and mitigation measures (incl. daily waste coverage) will lead to improvements in current aesthetics, particularly affecting nearby communities.	• Daily waste coverage • Windbreak trees • Fencing of site and buffer zone

Impact	Description	Mitigation Measures
Impacts after dumpsites closure	Key environmental impacts without adequate closure include air pollution due to continuing waste decomposing processes, risks of open fires, and contamination of groundwater due to uncollected leachate.	• Final closure cover: final closure cover is key to reduce and prevent water pollution from leachate as well as minimizing odour impacts, landfill gas generation, visual impacts, disease vectors, and prevention of slope collapsing. • Final capping system be installed progressively through time after the waste has been placed to its ultimate level over each cell or portion thereof. • Establishment of impermeable linings may be considered • Measures to minimize remaining leachate after closure will depend on detailed assessments and monitoring of groundwater pollution, soil permeability, and impacts on any nearby residential areas.

Table IV Social Risks and Mitigation Measures - Construction/Rehabilitation Phase

Impact	Description	Mitigation Measures
Economic displacement and livelihoods impacts	This may include impacts on waste pickers at the existing dumpsite; livelihood impacts on children; impacts on landowners; impacts on nearby communities. Children waste pickers, cannot be permitted to participate in waste recycling activities and will require livelihood restoration support and further livelihood support options.	• General impact on waste pickers will be positive as waste pickers will continue to have access to the waste resources under improved Occupational, Health and Safety conditions. • Meaningful consultations with neighbouring communities, waste pickers and other potential affected people a potential site • Priorities site options that ensure continued access to waste resources for waste pickers • In case of lost access to waste resources provision of Livelihood restoration assistance • Livelihood support options for children waste pickers as per the ESF. • Ensure awareness of job opportunities within surrounding communities and consideration for vulnerable groups through further livelihood support activities
Community Health and Safety	Rehabilitation and extension works at the dumpsites and construction of other waste facilities can have negative impact to neighbouring communities' health and safety from potential environmental pollution, nuisances, odour, and accidents.	• Supervision of the construction works and clear obligations and code of conduct for firms. • Regular information on progress and Environmental and Social compliance for local communities • Establishing a clear grievance redress system • Monitor labor management procedures • Communicate information about the hours of construction with the local population
SEA/SH	Influx of workers may induce risks of SEA/SH.	• Supervise application of OHS regulations and code of conduct on SEA/SH • Public hearings and meaningful consultations. • Restriction from access to the construction site • Establishing a clear grievance redress system

Table V Social Risks and Mitigation Measures - Operations Phase

Impact	Description	Mitigation Measures
Community Health and Safety and Occupational Health and Safety	Rehabilitation and extension of current dumpsites, or closure of existing sites and development of new sites, can have negative impact to neighboring communities' health and safety from potential environmental pollution, nuisances, odor, and accidents.	• The application of modern dumpsite/landfill operations and inclusion of performance indicators for management and operation performance in contracts, for instance waste compaction and daily soil coverage, will limit the potential for the development of resident populations of vermin and pests • Gas collection and composting to remove larger part of the organic fraction • Leachate collection and treatment • Lining system and daily waste cover and in case of closure final waste cover • Fencing of site, planting trees, • Provision of PPE, training and adherence to OHS procedures • Provision of appropriate PPEs and training • Health checks
SEA/SH	Influx of workers may induce risks of SEA/SH.	• Supervise application of OHS regulations and code of conduct on SEA/SH • Public hearings and meaningful consultations. • Restriction from access to the construction site • Establishing a clear grievance redress system
Job opportunities	The project is foreseen to create various job opportunities particularly for villages in close vicinity to the landfills. This may include jobs for daily operations at the dumpsite, waste sorting at the material recovery facility, composting facility, collection, and other areas along the waste management chain. Operations will require jobs for various backgrounds and qualifications including for poor people with low and medium skills.	• Ensure awareness of job opportunities within surrounding communities and consideration for poor and vulnerable groups • Transparent information sharing about the created job opportunities particularly in local areas. • Fair recruitment procedure to ensure equal employment opportunities and non-discriminatory actions. • Local sourcing of supplies and materials whenever possible
Impacts on property value	The project foresees a wide range of measures that will positively affect land prices around the existing dumpsites.	• Gas collection and treatment • Leachate collection and treatment • Lining system • Daily waste cover or in case of closure final waste cover • Waste sorting • Fencing and buffer zones

RISK CLASSIFICATION AND IMPACT MANAGEMENT FOR THE SUB-PROJECTS

The anticipated sub-projects are screened to determine the significance of associated environmental and social risks. The screening is undertaken in line with the World Bank Environmental and Social Risk Classification (ESRC), rating risks as High, Substantial, Moderate and Low Risks, based on a range of relevant factors which may include:

- Type, location, sensitivity, and scale of the project;
- Nature and magnitude of the potential environmental and social risks and impacts;
- Capacity and commitment of the implementing agencies to manage the environmental and social risks and impacts consistent with the ESF;
- Legal and institutional considerations;
- Nature of the mitigation and technology being proposed;
- Governance structures and legislation; and
- Considerations relating to stability, conflict, or security.

As per the analysis, mitigation measures and environmental and social risks of sub-projects envisaged under the Project, Table VI describes the risk ratings given for the different types of project activities and the environmental and social management tools to be developed and implemented within the project.

Table VI Sub-projects Environmental and Social (E&S) Risk Classification and E&S Management Tools

Risk Rating	Definition	Project Activity	Applicable E&S Tools
High	The project will possibly cause a wide range of significant environmental and social risks and adverse impacts on the population and environment. Some of the impacts can't be mitigated by now, or with special situations such as requiring complex and / or unproven mitigation and/or compensation measures or techniques.	None identified.	Not Applicable
Substantial	Some of the E&S impacts of the project are possibly significant, but with reliable mitigation and/or compensation measures will be designed.	Dumpsite rehabilitation/ closure and/or operation, material recovery, composting.	ESIA, ESMP, LRP (if triggered)
Moderate	The project has potential E&S risks or adverse impacts which are possibly not significant and can be mitigated in predictable ways.	Waste sorting, transportation, recycling, material recovery.	ESMP
Low	The potential adverse risks and impacts on humans and / or the environment may be small or negligible.	Sorting at source, collection	E&S screening and inclusion of potential impact as part of the ESMP

According to the sub-project risk classification and the requirements of the corresponding E&S impact assessment document form confirmed by the World Bank, the Project Management Unit (PMU) shall employ qualified environmental and social consultants to prepare the site-specific environmental studies for the sub-projects according to the applicable environmental and social standards (ESS) under the ESF of the World Bank and the applicable national regulations.

The national EIA Decree 8633/2012 requires that either an Initial Environmental Examination (IEE) or and Environmental Impact Assessment (EIA) report be submitted to the MOE for review and approval. In order to ensure alignment, a national EIA will be prepared as an ESIA in line with both national and international standards, and an IEE will be prepared as an ESMP report.

In the light of key characteristics of the physical, biological, and socio-economic environment of the potential project sites, which are deemed to be of significance in determining the potential impacts of project activities, the site-specific ESIAs/ESMPs will identify and evaluate the following:

- Site-specific environmental and social characteristics, including the presence of the informal sector and waste pickers that could be negatively affected by the project;
- Direct and indirect environmental and social impacts likely to arise from project activities;
- Sub-projects that will require cumulative impact assessment, emergency response plans, risk hazard analysis;
- Appropriate measures to minimize potential significant environmental and social impacts;
- An environmental and social management plan to mitigate environmental and social impacts;
- Appropriate compensation for impacts that cannot be mitigated;
- Institutional arrangements to oversee the proposed project activities including the necessary capacity building program;
- Opportunities for public benefit throughout the lifetime of the project;
- Opportunities for stakeholders to register grievances through an adequately functioning Grievance Mechanism and widespread communication of project activities throughout project lifecycle;
- Feedback from stakeholders to inform project design in inclusive stakeholder engagements; and,
- A comprehensive monitoring program to evaluate the impacts of project activities.

Furthermore, since the closure of dumpsites will be implemented in close coordination with other facilities that will be receiving the wastes once the dumpsite is closed, an ESMP including an environmental audit will be conducted for these facilities to ensure that they also comply with the relevant environmental and social standards. Close coordination with other lenders or donors implementing these projects will be maintained to ensure they integrate any findings from the ESMP in their project implementation.

STAKEHOLDER IDENTIFICATION AND CONSULTATION

The main goal of the stakeholders' consultations and engagements is to ensure stakeholders, and particularly local communities in the targeted geographical areas are aware of the planned project activities and understand the possible environmental and social implications of such activities. The consultations aim also to improve the design of the project by adding some concrete propositions that are relevant to the project and that help ameliorate its outcome.

Stakeholder identification is undertaken to support better communications and build effective relationships. The participation process is inclusive, whereby all stakeholders are encouraged to be involved in the consultation process, to the extent the current circumstances permit. Equal access to information is provided to all stakeholders. Sensitivity to stakeholders' needs is the key principle underlying the selection of engagement methods. Special attention is given to vulnerable groups, including waste pickers and women. Information will be provided to and widely distributed among all stakeholders in an appropriate format.

The Stakeholder Engagement Program (SEP) will be undertaken throughout the project stages, namely during Project preparation, before start of activities, and throughout the project lifetime during operation. The Project documents and tools will be disclosed in a timely and easy to access manner including the ESMF, ESCP, SEP, GM / GBV referral pathways, and ESIA/ESMP when relevant. The information will be disseminated by posting of documents on the websites of MOE and the World Bank, and having hard copies made available at the identified municipalities and distributed during consultation meetings.

A series of consultation meetings and targeted focus group discussions with affected parties will be organized throughout the project lifetime. Sessions may be conducted remotely depending on COVID-19 restrictions and as applicable.

The stakeholders identified for the proposed project are the following, with a possibility of adding relevant stakeholders according to the needs of the project:

a. Public Institutions:

At the National Level: Ministry of Environment (MOE), Ministry of Interior and Municipalities (MOIM), Ministry of Industry (MOI), Ministry of Finance (MOF), Ministry of Agriculture (MOA), Ministry of Public Health (MOPH), Office of the Minister of State for Administrative Reform (OMSAR), Council for Development and Reconstruction (CDR), and Environment Committee at the Lebanese Parliament.

Within the Project possible Geographic Areas of Intervention: Governorates of South Lebanon, Nabatiyeh and Akkar, Quaemmaqams of Akkar, Nabatiyeh, Saida and Tyre, Union of Municipalities in Tyre, Iqlim el Touffah, Jurd el Kaiteh, El Zahrani, Municipalities of Qana, Deir Qanoun , Abbasiyeh, Houmine El Faouka, Siddiqine, Fnaydeq, Mishmesh, Sarafand, Marwaniyeh, Saksakiyeh.

b. Private Sector Institutions: Association of Lebanese Industrialists (ALI), Recycling Industries, Solid Waste Management Companies
c. International Organizations: European Union, UNDP, and USAID amongst others.
d. Civil society and nongovernmental organizations: ISWA International, Arcenciel, Waste Coalition, Green Globe, Terre Liban, Baldati, Compost Baladi, Green Line, Amwaj Environment, Greenpeace, Green Mind Beirut, World Vision Lebanon
e. Academia: American University of Beirut, University of Balamand, Lebanese American University, and the Lebanese University.
f. Media: Conventional media such as TV, Radio and Newspapers, as well as social media.
g. Vulnerable groups including waste pickers, women, youth and disabled persons.

An online consultation session was successfully held on February 10, 2022, including 35 participants, of which 18 were women, from central government, local authorities, private sector, academia, NGOs and international organizations. The main objective of the consultation was to present the ESMF as well as the Stakeholder Engagement Plan (SEP) and the Environmental and Social Commitment Plan (ESCP), and to seek the views and comments from stakeholders prior to disclosing the documents. The main issues and comments raised by various stakeholders included the following:

- It is critical to conduct robust feasibility studies for each sub-project to ensure they are sustainable from a financial point of view;
- Most stakeholders have raised the importance to implement the project with the highest levels of transparency and to engage with stakeholders throughout all stages of the project implementation including during site selection and projects selection, review of tender documents and terms of references; this is critical to re-establish trust between the population and the government entities, in this case MOE; projects should be selected on the basis of clientelism as it has happened in the past; PMU plays an important role in this aspect;
- It has been clarified that the grant from the Global Environment Facility (GEF) is for a total amount of USD 10 million to finance the two components of the project; about USD 6.5 million are available to implement projects at two (2) locations); Procurement activities will be carried out following the World Bank's system. PMU staff will be formed for this project to ensure the transparency of any procurement. TORs will be developed by the PMU;
- Stakeholders raised the importance to build MOE's capacity to be able to implement the ESCP especially given the current situation and financial crisis whereby MoE is severely understaffed and has limited resources;
- Stakeholders expressed concern in implementing projects that require a functional and independent judicial system and proper accountability and resources to enforce environmental and technical measures; stakeholders mostly referred to Refuse-Derived Fuels (RDF) and their use; any project related to waste-to-energy faces significant public opposition in Lebanon;
- Other stakeholders and particularly waste experts, were however of the opinion that without RDF, it would be challenging to achieve significant diversion of wastes from landfills;
- Stakeholders generally welcomed the piloting nature of the project and expressed the importance to develop sustainable waste management models to be replicated in the Lebanon;
- The example of the closure of the Bourj Hammoud dumpsite, one of the largest dumpsites in Lebanon that used to cover Beirut and Mount Lebanon was raised; significant problems were faced with waste pickers whom used to recover wastes from the site; this further re-emphasizes the importance to engage with waste pickers during project design to ensure their integration in the projects where applicable;
- Stakeholders also emphasized the critical role that the private sector and particularly the industrial sector plays in promoting circular economy principles and for creating a market for the recovery of materials; it is very important that Component 1 supports the creation of an enabling environment for circular economy and to provide incentives to the private sector to sustain their operations and create suitable market conditions; an example was provided of a major glass manufacturing industry that used to receive glass to produce recycled glass and which had to discontinue its operations because glass imported from Egypt was cheaper that recycled glass produced in Lebanon; this has led to the accumulation of glass wastes in the environment; recycled rubber in Lebanon is also currently more expensive from the one imported from Turkey for example; if this is not addressed, tires will continue to be burned leading to generation of UPOPs;
- Component 1 should also create a competitive environment for national recyclable products and provide protection from cheap imported products;

- Some stakeholders provided inputs to the Grievance Mechanism and explained successful experiences in other projects (eg. LEPAP) with the adoption of a multi-layered approach (first level complaint to the facility operator, second level to the municipality and third level to PMU);
- Stakeholders also asked about site selection and implementation criteria; it was clarified that the entry point to the project site would be through the dumpsite rehabilitation project but the 3R initiatives would be implemented on a wider area (eg. Caza or Union of Municipalities); it was highlighted that it is important to consider not only the dumpsite rehabilitation as a main element of site selection, but also whether the region has a favourable environment for a successful implementation of circular economy principles (eg. proximity to industrial sector, etc.);
- Most stakeholders emphasized the importance of an inclusive approach to waste management whereby all stakeholders are engaged: women, local communities, waste pickers and informal sector, municipalities, schools, and private sector; successful examples of sorting at the source projects were described whereby such an approach was instrumental to the project's success; the 3P partnership model was also proposed to be adopted (People, Private and Public); successful initiatives promoting home composting and partnering with poultry and pig farms to use organic wastes were explained; the importance of adopting a bottom-up approach in project implementation was raised by various stakeholders;
- The importance of not charging the people with any fees was raised. Instead, the adoption of incentives should keep them engaged. All parties should be involved and should receive incentives to encourage them to sort their waste at source. Door-to-door campaigns, awareness campaigns at schools, and similar activities should be encouraged to train the communities on sorting from source. A monitoring system needs to be established to keep track of the sorted waste;
- Several stakeholders mentioned the need to build on success stories and to learn from past failures; for example, commingled wastes should not be used as a source of compost for farmers (only green wastes and/or wastes sorted at source) and RDF can not be promoted if the regulatory environment is not in place (eg. remove PVC from RDF stream, develop specifications, etc.);
- It has been suggested to form local committees to monitor the implementation of the projects and provide a foundation to increase trust between people and the government and strengthen the projects governance; this approach can support overcome the NIMBY syndrome which is still very acute in Lebanon; innovative project governance solutions are needed;
- Lebanon continues to rely on landfilling to manage wastes which is not sustainable; the example of a recent landfill project was provided whereby the landfill reached capacity in less than 2 years instead of its design capacity of 5 years; this further emphasizes the importance to promote 3R concepts and waste circularity principles in waste management; and
- Key pillars for the success of the project were proposed: policy and regulatory framework, institutional/governance, sound technology and financial sustainability; the regulatory framework must be well-developed to ensure successful implementation of the project; this includes for example a framework for Extended Producer Responsibility, clear permitting procedures and responsibilities in line with Law 80/2018, and specific waste stream regulations such as for packaging.

INSTITUTIONAL ARRANGEMENTS

The Ministry of Environment is the leading governmental institution concerned with environmental issues in the country. Within its core responsibilities is the management of solid waste and UPOPs. The MOE is the national authority in charge of the implementation of the global environmental treaties including the Stockholm, Minamata and Basel Conventions. Other governmental agencies are cooperating in waste management and chemical life cycle include the Ministry of Agriculture (MOA), Ministry of Interior and Municipalities and the Ministry of Industry (MOI). The proposed project will be implemented by a newly established Project Management Unit (PMU) under MOE.

The PMU under the Ministry of Environment will prepare and submit to the WB regular monitoring reports on the environmental and social performance of the Project, including but not limited to the implementation of the ESCP, status of preparation and implementation of E&S documents required under the ESCP, stakeholder engagement activities, functioning of the grievance mechanism

GRIEVANCE MECHANISM (GM)

An effective and responsive Grievance Mechanism facilitates project progress by reducing the risk that unaddressed complaints eventually lead to implementation delays, lengthy court procedures, or adverse public attention. The primary purpose of the GM however will be to provide clear and accountable means for project beneficiaries and affected persons to raise complaints, including concerns of possible tensions and feelings of exclusion, as well as to seek remedies when they believe they have been harmed by the project.

The GM will be accessible to all relevant stakeholders who can use this mechanism to send their suggestions, concerns and complaints related to the project. The complaints, suggestions and concerns can be sent by e-mail, mail, phone, in person and other means. The phone number, e-mail address, and address for receiving complaints will be disclosed among the project stakeholders and will be posted at project sites and relevant Municipalities' premises once the project becomes effective.

ENVIRONMENTAL AND SOCIAL COMMITMENT PLAN

The MOE will implement material measures and actions so that the Project is implemented in accordance with the World Bank's Environmental and Social Standards (ESSs). This Environmental and Social Commitment Plan (ESCP) sets out those material measures and actions, any specific document, plan, and instrument to be prepared, updated, disclosed, consulted upon, adopted and implemented, all in a manner acceptable to the Bank as well as the timing for each of these. The MOE is responsible for compliance with all requirements of the ESCP and shall monitor the implementation of specific measures and actions conducted by other authorities and contractors.

The main measures and actions to be undertaken include:

- Monitoring and reporting requirements
- Preparation of ESIA/ESMP and other identified environmental and social safeguard studies for demonstration projects including also ESMP / environmental audits for facilities that will be receiving the wastes after closure of the dumpsites

- Preparation of Labor management procedures (LMP) including an operational workers grievance mechanism
- Preparation of an Occupational Health and Safety Management Plan (OHSMP)
- Preparation of a livelihood restoration plan (LRP) in line with ESS5 in case impacts on livelihood, particularly on waste pickers, are triggered by any of the project interventions
- Prepare, adopt, maintain, and operate a grievance mechanism, as described in the SEP
- Provide training and information dissemination to the public and community groups on relevant topics.

1 PROJECT DESCRIPTION

1.1 PROJECT BACKGROUND

Currently, the solid waste in Lebanon is around 79% disposed in landfills and open dumps. In 2020, the Ministry of Environment (MOE) conducted a country-level Material Flow Analysis (MFA) of municipal solid waste (MSW) using limited and estimated data, which shows that about 36% of the total MSW ends in open dumpsites, which is about 969,750 tons/year exposed to open burning.

In 2011 a national survey was carried out to identify all MSW dumpsites. As a result, 504 MSW dumpsites were identified across Lebanon, out of which 76% (382) were operational and 24% (122) were non-operational. The volume of MSW in operational dumpsites was 2,675,548 m^3 while that in non-operational dumpsites was 774,523 m^3. In the 2016, there had been an updated survey, 617 MSW dumpsites were identified. About 55% (341) of the MSW dumpsites were identified as operational and 43% (263) as non-operational MSW dumpsites, and 2% (13) were inaccessible. Similar to the findings of the 2011 survey, the highest number of operational dumpsites in the 2016 survey is present in 'Nabatieh and South Lebanon area' which had around 37% (127) of the operational dumpsites, followed by 'Beqaa and Baalbek/Hermel area' with 28% (96). Industrial solid waste is dumped with MSW since no industrial waste treatment facilities exist in the country. A Master Plan for the Closure of Uncontrolled dumpsites was prepared by MOE in 2011 and updated in 2017 to prioritize the closure and rehabilitation of these dumpsites.

In October 2018, the Government of Lebanon (GOL) ratified its first Integrated Solid Waste Management (ISWM) Law. In September 2019, it also approved a Framework Decree for the "Fundamentals of Hazardous Waste Management". As per the draft National Solid Waste Management Strategy (2019), Lebanon is to move toward a 'circular economy' to realize resource recovery opportunities and to grow recycling sector investment and jobs. Thus, around 50% increase in reuse and recycling rates of products had been set to be achieved within 10 years from the strategy adoption. A Strategic Environmental and Social Assessment (SESA) of the strategy is currently being developed under the leadership of MOE.

The National Implementation Plan on Persistent Organic Pollutants (NIP POPs) updated in 2017 revealed that waste burning processes is the source of 26% of the total PCDD/PCDF emissions, ranking second after disposal activities (61%). Waste burning accounts for over 95% of both air and land PCDD/PCDF emissions from open burning processes.

In Lebanon, most Unintentional Persistent Organic Pollutants (UPOPs) emissions can be reduced by improving waste management in a circular economy. Circular economy principles offer Lebanon major opportunities for improving resource productivity, stimulating job-creation, and improving competitiveness in the global market. This can only be achieved through investments in technology and legislative change. 3Rs (reduce, reuse, and recycle) of waste management play the major role in the circular economy. Implementing 3R practices in industry value chains supported by improved regulation and economic instruments, investments, and technical assistance will reduce waste entering the economy and valorize waste collected and sorted in the market therefore avoiding entering dumpsites and open burning. Rehabilitating existing dumpsites can also control open burning.

One of the key barriers to boosting 3R practices is the presence of toxic substances in waste streams. In a rapid assessment in 2019 supported by EBRD, the total quantity of industrial hazardous waste generated in 2019 was estimated at about 71,800 tons/year, distributed in key sectors including chemicals, petroleum/coal/gas, transport, and textile/clothing/footwear. Currently, the country lacks the adequate infrastructure for collection, treatment, and disposal of hazardous waste. Industrial hazardous waste is rarely sorted; it usually ends up in the MSW streams or is directly discharged into the environment by open dumping, open burning and disposal in water streams and the sea. Improving hazardous waste management including POPs waste is, therefore, critical to reduce the exposure risk and establish a ground for sustainable material loop in the country.

Information and monitoring barriers, lack of regulations on the environmental permits for hazardous chemical emissions and releases, weak institutional framework for effective operational coordination among key stakeholders involved in chemical and waste management, technical and infrastructure barriers and financing barriers are preventing the GoL to progress at the needed pace to implement ISWM projects in line with the requirements set-out by the Law.

1.2 PROJECT DESCRIPTION

The proposed project is designed to address the identified barriers to sustainable waste management and to reduce UPOPs emitted from the waste disposal and open burning processes in Lebanon. The project will support combined policy actions, capacity building activities, and demonstrations for promoting the circular economy, especially 3Rs (reduce, reuse, and recycle) of waste management and improving open dumpsites, following the best available techniques (BAT)[6] and best environmental practices (BEP)[7] Guidance adopted by the Stockholm Convention (2007; rev 2019)[8], and in line with the World Bank Group Environmental Health and Safety Guidelines. Climate change-responsive techniques to maximize environment and climate co-benefits will be considered and used.

This project will contribute to building the circular economy as a pathway for Lebanon's green growth and sustainable development in post COVID-19 era, as the project will promote circular solutions to reduce unsustainable resource extraction and environmental degradation, specifically through demonstrations in selected areas to minimize waste and promote sustainable business practices including green chemistry, extended producer responsibility and green public procurement.

1.3 PROJECT SCOPE

The project development objective is to assist Lebanon in reducing unintentionally produced persistent organic pollutants through promoting circular economy and improving open dumpsites in the waste sector.

[6] "Best available techniques" means the most effective and advanced stage in the development of activities and their methods of operation which indicate the practical suitability of particular techniques for providing in principle the basis for release limitations designed to prevent and, where that is not practicable, generally to reduce releases of chemicals listed in Part I of Annex C and their impact on the environment as a whole.

[7] "Best environmental practices" means the application of the most appropriate combination of environmental control measures and strategies.

[8] http://chm.pops.int/Implementation/BATBEP/BATBEPGuidelinesArticle5/tabid/187/Default.aspx

The Project consists of four (4) components that will be implemented over a six-year period, namely:

Component 1: Strengthen Regulatory Framework and Capacities for Sustainable Waste Management in the Circular Economy

This component aims to improve the policy framework, build capacity and long-term planning for applying a circular economy model in waste management and enhance the technical know-how for UPOPs assessment and measurement through a series of technical assistance (TA) activities. In addition, it will aim to establish a cooperation framework between Government and academia/research centers thus UPOPs research supports policy making. This action is necessary to ensure optimal allocation of national resources and the development of science-based legislative decisions.

This component is comprised of three sub-components, described below:

- Component 1.1. Policy framework and capacity building for applying circular economy in waste management
- Component 1.2. Long-term planning for circular economy in waste management
- Component 1.3. Long-term improvements in the management of UPOPs

Subcomponent 1.1: Policy framework and capacity building for applying circular economy in waste management

This subcomponent builds upon existing legal framework such as the Integrated Solid Waste Management (ISWM) Law and the Public Procurement Law to support a reform process at the Government's level for developing and implementing resource efficiency policies that promote eco-innovation especially in the waste management cycle chain. This subcomponent will (i) assess local analytical capacity and priority of pollutants to be measured based on their relevance in the country and build capacities of national laboratories (public and semi-public) and academic research laboratories to test for Persistent Organic Pollutants (POPs) parameters (mainly UPOPs in materials such as municipal waste, soil, air samples, etc.); (ii) provide needed infrastructure for UPOPs assessment, measurement, analysis, and prevention measures; and (iii) to assess and rehabilitate the existing national Air Quality Management Network (AQMN) with UPOPs assessment in areas covered by the project and other areas with potential high UPOPs' emissions levels. The 2017 National Implementation Plan (NIP) for POPs recommended to establish a cooperation framework between Government and Academia/Research centers, as POPs research supports policy making. This action is necessary to ensure optimal allocation of resources and the development of science-based legislative decisions and to stimulate research on green and sustainable chemistry and alternative assessment. This subcomponent will (iv) set clear standards for the suppliers and manufacturers using recycled materials, voluntary or mandatory standards can help markets operate more effectively. This will be done by establishing a Technical Committee (including members from both central/local governments and the private sectors) for leading initiatives on application of circular economy in waste management and organizing knowledge and learning events and trainings for decision makers, stakeholders, and practitioners, and public awareness raising activities on consequences of waste open burning, circular economy, and other alternative approaches, and updating national product standards for plastics, paper, inks, glass, etc.

Subcomponent 1.2: Long-term planning for circular economy in waste management

This subcomponent will support the Government of Lebanon (GoL) in reviewing and updating its 2017 National Implementation Plan (NIP) for POPs in compliance with Article 7 of Stockholm Convention. The new NIP will be considering applying circular economy, green chemistry, EPR, GPP and economic incentives where feasible and appropriate and integrating the updated NIP in the country's sustainable development strategies where appropriate. Also under this subcomponent, other national plans which are keystones for a robust phasing out of open dumping of waste, and transition to a circular economy in waste management will be updated and/or developed. This will include the Updating of the "2016 Master Plan for the Closure and Rehabilitation of Uncontrolled Dumpsites of Lebanon" and will be linked to the national ISWM strategy (currently being updated) to ensure that the proposed actions for phasing-out of open dumping of waste in the country constitutes an integral part of the ISWM strategy adopted by the GoL.

Subcomponent 1.3: Long-term improvements in the management of UPOPs (generation and emissions)

This subcomponent will implement priority activities identified by the 2017 NIP in view of establishing a comprehensive and long-term management of UPOPs, thus controlling, and gradually reducing UPOPs. The priority activities will include the following:

a) Map out vulnerable segments of the population that are susceptible to open burning of waste (such as schools, hospitals, etc.) to determine priority areas of intervention

b) Assess the presence of UPOPs in sediments at river outlets especially near industries, open dumps and in the ports and development of a strategy for the containment and management of contaminated sediments, as needed

c) Map out through the establishment of a national unified database (GIS compatible) for POPs and POPs contaminated sites (including contaminated dumpsites)

Component 2: Demonstrations on 3R Practices and BATs/BEPs at Open Dumpsite in Selected Geographic Areas

This component aims to provide investments to demonstrate: (i) 3R practices to reduce waste entering dumpsites/landfills in selected SW service zones; and (ii) BATs/BEPs to eliminate open burning at selected dumpsites. Local authorities, NGOs and private sector stakeholders will be involved and selectively supported with technology transfer/production change, technical trainings, and networking to improve their overall material flows, profitability, viability and reduce their impacts on the environment and people. This component will include two sub-components:

Subcomponent 2.1: Design and implementation of 3R practices in key waste streams (reducing the amount of waste disposed of via open dumpsites/open burning)

This sub-component aims to promote straightforward 3R practices in key waste streams and confirm the potential for the adoption of 3Rs in the selected service areas to reduce waste entering dumpsites and landfills. This sub-component will support a menu of 3R practice options as proposed below to show how a Circular Economy presents key opportunities for green growth and job

creation, while also addressing the critical problems of resource degradation and environmental contamination.

This sub-component will support local stakeholders responsible for SWM in 2-3 service areas where dumpsite open burning is taking place to establish and implement a SWM plan based on the 3R practices through the following:

a) Waste characterization analysis for the selected geographic areas and exploration of best opportunities for adoption of 3R.

b) Identify sources and pathways of UPOPs in the waste streams and ensure that appropriate measures are in place for their recovery and proper management.

c) Sorting waste at household level and from commercial establishments to maximize recyclable recovery rates: a three-bin system could be a suitable solution to start with (recyclable waste, organic waste, and residual waste).

d) Upgrade of existing sorting and recycling facilities, including trucks for different waste types, use of sensor technology and automation of dismantling and sorting, etc.

More specifically, this subcomponent will (i) develop a local master plan at the level of each service area selected as a potential beneficiary to confirm the potential for adoption of an ISWM approach at the level of the service areas and use it as a basis for shortlisting of beneficiary areas; (ii) implement the local plan at the level of 2-3 service areas, and (iii) develop the legal and institutional basis to support the financial feasibility for cost recovery. Cost recovery will be assessed at the level of special waste streams and will improve the efficiency of material flows and reduce leakages/waste generation and make reuse and recycling the intended destination at the end of life.

Sub-component 2.2: Implementation of BAT/BEP at selected open dumpsites

This sub-component aims to eliminate waste open burning, therefore reducing UPOPs emission at selected open dumpsites. It will support demonstration of BATs/BEPs at the level of 3-4 selected open dumps in the selected service areas where an ISWM approach has proven to be feasible. Interventions will include re-shaping the dump, capping (as needed), application of topsoil for daily cover, intermediate cover, final cover, grass sowing, gas collection, venting/flaring arrangements, collection, and leachate treatment/management, regulating/banning or identifying dedicated cells for the disposal of certain category waste where feasible, etc.

The selection of the sites is based on the open dumps' survey of 2017 (MOE/UNDP) which surveyed, assessed, and categorized all existing dumps in Lebanon, the analysis included updates on latest developments in the last 4 years (from 2017 to 2021). The dumps database was updated with the following information:

- Status of the dumps: some dumps have already been closed, rehabilitated or removed.
- Update the volume of waste in dumps by adding the volume generated over the last 4 years assuming same management scenarios still apply.

Other important site selection criteria included the following : (i) volume of waste at site (m3): dumps with volume of waste less than 5,000 m^3 or larger than 200,000 m^3 were considered either as

too small or too big for the intervention and thus were excluded; (ii) distance to rivers and streams: dumps distance to rivers or streams that is less than 150 m was considered in the narrowing down exercise; (iii) distance to urban areas : the distance of dumpsites to urban agglomeration that are less than 500 m were retained in the narrowing down exercise; (iv) availability of a SWM system in the area served by the dump after 2017 and any future plans to further the SWM system to confirm funding availability and commitment of municipalities.

Site selection allowed the identification of a short-list of 5 service zones and 10 dumpsites as potential demonstrations sites for inclusion under the Project, as indicated in Table 1-1 below. This preliminary selection of the proposed zones and dumpsites will be subject to further in-depth assessments during project implementation to confirm the technical, financial, and institutional feasibility of the interventions which will be proposed at the level of the dumpsites as well as within the service zones. These will be based on i) MSW generation rates and waste composition, ii) the distribution of MSW management facilities including collecting, sorting, recycling and composting companies and dumpsites/landfills, iii) the current situation of sorting, recycling and composting facilities and the characteristics, risks/impacts of open dumpsites and potential for their upgrade/improvement, iv) municipalities' engagement in 3R practices and improvement of dumpsites, v) other factors as needed. This detailed assessment combined with implementation arrangement with the participating local governments will result in the final selection of 2-3 project sites for project implementation.

Table 1-1 Potential service zones to be covered by the project

Service area	Caza/Mohafaza	Open Dumps with open burning
Union of Municipalities of Tyre	Tyre/South	Qana
		Deir Qanoun
Municipality of Abbasiyeh	Tyre/South	Abbasiyeh
Union of Municipalities of Iqlim el Touffah	Nabatieh/ Nabatieh	Houmine el Faouka
		Siddiqine
Union of Municipalities of Sahel el Zahrani	Saida/South	Sarafand
		Marwaniyeh
		Saksakiyeh
Union of Municipalities of Jurd El Kaiteh	Akkar/North	Fnaydeq
		Mishmesh

Component 3: Project Monitoring and Evaluation

This component will support the implementation of the monitoring & evaluation (M&E) plan and ensure timely and efficient implementation of the M&E plan of the project at the level of the outcome indicators and results by collecting evidence-based information and data, and reporting to the World Bank and the GEF, as well as a mid-term and technical evaluations following the World

Bank and GEF guidance. This will also include support for related activities including the project launch and completion workshops.

Component 4: Project Management

This component will support operating costs associated with day-to-day project management and implementation including procurement, financial management, and environmental and social management functions to be carried out by the PMU. The Project will also finance incremental costs in relation to coordination and collaboration with other government agencies, non-government agencies, and the industries and private sector.

1.4 THE GOALS AND SCOPE OF THE ESMF

This Environmental and Social Management Framework (ESMF) is a management tool whose format is in line with the requirements of the World Bank's Environmental and Social Framework (ESF), notably ESS1 "Assessment and Management of Environmental and Social Risks and Impacts" and the laws and regulations in Lebanon, to frame the management of potential environmental and social risks associated with the programme implementation.

The World Bank's (WB) new Environmental and Social Framework (ESF), which came into effect in October 2018, is applied to the proposed project, along with World Bank Group (WBG) Environmental, Health, and Safety (EHS) Guidelines on waste management facilities and examples of Good International Industry Practice (GIIP).

The ESMF contains measures and plans to reduce, mitigate and/or offset adverse risks and impacts, provisions for estimating and budgeting the costs of such measures, and information on the agency or agencies responsible for addressing project risks and impacts, including its capacity to manage environmental and social risks and impacts. It includes adequate information on the area in which sub-projects are expected to be sited, including any potential environmental and social vulnerabilities of the area; and on the potential impacts that may occur and mitigation measures that might be expected to be used.

The ESMF also requires that an emergency preparedness and response process and Resource Efficiency and Pollution Prevention and Management measures be included in ESIA/ESMPs studies for sub-projects.

The ESMF requires also that ESMPs be included in contracts to be signed with accredited laboratories for sampling, transport, analysis, and disposal of hazardous waste. The ESMF contains overall provisions to prepare detailed ESIAs/ESMPs for demonstration activities under Component 2 during implementation that will include an alternatives analysis for siting and evaluation of technologies.

Cumulative impact assessment needs to be conducted in sub-projects ESIA/ESMP studies particularly for the closure of dumpsites which will lead to the diversion of wastes other facilities which need to be able to accommodate the additional wastes.

The ESMF makes reference to the labor-management procedures (LMP) prepared for the project, including prevention of child labor, labor-induced sexual abuse and exploitation and sexual

harassment, code of conduct needs associated with labor influx of skilled personnel, and medical and health insurance coverage. The ESMF also clearly identifies any impacts, whether beneficial or adverse, to any Project Affected Parties (PAPs), other interested parties, and vulnerable groups, including any potential impact to informal waste pickers, and outlines the respective mitigation measures accordingly. The ESMF also outlines mitigation measures to mitigate SEA/SH risks.

The ESMF also ensures proper, meaningful, and inclusive consultation is carried out with project beneficiaries and any identified vulnerable groups during project preparation and throughout project implementation with an adequately functioning Grievance Mechanism (GM) including referral pathways for complaints related to sexual exploitation and abuse/sexual harassment (SEA/SH). Additional/separate consultations may also be considered to be undertaken as part of the ESMF with identified vulnerable groups to help inform project design. The list of participants, with gender disaggregation, is documented as part of the ESMF.

1.5 CURRENT SITUATION OF SOLID WASTE MANAGEMENT AND UPOPS EMISSIONS IN LEBANON

1.5.1 Unintentionally Released Persistent Organic Pollutants in Lebanon

Unintentionally released Persistent Organic Pollutants (UPOPs) include (1) Perfluorooctane Sulfonate (PFOS), (2) Hexabromocyclododecane (HBCD) and polybrominated diphenyl ethers (PBDE), (3) Polychlorinated Biphenyls (PCBs), and (4) Dioxins, Furans and other UPOPs:

- Potential sources of PFOS are categorized as: surface treatment, paper production and performance chemicals. The waste generated from these categories is sent with MSW (or the bulky wastes stream) to landfills and dumps (MOE/UNEP/GEF, 2017).
- Sources of PBDE in Lebanon are categorized as: Electrical and Electronic Equipment (e-waste), Transport, Furniture, Foam, Mattresses and Pillows, Textile, and Rubber. The management of e-waste was addressed separately in this chapter. For transport, two facilities for the disposal of end-of-life vehicles are operating in the country (both in the Matn Caza): one facility (DiaMetal) recovers the metal through shredding and sends the rest as waste material for landfilling; while the other one (Evandy) scraps the entire vehicles and exports them to Turkey– with recovery of specific components, e.g., batteries, tires and oil. Also, few (12) obsolete public transport buses remain stored in Beirut. The remaining categories are sent with MSW or bulky items to landfills (MOE/UNEP/GEF, 2017).
- Sources of HBCD include: Expanded Polystyrene (EPS), Extruded Polystyrene (XPS), Polyurethane (PUR), Textile and Paints. The generated wastes and empty packaging items and containers end in MSW dumpsites and landfills; EPS/ XPS are piled up on construction sites and mixed with backfilling material or sent to CDW landfills. (MOE/UNEP/GEF, 2017).
- PCB waste is often associated with the power sector, known to be the main source and stock of PCB containing oils and equipment. Contaminated soil and water were found under transformers in Zouk power plant and Bauchrieh storage site and repair shop (MOE/UNEP/GEF, 2017)[9]. An action plan and inventory of PCB equipment in the power sector (involving the sampling and testing of 22,620 transformers) identified 1,129 transformers and 4 tanks/drums that contain more than 50 ppm of PCB, and pinpointed treatment and disposal methods and

[9] Yet, the study does not provide a comprehensive overview of contaminated sites, e.g. PFOS hotspots, agriculture contaminated sites from pesticides, contaminated sites from open dumps and burning of SW, Ports sediments (Beirut and Tripoli), etc.

priorities (EDESSA/WAC/SLR, 2018). So far, 265 transformers (out of 1129) have been disposed of.

The major identified gaps[10] are: (1) limited laboratory analysis capacity and lack of financial resources; (2) need for new laws and decrees and/or updates of existing ones, to comply to the requirements of Stockholm Convention and achieve Lebanon's obligations toward the convention; (3) lack of national databases for POPs and lack of systematic means to list and regulate new chemical pollutants; (4) poor institutional coordination; and (5) insufficient awareness among main stakeholders.

The main sources to UPOPs are waste incineration, metal production, heat and power generation, production of mineral products, transport, open burning processes, and chemicals and consumer goods. According to the 2017 National Assessment of POPs, evidence of the presence of several types of UPOPs, in particular Polychlorinated dibenzo-p-dioxins (PCDD), Polychlorinated dibenzofurans (PCDF), PCB and Hexachlorobenzene (HCB), has been documented in Lebanon between 2004 and 2014 through calculations based on estimates and emission factors but not on actual measurement.

Table 1-2 below highlights the contribution to PCDD and PCDF emissions of each identified source.

Table 1-2 PCDD/PCDF emissions from each source group to different matrices (Source: (MOE/UNEP/GEF, 2017)

Group	Source Groups	Annual Releases (g TEQ/a)					
		Air	Water	Land	Product	Residue	%
1	Waste Incineration	14.5	0.0	0.0	0.0	0.1	**1**
2	Ferrous and Non-Ferrous Metal Production	11.9	0.0	0.0	0.0	10.3	**1**
3	Heat and Power Generation	3.7	0.0	0.0	0.0	0.0	**0**
4	Production of Mineral Products	36.4	0.0	0.0	0.0	0.9	**2**
5	Transportation	2.2	0.0	0.0	0.0	0.0	**0**
6	Open Burning Processes	400.4	0.0	10.1	0.0	0.0	**26**
7	Production of Chemicals and Consumer Goods	0.0	0.0	0.0	44.4	0.0	**3**
8	Miscellaneous	0.0	0.0	0.0	0.0	0.3	**0**
9	Disposal	0.0	22.6	0.0	35.5	917.7	**61**
10	Identification of Potential Hot-Spots				86	0.0	**5.4**
1-10	**Total**	**469.2**	**22.6**	**10.1**	**165.9**	**929.3**	**100**
	Grand Total			**1597**			

1.5.2 Solid Waste Management in Lebanon and in Priority Areas

Several legislations govern solid waste management (SWM) in Lebanon, but the sector is still not well organized. An integrated solid waste management (ISWM) strategy has been drafted in 2019.

[10] Mostly based on the National Assessment of POPs Impacts and Management - Pesticides, Industrial and Unintentionally Released (MoE/GEF/UNEP 2017).

However, the endorsement of the draft ISWM strategy is pending to the preparation of the corresponding Strategic Environmental Assessment (SEA) (currently at the scoping stage and expected to be finalized by summer 2022) and the finalization of the strategy accordingly. The draft ISWM strategy highlighted in its vision (1) diversion of waste from dumpsites and (2) closure and rehabilitation of existing dumpsites. This is aligned with Law 80/2018 (Article 10), that clearly highlights the closing of dumpsites as a priority and requires the identification of closing/rehabilitation methods as an integral part of the national ISWM strategy.

Approximately 2 million tons/year of MSW are generated in Lebanon. Daily MSW generation is estimated at 1.05 kg/capita/day. MSW is mainly composed of 51% of organic waste, while the remaining is comprised of recyclables like paper and cardboard, plastic, glass, textiles, metals, demolition/construction waste and others (CDR, 2019).

The majority of this waste is collected and disposed of by landfilling/ dumping. The main service providers are RAMCO and CityBlu. Currently, Costa Brava and Jdeideh Landfill sites (with a capacity of 1,000 t/day and 1,200 t/day, respectively) serve Beirut and regions of Mount Lebanon Governorate, and receive collected wastes for disposal (MoE/UNDP, 2017). Costa Brava is located in Khalde (southern Beirut), and Jdeideh is located North-East to Beirut in Matn District.

The aforementioned landfills are located on the coastal line of Lebanon, leading to the deterioration of the water quality in the area, similarly to other coastal landfills in Tripoli, Saida, and Tyre. Jdeideh and Costa Brava landfills receive residues from Amrousieh and Karantina facilities which consist of collection of comingled waste followed by material recovery (SOER, 2020).

The area near the Jdeideh landfill is potentially contaminated with POPs (UPOPs and PFOS) due to fire incidents which had previously occurred, and the nonexistence of separation and treatment for POPs-containing wastes. The lower bound estimate of total annual costs from additional coronary heart disease risk to Jdeideh municipality over the current life expectancy is US$ 7.4 million using a 3% discount rate (US$ 9.3 million using a 0% discount rate) (MoE/ GEF/UNEP, 2017).

The concentration of microplastics that were reported in a study in October 2019 was 1.7 particles/m3 in Costa Brava (UNEP/MoE/CNRS, 2019).

Many of the remaining rural areas collect municipal solid waste and dispose of it by open dumping and burning.

Dumpsites and open dumping and burning are frequent in Lebanon. Two types of dumpsites are identified in Lebanon: MSW dumpsites and Construction and Demolition Waste (CDW) dumpsites.

Table 1-3, and Table 1-4 include information about results from the latest survey conducted in 2016 to identify and assess the prospects of closure and/or rehabilitation of dumpsites in Lebanon.

Out of the total annual generated waste, only 6% are being recycled. Landfills receive the largest portion of the waste (44%), followed by dumpsites (36%) (SOER, 2020).

Table 1-3 Municipal Solid Waste Dumpsites as of 2016 (Source: /UNDP, 2017)MOE

MSW Dumpsites	Operational		Non-Operational		Inaccessible		Grand Total	
	#	Volume (m^3)	#	Volume (m^3)	#	Volume (m^3)	#	Volume (m^3)
All Lebanon								
2011	**382**	**2,675,548**	**122**	**774,523**	**-**	**-**	**504**	**3,450,073**
2016	**341**	**4,588,218**	**263**	**1,135,603**	**13**	**19,486**	**617**	**5,743,307**
Area 1: Akkar and North Lebanon								
2011	61	606,007	25	208,088	-	-	**86**	**814,095**
2016	38	2,246,797	46	182,295	3	5,280	**87**	**2,434,372**
Area 2: Beirut and Mount Lebanon								
2011	43	453,976	16	39,175	-	-	**59**	**493,151**
2016	80	767,846	46	43,885	2	2,400	**132**	**814,131**
Area 3: Nabatieh and South Lebanon								
2011	168	947,002	52	120,955	-	-	**220**	**1,067,957**
2016	127	637,590	110	480,498	1	41	**238**	**1,118,129**
Area 4: Beqaa and Baalback/Hermel								
2011	110	668,565	29	406,305	-	-	**139**	**1,074,870**
2016	96	935,985	57	428,925	7	11,765	**160**	**1,376,675**

Table 1-4 Construction and Demolition Waste Dumpsites as of 2016 (Source: MOE/UNDP, 2017)

CDW Dumpsites	Operational		Non-Operational		Inaccessible		Grand Total	
	#	Volume (m^3)	#	Volume (m^3)	#	Volume (m^3)	#	Volume (m^3)
All Lebanon								
2011	**132**	**1,468,528**	**34**	**262,653**	-	-	**166**	**1,731,181**
2016	**178**	**964,223**	**145**	**1,181,313**	**1**	**15,000**	**324**	**2,160,536**
Area 1: Akkar and North Lebanon								
2011	26	42,968	7	27,960	-	-	**33**	**70,928**
2016	29	183,160	18	29,006	-	-	**47**	**212,166**
Area 2: Beirut and Mount Lebanon								
2011	71	1,021,113	18	203,285	-	-	**89**	**1,224,398**
2016	35	419,880	88	1,116,910	-	-	**124**	**1,551,790**
Area 3: Nabatieh and South Lebanon								
2011	34	179,447	5	20,708	-	-	**39**	**200,155**
2016	69	159,933	35	32,897	-	-	**104**	**192,830**
Area 4: Beqaa and Baalback/Hermel								
2011	1	225,000	4	10,700	-	-	**5**	**235,700**
2016	45	201,250	4	2,500	-	-	**49**	**203,750**

2 ENVIRONMENT AND SOCIAL BACKGROUND

2.1 ENVIRONMENT OVERVIEW

2.1.1 Geographical Location

Lebanon is a Middle Eastern country located in Western Asia and bordered by the Syrian Arab Republic from north and east, Palestinian territories from the south, and the Mediterranean Sea from the west. The country extends over an area of 10,452 square kilometers only. Despite the small area of Lebanon, the country has been a host of civilizations and cultures throughout the time, similarly to many other Mediterranean countries.

2.2 CLIMATE AND METEOROLOGY

Lebanon has a typical Mediterranean climate characterized by a long, hot, and dry summer, and cool, rainy winter. Temperatures gradually decrease during winter season and precipitations either accumulate in groundwater reservoirs through infiltration, or run-off. When springs and water courses are revived again, the spring season begins.

The topography of the country, with an elevation gain that extends on only about 40 kilometers, affects the climatic patterns. Along the coast, summers are hot and humid, with little or no rain.

Temperatures may vary from an area to the other, depending on the time during the day and the altitude. Temperatures may reach above 38° C in the daytime and below 16° C at night. The proximity of the sea to the coastal area acts has a buffer effect on the climate, making the range of temperatures narrower than it is inland.

Precipitation records vary from one year to the other, with major rainfalls occurring during the month of December. The influence of the Mediterranean Sea is abated by the altitude and, although the precipitation is even higher than it is along the coast, the range of temperatures is wider and the winters are more severe. The Beqaa Valley and the Anti-Lebanon Mountains witness less precipitation and humidity levels than other parts of the country, as the Mount Lebanon Mountains Chain creates a microclimate for the former areas.

The dominant wind direction is westerly from sea to land during the day, while it reverses at night (from land to sea).

2.2.1 Topography

The landscape of Lebanon is influenced by natural systems that extend outside the country. Thus, the Beqaa valley is part of the Great Rift system which stretches from Southern Turkey to Mozambique in Africa.

A major feature of Lebanese topography is the alternation of low lanes and high land running in a parallel manner with a north-to-south orientation. There are four longitudinal strips between the Mediterranean Sea and Syria. Which are from west to east as follows:

- A flat and narrow coastal strip (maritime plain) parallel to the Mediterranean Sea
- The Mount-Lebanon chain
- The Beqaa Valley (Central plateau)
- The Anti-Lebanon Mountains Chain

The steepness in Lebanese mountains highly affects the climate and weather in the Beqaa Valley, and at high altitudes.

2.2.2 Geology

The current geomorphological matrix of Lebanon is highly influenced by the historical geological events that occurred. The main tectonic events that happened are uplift, collision and changes in sea level, which have shaped the structural features and depositional environments of the country.

The uplift in the late Jurassic to early Cretaceous Eras was the first major tectonic event that is documented in the geological history of Lebanon. The second tectonic event is the closure of the Tethyan Sea in the early Tertiary Period. The first event led to the exposure, erosion and karstification of the Jurassic Limestone. The second event induced the formation of a collision zone, which has led to the first gentle uplift of Mount Lebanon and Anti-Lebanon Ranges. These events were separated by times of rise in sea level, which has caused the deposition of thick limestone units mainly in the early Jurassic, late Jurassic and middle Cretaceous periods. The early Cretaceous period was characterized by the delta river deposits that were mainly sands and clay and that reach a thickness of 300 m in central Lebanon.

At the end of the Miocene epoch, the Messinian Salinity Crisis occurred, which is a major regional event. This event led to the deposition of thick salt layers and the development of karstification due to a major drop in sea level by about 1000 m following the closer of the Mediterranean Sea. Moreover, the collision of the Arabian and Asian plates, during the Eocene and Oligocene epoch, led to the shaping the NNE-SSW trending features.

The stratigraphic formations are grouped according to their hydrostratigraphic classification (Figure 2-1). The two (2) main aquifers are the Kesrouane Jurassic (J4) and the Sannine-Maameltain (C4-C5) which are lithologically composed mainly of karstic limestone. They are the two (2) water towers (Chateau-D'eau) of Lebanon and cover about 5590 km^2, which is about 54% of the country surface area.

The main structural features are shaped by the major tectonic events that are recorded in the geological history of Lebanon (Figure 2-2). These structures have an impact on controlling the groundwater flow directions; they can serve either as a preferential pathway or as a flow-restricting boundary. They are divided into primary and secondary structures. The Primary structures are

divided into: 1) primary faults (Yammouneh, Rashaya, Hasbaya, Roum and Serghaya) 2) primary folds (North Mount Lebanon Anticline, Barouk-Niha Anticline, Beqaa Syncline/garben, North Anti-Lebanon Anticline and Mount Hermon Anticline) and 3) platforms (Akkar, Tyr and Saida-Damour). The secondary structures are divided in to secondary faults, which are trending in a NW-SE, NE-SW, ENE-WSW and E-W and secondary folds, mainly trending in a NNE-SSW direction parallel to the primary faults.

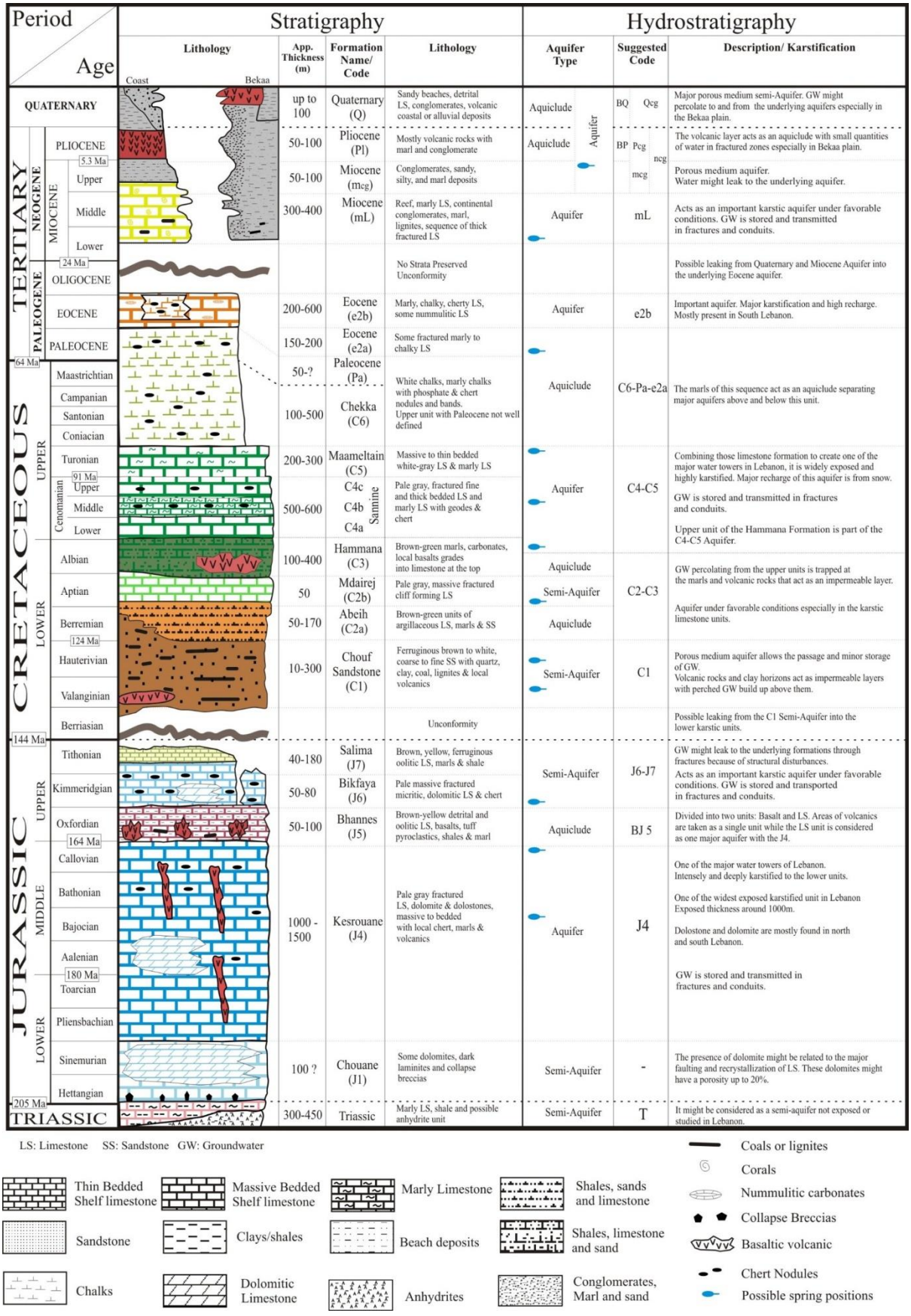


Figure 2-1 Stratigraphy and Hydrostratigraphy of Lebanon (Source: MoEW/UNDP, 2014)

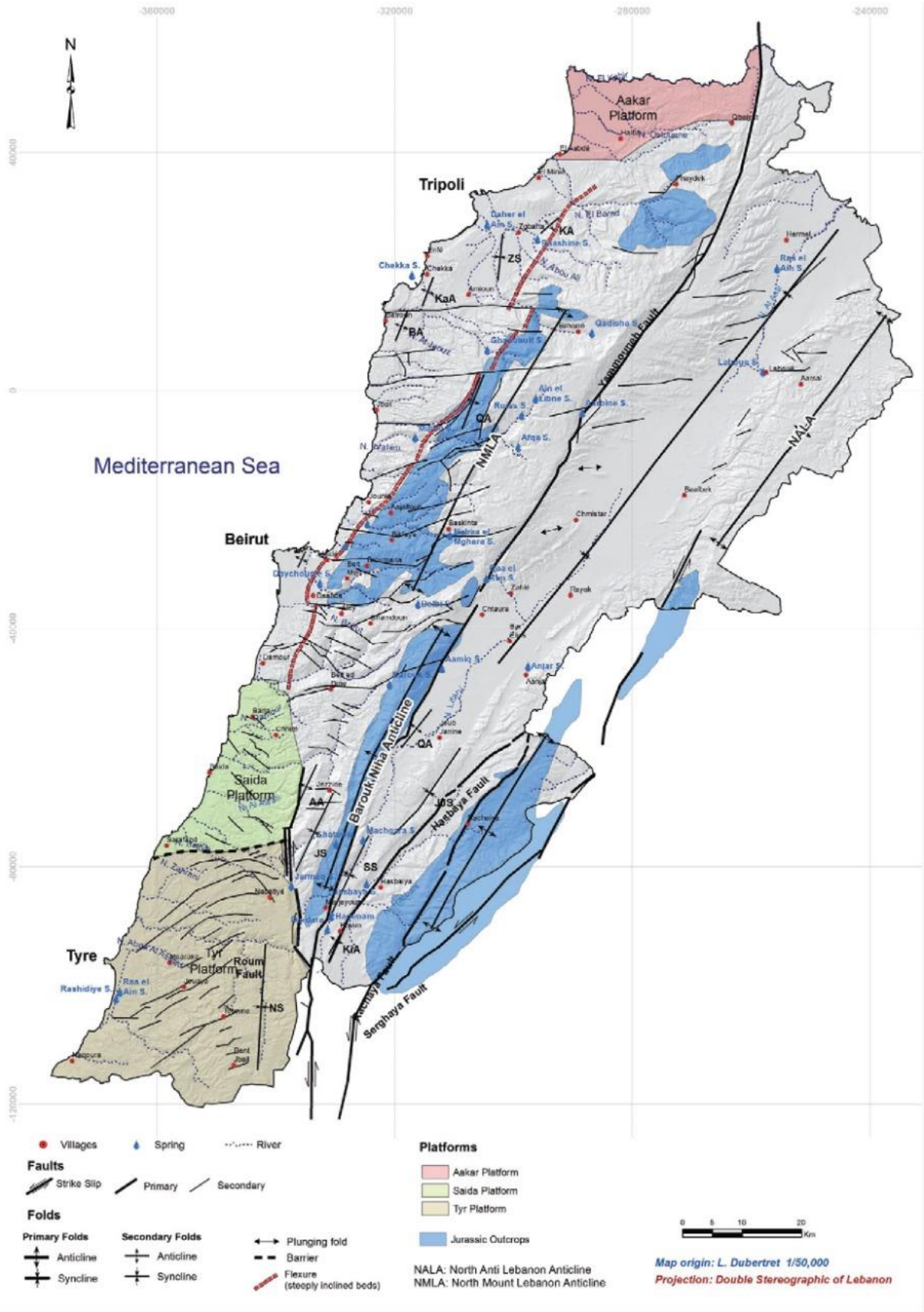


Figure 2-2 Major geological structural features of Lebanon (Source: MoEW/UNDP, 2014)

2.2.3 Hydrology and Water Conservancy

More than thirteen (13) rivers cut through Lebanon as shown in Figure 2-3. The main rivers with recognizable flow rates are the Litani River, Orontes (Assi) River, El Kebir River and Hasbani River. With the exception of the Litani River, which flows entirely within the country borders, all other main rivers are Transboundary Rivers.

The Litani River originates from Baalbek Caza and flows south towards Zahle and West Beqaa where it is trapped by Qaraoun Dam. From Qaraoun Dam it flows toward South Lebanon and Nabatieh governorates before discharging into the Mediterranean Sea. Its total length reaches about 170 Km. The estimated average annual flow volume of the Litani River at Qillaya Gauging Station is around 51 Million Cubic Meters (MCM). It is worth noting that the upper watershed of the Litani River is heavily polluted, more than the lower basin.

The Orontes River, also named as Al Assi River, is a transboundary river that originates in Lebanon, and flows into Syria to discharge into the sea in Antakya, Turkey. It initiates in Lebanon and is mainly fed by two major springs; Al Assi and Ain Ez Zarqa Springs. It also receives surface runoff from areas located at both sides of its course. Its average flow rate, estimated from the flow record collected between 2001 and 2013, is about 11 m3/s.

El Kebir River is a permanent river that flows along the Lebanese-Syrian country border in a west-northwest direction and discharges into the Mediterranean Sea. El Kebir River is gauged at the sea mouth, having an estimated yearly average flow of 474 Million Cubic Meters (MCM).

The Hasbani River is a permanent river that flows south for about 40.2 km from its starting point before exiting the country and crossing into bordering nations. The Wazzani Spring emerges on the side of the Hasbani River and discharges into it. The estimated average annual flow volume of the Hasbani River (segment within Lebanon) is around 149 Million Cubic Meters (MCM).

Besides the main rivers, several small scale rivers (such as Damour River, El Bared River, Ibrahim River, Nahr el Kalb, etc.) are present in Lebanon (Figure 2-3). All those rivers tend to flow towards the west, eventually discharging into the Mediterranean Sea.

It is worth noting that inland wetlands are also present in Lebanon. The wetlands are located in Ammiq and Kfarzabad villages and are considered as Himas (protected areas) with high ecological value.

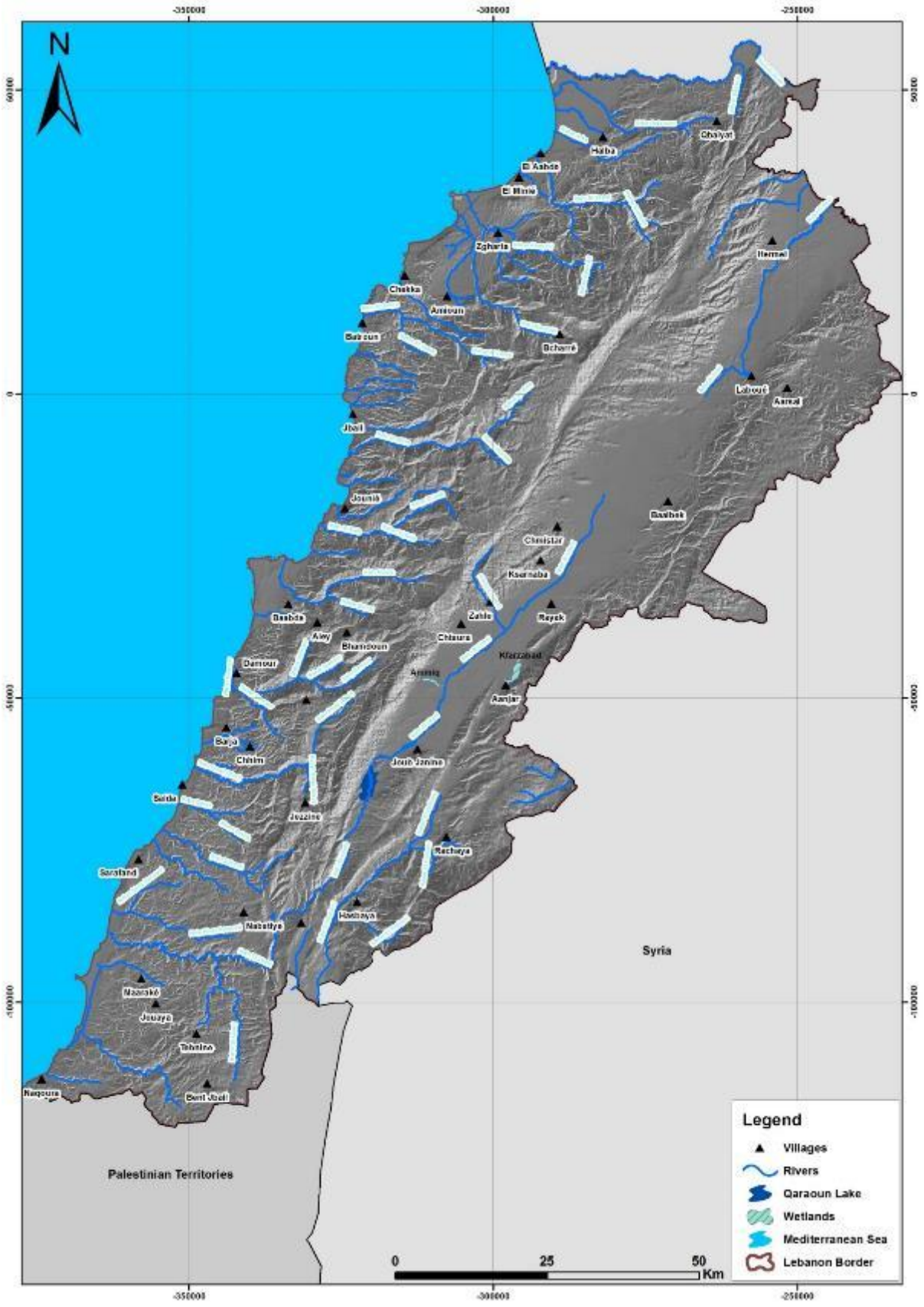


Figure 2-3 Map Showing the Major Surface Water Bodies in Lebanon (mainly Rivers and Wetlands)
(Stereographic Coordinates Projection)

2.2.4 Ecological Environment Status

Due to its location in the Mediterranean Basin, Lebanon has a rich biodiversity and is considered to be a biodiversity "hotspot. The country hosts around 9,116 known species distributed over its different geomorphologies. Given its diversity and significant ecological profile, 4 Ramsar sites, 15 Important Bird Areas (IBAs) (under Birdlife International), 24 Important Plant Areas (IPAs), and 20 Key Biodiversity Areas (KBAs) have been designated in Lebanon so far as shown in Figure 2-4 (MOE/UNEP/GEF, 2016).

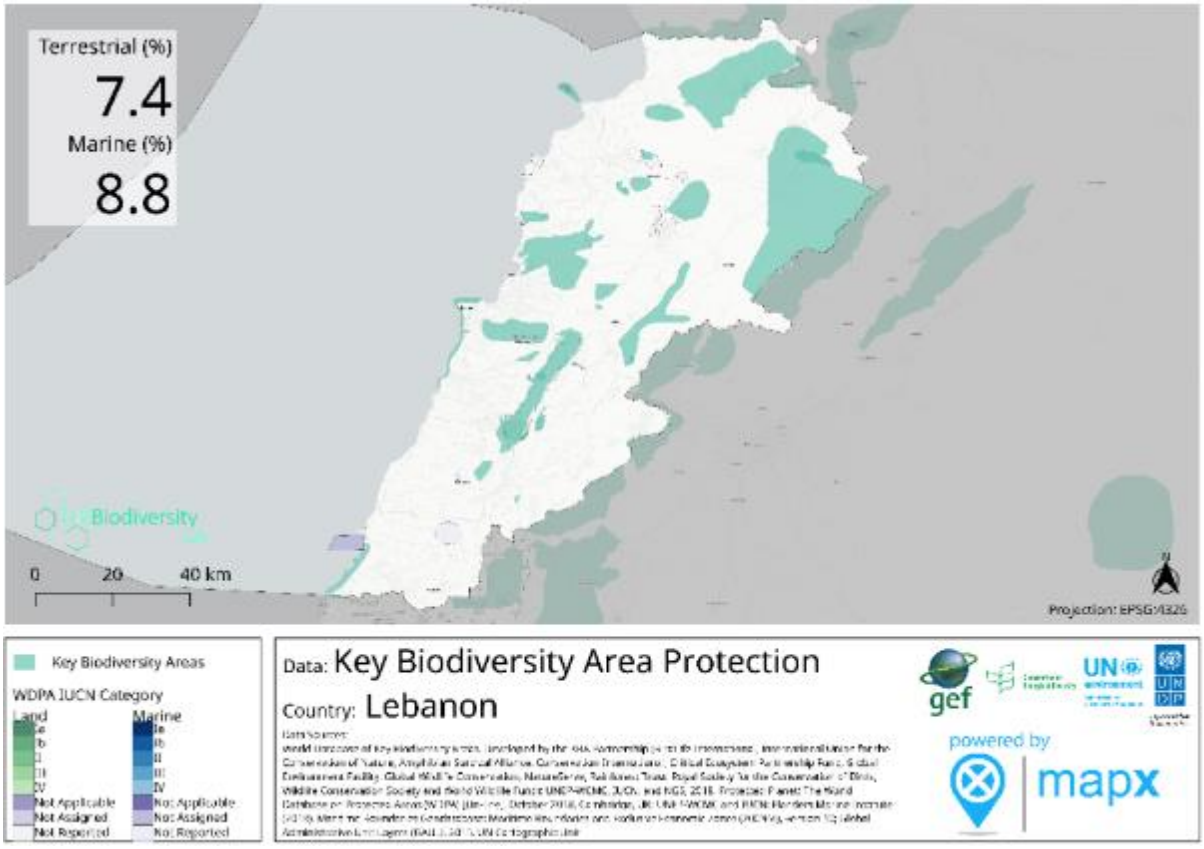


Figure 2-4 Key Biodiversity Areas (KBAs) in Lebanon

In addition, the Government of Lebanon has designated 17 sites across the country as nature reserves under the responsibility of MOE (Table 2-1). Most recently was the designation of Mount Hermon as a nature reserve in December 2020; and the Abbassiyeh coast, South Lebanon nature reserve in May 2020.

Table 2-1 List of Nature Reserves in Lebanon (adapted from SOER, 2020)

Nature Reserve	International Designation
Horsh Ehden	Important Bird Area (IBA)
Palm Islands	Ramsar Site, Specially Protected Area (SPA), SPA of Mediterranean Importance (SPAMI), IBA
Karm Chbat	None
Al Shouf Reserve	Biosphere Reserve, Important Bird Area
Tyre Coast	Ramsar Site, SPAMI
Bentael	Important Bird Area
Yammouneh	None

Nature Reserve	International Designation
Tannourine Cedars Forest	Important Bird Area
Wadi Al Houjeir	None
Mashaa Chnaniir	None
Kafra	None
Ramya	None
Debl	None
Beit Leef	None
Jaj Cedars	None
Abbassiyeh Coast	None
Mt. Hermon	None
Nmayrieh	None

Moreover, Lebanon hosts a variety of unprotected natural important ecological areas such as grottos, mountain tops, natural bridges, forests, valleys, rivers, and holes. These areas are however threatened by anthropogenic and natural threats such as fragmentation, unsustainable exploitation of natural resources, pollution, and climate change.

Local communities in Lebanon have also implemented initiatives for community-based approaches for the protection and conservation of ecologically important sites across the country, such as those established in Anjar-Kfar Zabad (Beqaa) and Jdeidet el Fekha (Baalbek) (UNDP/MOE, 2019).

2.2.4.1 Overview of Protected Areas

Lebanon has ratified several international treaties and conventions for the protection of specific habitats and ecosystems through legislative texts. Those legislation define protected areas including nature reserves, marine protected areas, and himas.

2.2.4.1.1 Marine Protected Areas

The Lebanese MOE already declared three coastal sites as Marine Protected Areas (MPA):

- Palm Island Nature Reserve (PINR): Established under Law 121/1992, PINR consists of three small islands, the Palm Island, Sanani and Ramkin, located 5.5 km off the coast of Tripoli-North Lebanon. The Palm Island is the largest with a rocky shoreline from the northwest to the south and a sandy shoreline from the north to the east. It includes coastal sand dunes, and its sandy beach is classified as a nesting site for marine turtles and bird species. The other two islands, Sanani and Ramkin, are smaller and their shorelines are mostly rocky. The PINR is open for the public only during the summer season based on the decision of its Management Committee.
- Tyre Coast Nature Reserve (TCNR): Established under Law 708/1992 and located in South Lebanon, TCNR is a coastal & marine site which includes sensitive and threatened habitats: coastal sand dunes and freshwater ponds with reed beds. The TCNR is open for the public only during the summer season based on the decision of its Management Committee.
- Abassieh Coast Nature Reserve: Located in South Lebanon, it was recently declared as an MPA under Law 170/2019. It includes coastal sand dunes and a nesting site for marine turtles.

In addition, the “Lebanon’s Marine Protected Area Strategy” proposed a list of MPAs to support the conservation and management of important marine habitats and species in Lebanon (MoE/IUCN, 2012). For each site, key habitats were assessed and described, such as: permanent or transient

aggregations of fish species; turtle nesting areas; areas supporting high diversity; areas supporting species with limited abundance/distribution; areas that are preferred habitats for vulnerable species; and areas that contain a variety of habitat types in close proximity to one another. This Strategy sets out how the policy related to the marine environment fits within the Government's wider policy framework and what can be achieved by creating the network, (MoE/IUCN, 2012). Sites recommended are:

- Naqoura;
- Sidon rocks;
- Raoucheh cliffs and caves;
- Beirut Port Outer Platform;
- Byblos;
- Medfoun Rocky Area;
- Batroun Phoenician Wall;
- Ras El Chekaa Cliffs; and
- Enfeh Peninsula.

In addition, the strategy proposed five estuaries (Litani, Awally, Damour, Nahr Ibrahim and Arida) and four deep-water sites (Beirut Escarpment, St. Georges Canyon, Jounieh Canyon, and Tyre Canyons) to be declared as MPAs. Within this context, the MoE developed several draft laws to declare new coastal sites as MPAs.

2.2.4.1.2 Coastal Ecologically and Culturally Sensitive Sites

Within the project entitled "Environmental Resources Monitoring in Lebanon (ERML)" the geographical, biological, cultural features in addition to other parameters such as potential stresses and conservation status were considered for the classification of the most coastal sensitive sites (MOE/UNEP/UNDP, 2013a). The Convention on Biological Diversity (CBD) and United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Centre criteria were adopted for the evaluation and ranking of coastal sites as high, medium or low priority and immediate protection of high priority sites was recommended (Figure 2-5).

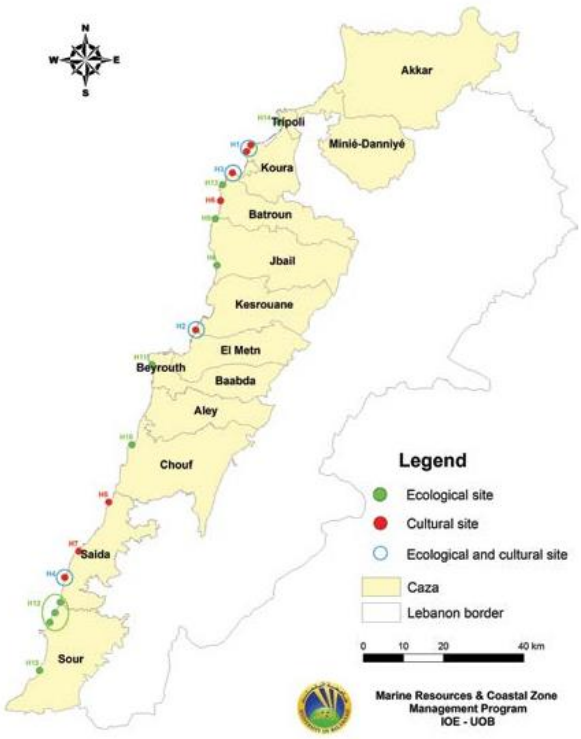


Figure 2-5 Ecological and Cultural High Priority Sites Map (Source: MoE/UNEP/UNDP, 2013)

2.2.4.1.3 Himas

Himas are known to be the oldest form of nature conservation and management, dated back almost 5,000 years ago in ancient Egypt. The Hima practice became an existing management tool in the Arab region almost 1,500 years ago. Since 2004, Society for the Protection of Nature in Lebanon (SPNL) worked relentlessly to revive this trend of traditional landscape management in collaboration with local authorities in many parts of the country such as Kfarzabad IBA. The goal is to combine traditional practices with the latest conservation strategies in order to attain sustainable resource use, as well as conservation of biodiversity and avifauna, with education, research, recreation and expansion of economic opportunities (AFDC, 2019; AFDC et al., 2019). Law 130/2019 for PAs ratified Hima as a conservation category.

2.2.5 Soil

Based on the soil map of Lebanon, there are twelve (12) soil types in Lebanon. The extent of the soil cover layer is shown in Figure 2-6. Leptosols tend to cover the largest surface area out of the twelve soils types. Soil cover characteristics are described in the paragraphs below.

- Cambisols are developed in medium and fine-textured materials (mostly colluvial and onalluvial deposits) which justifies their presence in the Beqaa valley. Cambisols are considerd to be good for agricultural usage and can be one of the most productive soils in terms of agriculture if the climate is appropriate (Encyclopedia Britannica, FAO soil group).
- Leptosols are shallow soils overlying calcareous rocks. Leptosols are unattractive for rainfed agricultures because of their inability to hold water. They however allow shrubs and small trees to grow over the rocky terrain, which gives them their importance in sustaining such terrestrial ecosystems (Encyclopedia Britannica, FAO soil group).

- Fluvisols are mainly composed of river sediments and are genetically young soils within the alluvial deposits (Encyclopedia Britannica, FAO soil group). Those soils can be found around water courses.
- Gleyosols are wetland soil that is saturated by groundwater. They are usually found in depression areas and low landscape positions (Encyclopedia Britannica, FAO soil group). Within Lebanon, they are mainly found at Ammiq and Kfarzabad Wetlands.
- Luvisols are present usually in forested regions. Such soils are characterized by their high content of clay minerals; thus, they do not bear water (Encyclopedia Britannica, FAO soil group).
- Regosols are shallow soils with low-humus surface horizon overlying directly the weathering rock in an actively eroding landscape. Such soils allow orchards to grow and thus are important in sustaining such terrestrial ecosystem (Encyclopedia Britannica, FAO soil group).
- Anthrosols are formed from heavily modified soils due to long term human activities related to irrigation and cultivation (Encyclopedia Britannica, FAO soil group).
- Arenosols are sandy-textured soils that lack any significant soil profile development. Such soils have high permeability and low nutrient content, making their agricultural usage problematic (Encyclopedia Britannica, FAO soil group).
- Calcisols are characterized by a layer of calcium carbonate. They are well drained soils and relatively fertile soils given their high calcium content (Encyclopedia Britannica, FAO soil group).
- Andosols are dark colored soils of volcanic origin (ash, tuff…). Such soils tend to form good agricultural soils given their richness in nutrients and their water-bearing characteristics (Encyclopedia Britannica, FAO soil group).
- Lixisols are soils with “low levels of plant nutrients and a high erodibility, making agriculture possible only with frequent fertilizer applications, minimum tillage, and careful erosion control” (Encyclopedia Britannica, FAO soil group).
- Vestisols contain high levels of plant with high clay content. Hence, they are not well suited to cultivation without careful management (Encyclopedia Britannica, FAO soil group).

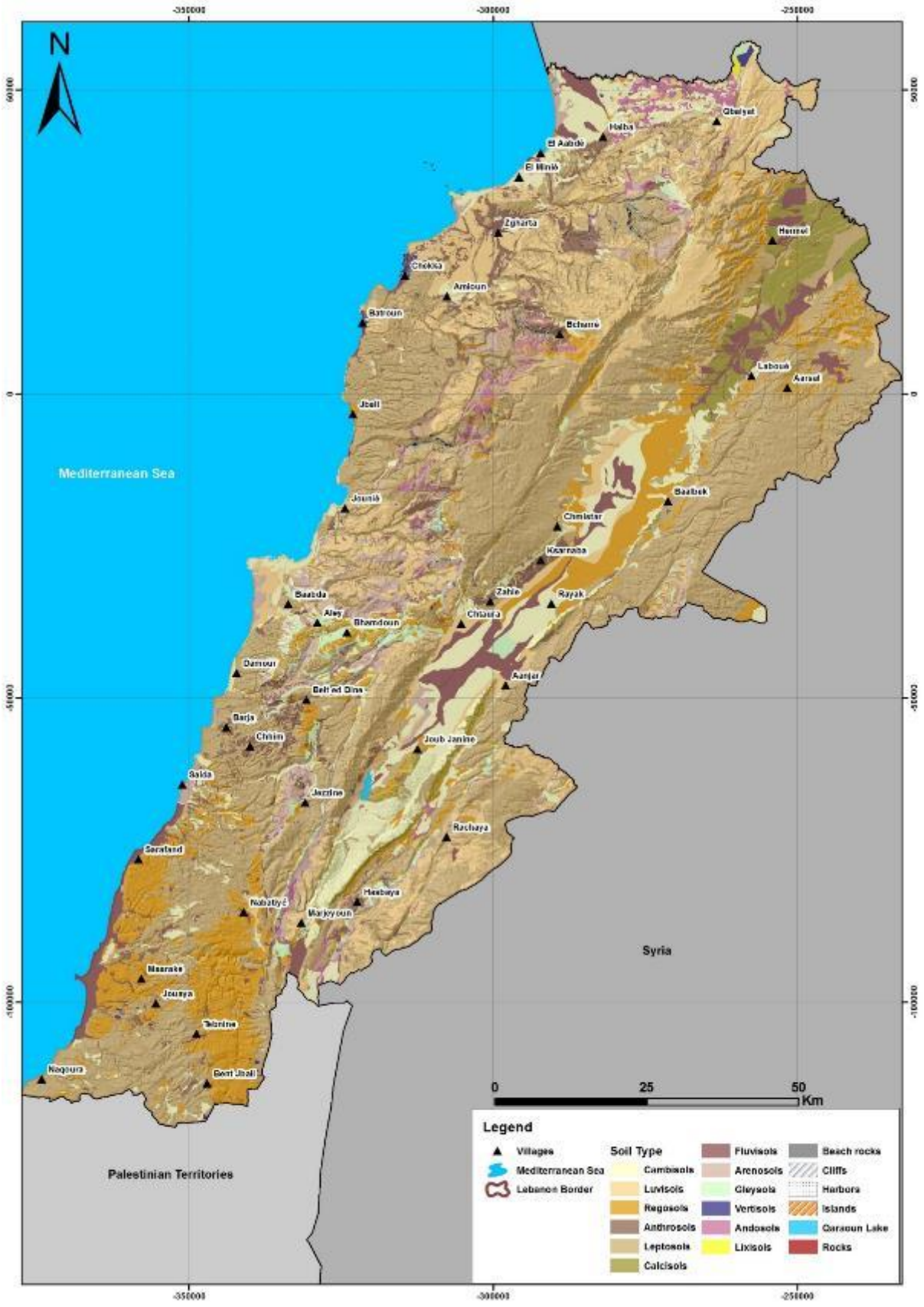


Figure 2-6 Soil Types in Lebanon (Source: CNRS-L, 2005)

Many improper human practices are leading to loss of natural resources including soil through erosion and mismanagement. In 2018, the Final National Report on Land Degradation Neutrality (LDN) Target Setting Programme was published, giving an insight about Land Productivity Dynamics (LPD) in Lebanon, and the most vulnerable areas to land degradation and soil erosion (Figure 2-7). The standard LPD classification is used, made of five distinct classes as follows:

- LPD 1: Declining productivity;
- LPD 2: Early signs of decline;
- LPD 3: Stable, but stressed;
- LPD 4: Stable, not stressed; and
- LPD 5: Increasing productivity.

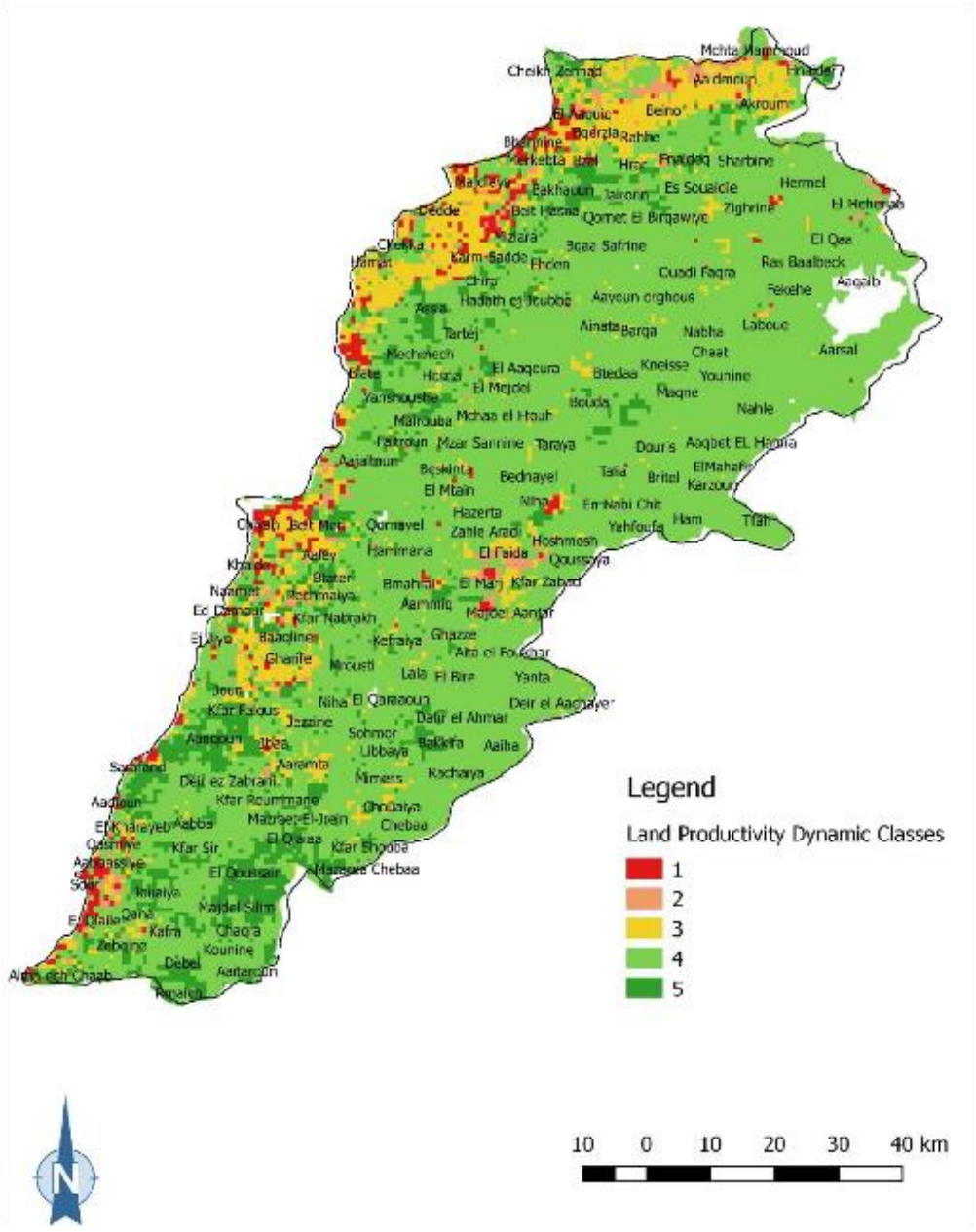


Figure 2-7 Land Productivity Dynamics trends of Lebanon (Source: Lebanon LDN TSP Country Report)

2.2.6 Land Resources

Land usage in Lebanon can be classified into four main categories: agricultural areas, urban areas, natural areas and mixed rural areas. Natural and agricultural areas with the latter expanding mostly over the Beqaa Valley, the South, Nabatiyeh, Akkar, Zgharta, Koura, and Minieh-Dannieh as shown in Figure 2-8 are the most prominent land use/cover in Lebanon. The main agricultural crops comprise fruit trees, vineyards, olives, bananas, citrus fruits and field crops. Most of the agriculture in Lebanon is subject to fertilizers and pesticides (agrochemicals). It is generally known that many farmers do not abide by the correct dosage of fertilizers and pesticides usage, which find their way into the soil and into groundwater by leaching down due to irrigation. On the other hand, the highest concentrations of urban areas are found in Tripoli, Beirut and the coastal line of Mount Lebanon to the North of Beirut, Saida, Nabatiyeh, Tyre, Zahle and Baalbek (CDR, 2005).

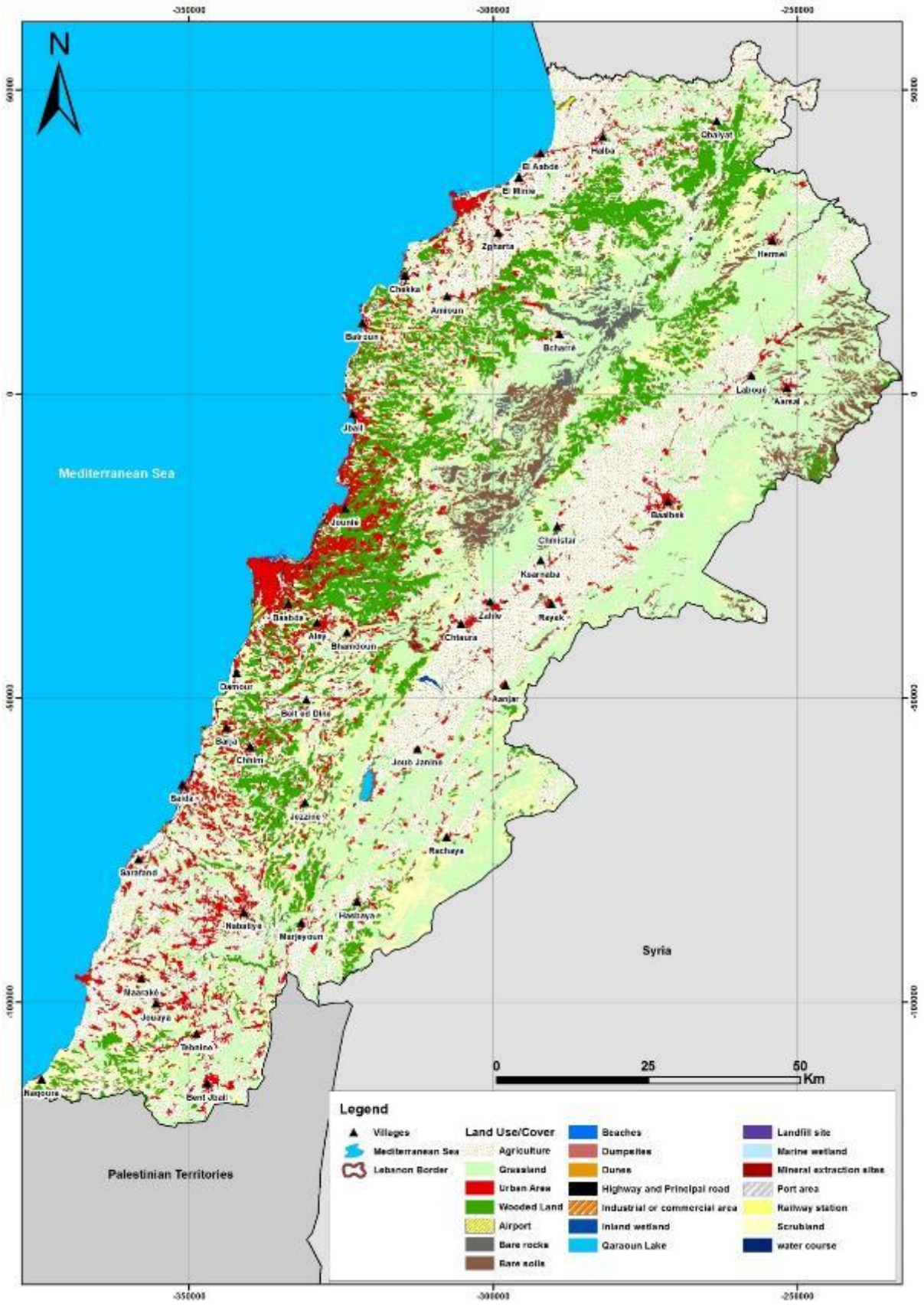


Figure 2-8 Land Use/Cover of Lebanon (Source: SDATL, 2013)

2.3 OVERVIEW OF HEALTH INDICATORS

Inadequate waste management practices are the main sources of UPOPs emissions in Lebanon. An improvement in practices would reduce UPOPs emissions. This would require the government to develop and implement a national solid waste management plan that defines the roles and responsibilities of the different government levels and agencies. The government would incur significant costs implementing such plan; however, this would create a lot of business and employment opportunities. Reducing the amount of wastes disposed in a landfill, and decreasing the amount of wastes being disposed inadequately, would generate more raw materials for the recycling industry. Until a comprehensive solid waste plan is implemented throughout the country, there will likely be more open waste burning and some attention is to be given to the more vulnerable segments of the population. For instance, burning wastes near schools will be particularly harmful for young children because they are more vulnerable to POPs exposure. Hospitals are also areas that house a portion of the population that is more susceptible to POPs exposure because of their medical condition and the presence of pregnant women, old people and children. Other sources of UPOPs emissions need a more comprehensive review. The Stockholm Convention has developed a series of Best Available Techniques (BAT) and Best Environmental Practices (BEP) guidelines for the various source categories. A review of the processes in Lebanon needs to be reviewed and compared to the BAT/BEP guidelines. These guidelines cover all source categories such as motor vehicles, thermal processes in the metallurgical industry, waste incinerators, and metal shredders. The main objective of the review is to identify which areas fall short of BAT/BEP practices. Once the results of the review are complete, the full economic cost to adopt these practices by the private sector could be determined.

The identified segments of the population that are more prone to exposure to POPs include (i) stakeholders that directly interact with POPs in their professional settings, (ii) segments of the general public that are within the areas of contaminated sites and (iii) segments of the population that are more prone to the food intake exposure pathway. The socioeconomic assessment also identified populations that are likely living in dwellings with poorer indoor air quality. The focus was done on residents of houses that have poor ventilation or little natural light as these are likely located in denser urban areas with poor circulation and therefore worse indoor air quality. The external health cost estimated for the endocrine effects of POPs are high for the general population. For the United States it was estimated that due to PBDE exposure about 11 million IQ points were lost costing US$ 266 billion (Attina TM et al, 2016).

2.4 CURRENT STATUS OF ENVIRONMENTAL QUALITY

The current status of environmental quality is presented based on available data and studies.

2.4.1 Current Situation of Atmospheric Environmental Quality

Since the launch of the national air quality monitoring network (AQMN) that was installed and operated by MOE and by researchers, the collection of air pollutants data throughout the installed stations has been intermittent and non-periodic. Short to medium term air quality measurement campaigns used to be conducted at universities where stations exist (i.e. American University of Beirut, Saint Joseph University, and University of Balamand). Levels of air pollutants exceed the WHO recommended limits for yearly averages.

2.4.1.1 Polycyclic Aromatic Hydrocarbons

Polycyclic Aromatic Hydrocarbons (PAH) and Elemental Carbon (EC) emissions recorded in Jal El Dib freeway were, respectively, 5 and 3.7 times greater than a diesel-impacted freeway in Southern California.

Measurements of ambient levels of PAH at three coastal locations at AUB, Zouk Mikael and Dora showed average levels of 36.3 ng/m^3 , 25.08 ng/m^3 and 91.88 ng/m^3 in winter and 13.15 ng/m^3 , 27.65 ng/ m^3 and 69.43 ng/m^3 in summer, respectively. High PAH levels in winter in AUB and Dora are attributed to several factors including the higher frequency of temperature inversions, increased usage of PAH emitting sources, such as domestic heating, and slower PAH photo-degradation reactions. In the vicinity of the power plant site in Zouk Mikael, a 300% increase in BaP in the summer (3.32 ng/m^3) is likely due to a greater need for electricity during the hot season.

Higher and alarming levels of PAHs were also observed during open waste burning episodes in a residential area located east of Beirut between October and December 2015. Associated with PAHs are high levels of PM (PM_{10}, $PM_{2.5}$), gaseous and particle-bound PAHs, as well as PCDD/Fs. During waste burning, the total concentration of 16 measured PAHs averaged at 55 ± 19 ng/m^3 compared to a concentration of 24.1 ng/m^3 measured on the “no-burning” day (Figure 2-9). In one incident, the sum of the 16 PAHs was 76.7 ng/m^3; a 218% increase over the “no-burning” day (Baalbaki et. al., 2016).

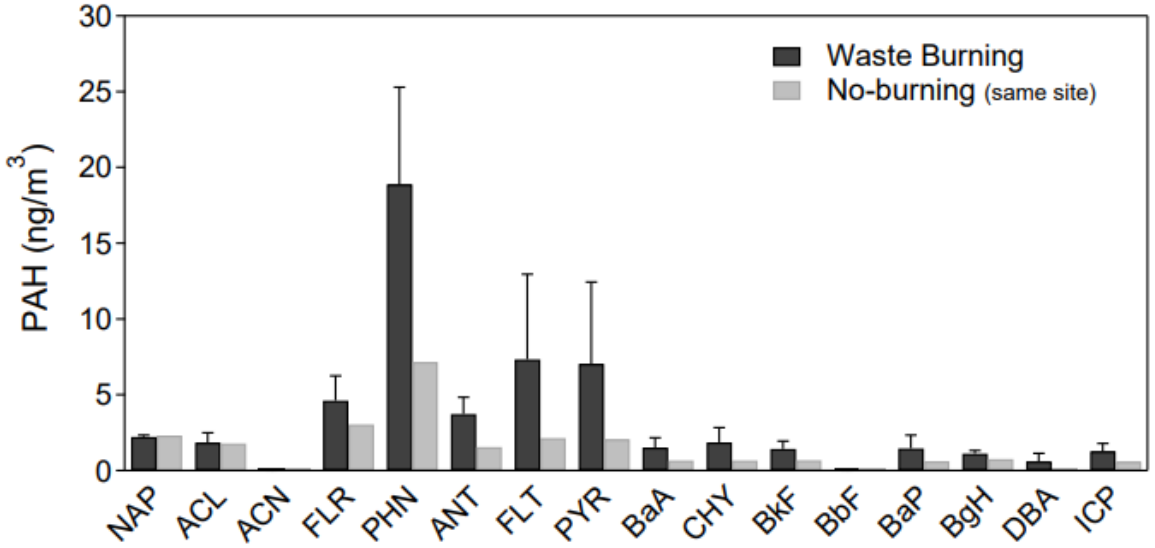


Figure 2-9 Levels of 16 PAHs during Waste Burning and "No-Burning" Days in Beirut, Oct-Dec 2015 (Source: Baalbaki et al., 2016)

Note: Error Bars Represent the Standard Deviation Of 3 Samples. NAP (Naphthalene), ACL (Acenaphtylene), ACN (Acenaphtene), FLR (Fluorene), PHN (Phenanthrene), ANT (Anthracene), FLT (Fluoranthene), PYR (Pyrene), BaA (benzo[a] anthracene), CHY (Chrysene), BkF(Benzo[k]fluoranthene), BbF (Benzo[b]fluoranthene), BaP (Benzo[a]pyrene), BgH (Benzo[g,h,i]perylene), DBA (Dibenz[a,h]anthracene) and ICP (Indeno[1,2,3-cd]pyrene).

2.4.1.2 Volatile Organic Compounds

NMHCs were measured in a study conducted by Salameh et al. (2016) at a suburban site in Beirut during two field campaigns in the summer of 2011 and winter of 2012. The study indicated that gasoline evaporation contribution, mainly from traffic and the episodic point source, was found to be a large contributor to Non-Methane Hydrocarbons (NMHC) ambient concentrations. Furthermore, concentrations were found higher during summer. On the other hand, regardless of the season, major compounds such as toluene, isopentane, butane, m,p-xylenes, propane and ethylene were the most abundant forms of NMHCs in Beirut's urban area during both seasons, representing almost 50% of the measured average (Salameh et al., 2015).

2.4.2 Current Situation of the Surface Water Environmental Quality

Sources of surface water in Lebanon include rivers, lakes, springs, and seasonal streams.

The extent of water impairments in river systems varies widely by season, across rivers, as well as within a specific river. The main sources of pollution of rivers and springs are domestic wastewater, solid waste, industrial and healthcare untreated discharges. Touristic and classified establishments are also a point source of water quality deterioration for fresh water bodies, along quarries, and non-point agricultural run-off. The contribution of each source of pollution is specific to each river, and dependent of the land-use within each watershed.

Riverine pollution levels vary with the seasons, marking the highest values during the dry season, when dilution is lowest, yet pollution loading to the receiving environments tends to be highest during the wet season when water flows and thus fluxes are highest. Since 2010, several studies

have attempted to characterize and better quantify the pollution status in 11 rivers[11] across Lebanon.

Contamination with heavy metals is not recorded in all rivers. In El Kabir River, the concentrations of Copper, Zinc, Strontium, Chromium and Nickel were all above the world average concentrations (Thomas et al., 2005). However, heavy metals were not detected in the ULB. Pollution by pesticides and polycyclic aromatic hydrocarbons (PAHs) has been reported in the El Kabir, Abou Ali and Litani rivers. There is limited research on the contribution of UPOPs to surface water pollution in Lebanon.

2.4.3 Current Situation of the Groundwater Environmental Quality

Groundwater quality in Lebanon has been deteriorated in terms of recharge and water composition. This is mainly due to over-abstraction and anthropogenic pollution.

Due to the nature of Lebanese aquifers, which are mostly karstic, they become vulnerable to biological contamination. Large pores of the karstic rocks accelerate the spread of germs to the groundwater (Appleyard, 2003).

Limited information about groundwater contamination with heavy metals are available. However, the conducted studies did not show an exceedance of heavy metals concentration when referring to the United States Environmental Protection Agency and World Health Organization (WHO) standards set for drinking water (Amacha and Baydoun, 2018). Similarly, the prevalence of groundwater pollution by PAH and pesticides is limited to a few studies that were conducted in North Lebanon). Recently, groundwater pollution by POPs such as polychlorinated biphenyls (PCBs) was documented on sites utilized by the Electricité du Liban. Of particular concern was a well in the Bauchrieh area that may have been used to dump up to 0.5 tons of PCBs (MOE, 2016).

2.4.4 Current Situation of the Acoustic Environmental Quality

Data about noise and acoustic environmental quality is not available in Lebanon. While Law No. 444 highlights the importance of assessing and monitoring the acoustic environment, minor efforts have been put to draw a framework for noise and acoustic disturbances.

2.4.5 Current Situation of Persistent Organic Pollutants

The Government of Lebanon (GOL) through the Ministry of Environment (MOE), with the support of UNEP and GEF, has conducted assessments of the use and management of Persistent Organic Pollutants (POPs) in Lebanon. The National Implementation Plan (NIP) on POPs relied on the outcomes of those assessment in order to develop an updated plan for proper use, management, and phase-out of POPs in Lebanon.

Currently there is no established national program for monitoring of releases and environmental levels of POPs. The monitoring of POPs releases and environmental levels is mainly taking place at academic and research levels. Reliable information about the release and emissions of POPs to the environment are documented in academic research studies, as elaborated in Sections 2.4.1, 2.4.2, and 2.4.3. Additionally, NIP POPs has documented other academic studies and programmes for the monitoring of POPs in Lebanon.

[11] Orontes, El-Kabir, Bared, Arka, Abou Ali, Ibrahim, Antelias, Beirut, Damour, Awali, and Litani rivers

2.4.5.1 Academic Research Studies:

2.4.5.1.1 IPOPs and UPOPs

At the time of the study (National Implementation Plan on POPs, 2017), the following research studies were identified:

- The Lebanese American University (LAU) was conducting a study on POPs and heavy metals levels in breast milk collected from Lebanese lactating mothers, but results were not available at the time of the publication of NIP POPs;
- University of Saint-Joseph (USJ) was carrying out an epidemiological study on a population of students and employees in their Beirut campus. The aim of the study was to determine, for the first time, the serum levels of 6 indicator PCBs (28, 52, 101, 138, 153, 180) and of selected OCPs (DDT, DDE, HCB and β-HCH) in a sample of students and employees. Furthermore, possible difference in POPs levels by gender, age, body mass index (BMI) and diet were evaluated;
- In 2015, Merhaby et al, published an article entitled "Organic pollution in surficial sediments of Tripoli harbour, Lebanon"; Tripoli harbour is among the most important ports on the Mediterranean Sea eastern basin. The persistent organic pollutants (POPs) were monitored (28 PCBs, 16 PAHs and 18 Me-PAHs) in 15 stations of Tripoli harbour basins, which are influenced by anthropogenic activities. Total PAHs concentrations ranged from 243 to 2965 µg kg-1 dw, total Me-PAH concentrations ranged from 54 to 1638 µg kg-1 dw, while total PCB levels ranged from 18 to 302 µg kg-1 dw. PCBs profiles were dominated by four and six-chlorinated congeners while the PAHs were dominated by four and five rings. For identifying pollution emission sources of PAHs, different ratios were used. The results show that the pollution origin was predominated by pyrogenic process related to the deposition of coal dust and the combustion of biomass and coal. Based on Sediments Quality Guidelines the biological adverse effects on aquatic ecosystems were expected rarely to occasionally for PAHs and PCBs contamination.

Since then, a couple of studies have been conducted to further assess the concentrations of UPOPs in ambient air, especially during open burning activities:

- Baalbaki et al. (2016) reported high and alarming levels of PCDD/Fs that were observed during open waste burning episodes in a residential area located east of Beirut between October and December 2015. These levels of POPs are associated with high concentrations of PAHs, PM (PM_{10}, $PM_{2.5}$), gaseous and particle-bound PAHs. During waste burning, the total concentration of 16 measured PAHs averaged at 55 ± 19 ng/m^3 compared to a concentration of 24.1 ng/m^3 measured on the "no-burning" day. In one incident, the sum of the 16 PAHs was 76.7 ng/m^3; a 218% increase over the "no-burning" day.
- Due to high concentrations of PAH, dioxins and furans, particles collected under industrial influence showed dose-response higher mutagenicity and genotoxicity compared to the rural one (Melki, 2017).

2.5 SOCIAL ASSESSMENT

2.5.1 Socioeconomic Profile

2.5.1.1 Demography

With a population density of 669 inhabitants/km2, Lebanon ranks in the top 20 list of the most populated countries (World Bank Group, 2021). With the start of the Syrian war, many Syrians fled their home country and settled in different regions in Lebanon, which lead to an increase in the total number of population (Table 2-2). An increase in poverty is also recorded since 2011, and is being greatly affected by the current economic crisis that started in 2019. The growth of the population led to an over-exploitation of natural resources, and resource depletion intensified to cater for a larger population. Mismanagement of natural resources has led to an exacerbated environmental degradation, and pressure was added on an already resource-strapped management infrastructure.

Table 2-2 Population Number and Density (2011-2018) (Source: World Bank, 2021)

Year	Total Population (including Refugees and Displaced)	Total Population Density in Lebanon (inhabitants/km^2)	World Population Average Density (inhabitants/km2)
2018	6,848,925	669	60
2017	6,811,873	665	59
2016	6,711,121	656	58
2015	6,532,678	638	58
2014	6,262,410	612	57
2013	5,914,621	578	56
2012	5,538,634	541	56
2011	5,202,343	508	55

Roughly, 65% of the population in Lebanon is between 15 and 64 years old (Figure 2-10). 51.6% of the total population are women, and 48.4% are men (EU/CAS/ILO, 2019).

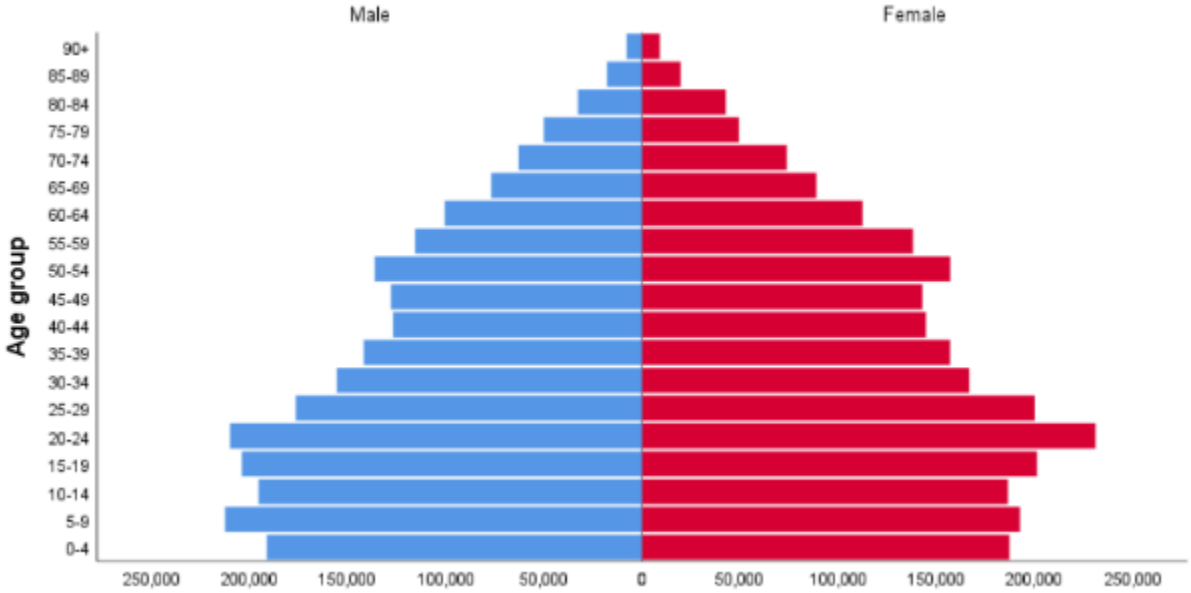


Figure 2-10 Age Pyramid of the Lebanese Residential Population (Source: EU/CAS/ILO, 2019)

The segregation of the Lebanese population is shown in Table 2-3.

Table 2-3 Population Distribution by Governorate and Caza (Source: EU/CAS/ILO, 2019)

Governorate	Caza	Population per Caza	Percentage of Total Population
Akkar	Akkar	324,000	6.7
Baalbek-Hermel	Baabek	214,600	5.1
	Hermel	30,500	
Beirut	Beirut	341,700	7.1
Beqaa	Rachaya	33,800	6.1
	West Beqaa	86,400	
	Zahle	177,400	
Mount Lebanon	Aley	300,800	41.9
	Baabda	553,800	
	Chouf	277,000	
	Jbeil	129,500	
	Matn	511,000	
	Keserwan	260,500	
Nabatieh	Bint Jbeil	96,200	7.8
	Hasbaya	28,700	
	Marjaaoun	74,000	
	Nabatieh	180,200	
North Lebanon	Batroun	58,900	13.2
	Bcharre	22,100	
	Koura	84,600	
	Minieh-Dannieh	140,800	
	Tripoli	243,800	
	Zgharta	87,700	
South Lebanon	Jezzine	32,100	12.1
	Sidon	296,600	
	Tyre	255,700	
Note: Excludes people living in non-residential units, such as army barracks, refugee camps and adjacent gatherings, and informal settlements.			

Detailed information per area of interest is limited. Below is provided, however, available demographics for the areas of interest:

- The number of residents in Abbassieh is approximately 30,000 during winter season and 31,500 during summer season, of which 1,909 are refugees. However, the number of residents according to municipality records is 7,548 (UN-Habitat, 2017);
- Ain Baal hosts 8,500 residents during winter and 11,000 residents during summer (UN –Habitat, 2017).

2.5.1.2 Persons with Disability

Based on the guidelines of the Washington Group on Disability Statistics12, about 4 per cent of residents suffer from a disability, or have difficulty functioning, which restricts their participation because of difficulties in one or more of the following six core functional domains: seeing; hearing; walking or climbing steps; remembering or concentrating; self-care; and communicating (EU/CAS/ILO, 2019).

[12] https://www.washingtongroup-disability.com/

Table 2-4 below provides details about people with disability based on their gender.

Table 2-4 Disability status of the Lebanese population based on their gender (Source: EU/CAS/ILO, 2019)

Disability status	Percentages		
	Women	Men	Total
Person with a disability	4.1	3.9	4.0
Person without a disability	94.4	94.5	94.5
Not applicable (infants and newborns)	1.4	1.5	1.5
Total	100.0	100.0	100.0

The total percentage (4%) of residents with a disability can be divided into two groups:

- Persons with only one disability (2.5%); and
- Persons with more than one disability (1.5%).

Several types of disabilities are reported in Lebanon, as shown in Figure 2-11.

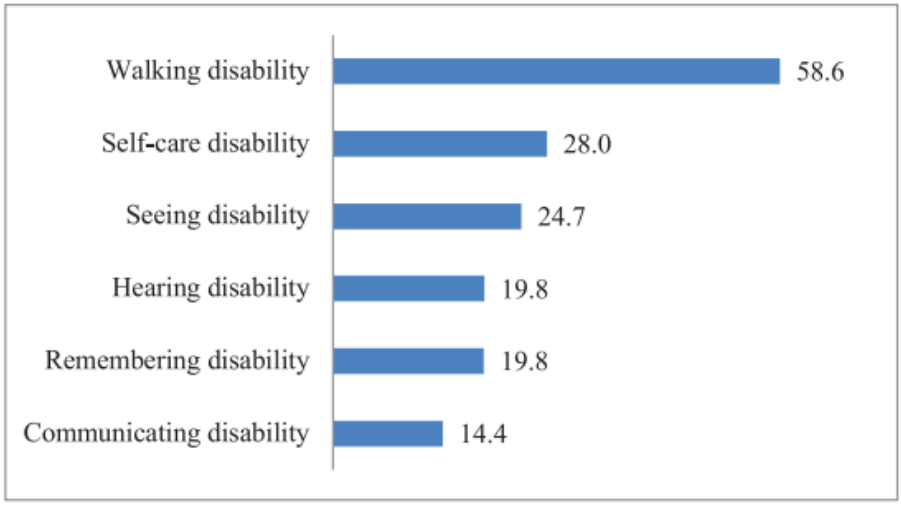


Figure 2-11 Percentage of Each Type of Disability in Lebanon (Source: CAS/EU/ILO, 2019)

2.5.1.3 Female-headed Households

Lebanese heads of households represent 85 per cent, while non-Lebanese heads of households made up the remaining 15 per cent. Around 18 per cent of households were headed by women and 82 per cent by men (EU/CAS/ILO, 2019).

2.5.1.4 Elderly

While the information relating to elderly is limited, it is worth noting that single-person households make up to 10.2 per cent of total households; half of them older adults, mostly elderly women who are generally widows (CAS/EU/ILO, 2019). People aged 65 years-old and above make up to 12.5% of the total Lebanese population, and half of those reported with a disability in Lebanon. Roughly one third of elderly people do not benefit from any health insurance coverage.

2.5.1.5 Sexual Exploitation and Abuse / Sexual Harassment

69% of gender-based violence (GBV) incidents reported through the GBV information management system (GBVIMS) in 2020 are incidents of domestic violence. Numbers were reportedly increasing due to the cumulative effect of both lockdown and economic collapse (UNFPA, 2020).

Women and girls with intellectual disabilities are particularly vulnerable to sexual violence and are often prevented from accessing a range of services and face un-adapted facilities, poverty, inadequate behavior of service providers. Elderly women are the most at risk due to their suffering from disparities that they experience throughout their lifetime (UNFPA, 2020).

In 2021, UNICEF13 reported that one in two children in Lebanon is at serious risk of physical, emotional, or sexual violence, as families struggle to cope in the country's deepening economic crisis. Hence, roughly 1.8 million children (more than 80 per cent) are now experiencing multidimensional poverty – up from around 900,000 in 2019.

2.5.1.6 Waste Pickers

Official and reliable data is scarce and to a certain extent non-existent in Lebanon regarding informal jobs such as waste picking. Within the 5 areas of interest for this project, however, information about waste pickers is being collected through communication with relevant local authorities. It has been reported that in one of the possible implementation sites some waste pickers do rely on recovered materials from the dumpsite; a limited number of persons however seem to be following this practice (three persons estimated) and the income from such activity was estimated at LL 400,000 per month (less than USD 300 at official exchange rate noting that the current black market conversion rate is 10 times higher).

2.5.1.7 Poverty

The portion of Lebanese households living in poverty is estimated at 75 % of the total population (UN, 2021).

In September 2021, ESCWA published a multidimensional poverty study to assess poverty index in Lebanon from 2019 till 2021[14]. The study revealed that 82% of the total population currently lives in multidimensional poverty, out of which 40% live in extreme multidimensional poverty. Only 18% of the population is not poor. The criteria that were selected to assess multidimensional poverty in Lebanon are:

- Education (access to education, educational attainment, school attendance);
- Health (health insurance, access to medicines, access to medical services);
- Public utilities (electricity, drinking water, sanitation, waste collection);
- Housing (overcrowding rate, housing type, having a toilet);
- Assets and property (internet access, information, communications and technologies, means of transport, household electrical devices, heating devices); and
- Employment and income (unemployment, employment informality, income).

[13] https://www.unicef.org/lebanon/press-releases/least-one-million-children-danger-violence-crisis-intensifies-lebanon-un
[14] https://www.unescwa.org/sites/default/files/news/docs/21-00634-_multidimentional_poverty_in_lebanon_-policy_brief_-_en.pdf

In Lebanon, the contribution of the housing dimension, is the lowest (4%) compared with other dimensions such as health (30%), public utilities (21%), and employment and income (18%).

2.5.1.8 Refugee Communities

Roughly 1.5 million Syrians had fled their country since 2011 and resettled in Lebanon. Only 879,529 refugees are registered as of 2020. With restricted legislation that do not stipulate any civil rights for refugees within the Lebanese territories, these people have become vulnerable with limited access to services and the job market. In 2020, three UN agencies (UNHCR, UNICEF, and WFP) led a survey to assess the vulnerability of Syrian refugees amid the crises. Key findings are listed below:

- Only 20% of the total refugee communities have legal residency permits;
- Host communities are being supportive to refugees in most reported cases;
- Compared to the numbers reported in the 2019 assessment, access to primary and hospital care has improved;
- 58% of Syrian refugees live in overcrowded shelters;
- Poor food consumption has quadrupled in 2020, compared to the year before;
- Refugees adopt livelihood coping mechanisms such as reducing the number of portions per day, and reducing the size of the portion;
- The reported rates of breastfeeding have decreased;
- Nearly half of households are food insecure;
- Nine out of 10 households live in extreme poverty;
- Unemployment rate among Syrian refugees has reached 39%;
- Competition for job is reported as the primary reason for social tension between host communities and refugees;
- More children are engaged in child labor;
- Bottle drinking water is the most prominent improved drinking water source for Syrian refugees; and
- Child not in age for school is the top reason for students to not attend school.

2.5.1.9 Basic Services and Utilities

2.5.1.9.1 Access to Solid Waste Management Services

Municipalities are responsible for collecting and transporting solid waste from collection points to designated facilities in a manner that does not harm the environment, in accordance with the standards and conditions set by and subject to approval of MoE, as per Decree No. 118 of 1977.

Small-scale facilities in remote areas of the North, South and Bekaa regions provide those areas with SWM services. These facilities are managed by Office of the Minister of State for administrative Reform (OMSAR) in coordination with local authorities.

Community-run systems in some regions consist of basic sorting, composting, and final disposal of MSW.

Information about the current situation of solid waste management in Lebanon is provided in Section 1.5.

2.5.1.9.2 Access to Water Supply

Lebanon's available renewable water resources have dropped below the 1,000 m^3 /capita/year threshold that defines water stress. In 2010, the MoEW estimated that the total renewable resources per capita per year was 926 m^3 and predicted that it will continue to fall reaching 839 m^3 by 2015 (MoEW, 2012). Since then, population growth, climate change, and the influx of refugees and displaced have further strained the available resources and as a result, the total renewable resources per capita has reached 700 m^3 /capita/year (IFI, 2014). In addition to the challenges associated with ensuring that the water sources are effectively managed to meet the demands of the different sectors, pollution levels in many of these freshwater systems have made them either unable to meet their designated uses or requiring expensive treatment prior to use (SOER, 2020).

With the ongoing multiple crises since 2019, water supply and access to water has become challenging to a majority of the Lebanese population. In addition to the decrease in available water resources per capita, the infrastructure of the sector has become very vulnerable lately, which has increased the risk of water shortage in many regions of the country, notably Baalbek-Hermel Governorate and West Beqaa Governorate (UNICEF, 2021), as shown in Figure 2-12 below.

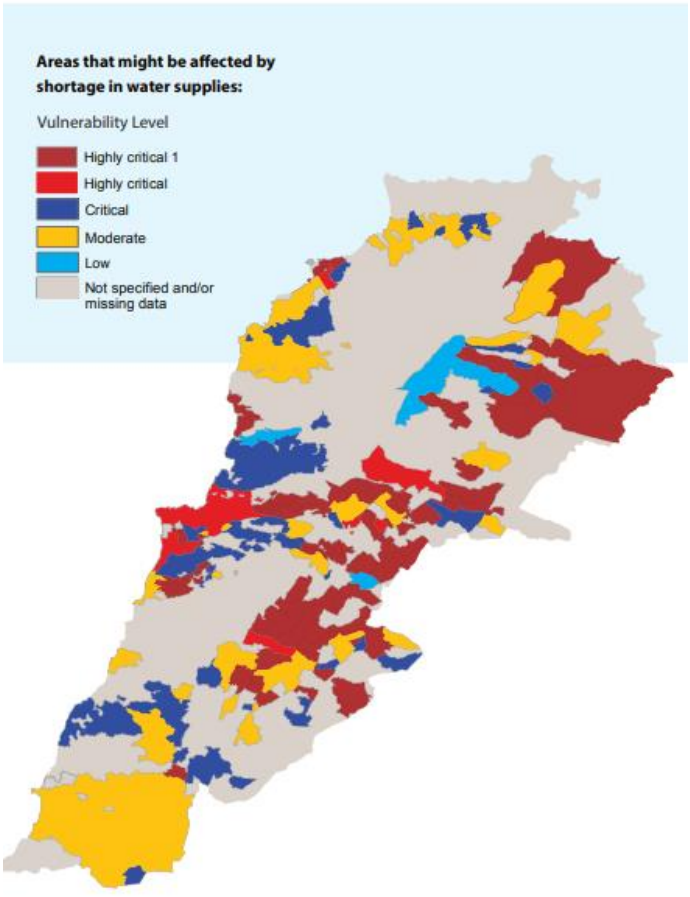


Figure 2-12 Vulnerability Level to water shortage in Lebanon (Source: UNICEF, 2021)

With the cumulative consequences that climate change, infrastructure deterioration, population growth, and climate change have, the situation of 33% of the total population is classified as Highly Critical 1 (Figure 2-13).

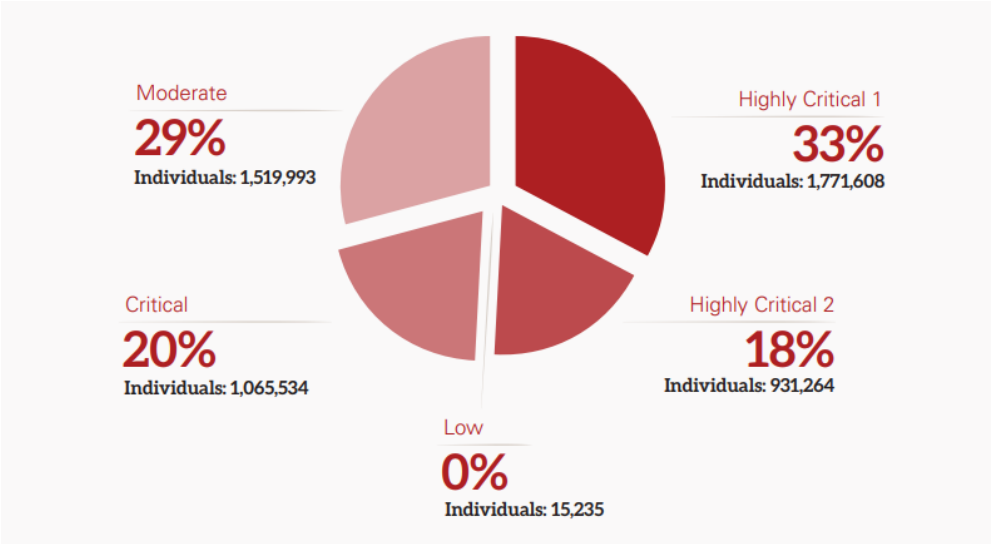


Figure 2-13 Levels of vulnerability of the Lebanese population (Source: UNICEF, 2021)

2.5.1.9.3 Access to Sanitation

In 2015, 81% of the total Lebanese population had access to improved sanitation facilities, and 19% relied on unimproved facilities other than open defecation and shared facilities (WHO/UNICEF JMP, 2015). As of 2017, residents that have access to safe sanitation facilities were reported at 98% of the total population (WHO/UNICEF JMP, 2019).

2.5.1.10 Economy, Livelihood and Employment

As of 2018-2019, less than 50% of the working-age population (15 years old and over) were participating in the labour force. Among women of working age, the labour force participation rate was 29.3 per cent. It is worth noting that women in managerial positions (28.8%) were broadly in proportion to their overall share of total employment (30.5%).

The structure of employment strongly relies on in favour of services (about 76%), most likely with increasing levels of informality. Agriculture accounts for less than 4%, and industry about 21% (EU/CAS/ILO, 2019).

The economy in Abbassieh depends on diaspora remittances and commercial activities. Moreover, there are 3,831 residential units in Abbassieh, 10 schools, 4 hospitals, 2 clinics, 3 slaughter houses, 15 butchers, 110 workshops, 621 commercial institutions and 18 restaurants (GETI, 2016).

2.5.1.11 Environmental Establishments and Activities

2.5.1.11.1 Recycling and Upcycling

The amount of inorganic material recovered from CDR facilities (over years 2014 to 2019) fluctuated between 6% and 8% (LACECO data). Yet an improvement was observed in the proportion sold to the industry as secondary raw material from 74% in the 2014-2015 period (before the 2015-2016 waste crisis) to 95% in the 2017-2019 period (after waste crisis) (LACECO data). This may be attributed to the considerable effort put by NGOs and local communities to reduce the accumulated waste during

the crisis by sorting and recovering recyclable materials. This has led to sorting initiatives and small businesses that gave a boost to the recycling industry. Yet, a lot remains to be done to create larger and broader secondary material markets and, ultimately, a complete national circular economy framework.

A generic MFA15 was generated based on 2019 records provided by individual waste management facilities, local authorities, data provided by MoE and CDR, and baseline reports developed by OMSAR (2017). The total waste received by MSW facilities was found to be 2,187,255 t/yr, which is less than the total estimated generation (2,700,000, MoE Data 2018). The difference of 512,745 t/yr (19%) is assumed to be sent directly to dumpsites. Roughly 65% of the total waste is received in material recovery facilities out of which 5% is recovered.

Moreover, there have been several small initiatives to value used tires, e.g. upcycling or using them as structural elements or drainage material when shredded. But practically, part of the used tires ends in the MSW stream and another part is managed by the formal sector; yet, the largest part is being handled by the informal sector – mostly in non-environmentally friendly applications, such as burning for metals recovery (SOER, 2020).

Other relevant information about recycling initiatives and industries covered nation-wide are found in Section 1.5.

2.5.1.11.2 Environmental Financial Incentives and Tax Exemptions

In an attempt to encourage and promote environmental activities, soft loans were granted through BDL's green financing mechanisms. Additionally, the GOL issued Decree No. 167/2017, an application decree to Article 20 of Law No. 444 that offers economic incentives for activities contributing to environmental protection and sustainability. This includes tax credits for environment industries. It also allowed for tax credits for expenditures on sustainable environmental protection activities and customs duty abatement on importing goods to be used to avoid, reduce or eliminate pollution or to treat, recycle or reuse waste. The necessary application decisions for this Decree were issued in 2017 by MoE through Decision No. 1281/1, in 2020 by the MoF Decision No. 18/1 and in early 2021 by the MoF through Decision No. 35/1.

2.5.1.11.3 Environmental Research and Development

Accredited environmental services providers in Lebanon are qualified by the Council for Development and Reconstruction (CDR).

Several research and laboratory establishments are affiliated to the government. Those that carry out laboratory analysis and research studies are the National Council for Scientific Research (CNRS-L), Industrial Research Institute (IRI), Lebanese Agricultural Research Institute (LARI), and Lebanese Center for Energy Conservation (LCEC).

With relevance to POPs and UPOPs, laboratories in Lebanon cover a wide range of analysis tests and sampling (Table 2-5).

[15] Disclaimer: The MFA presented in this chapter serves only as a rough quantification of the status-quo of MSW flows in the country. Data used in the MFA calculations are based on rates provided by local authorities and managing companies. Some of the provided information is reported informally, with roughly approximated values, especially in facilities that lack adequate weighing equipment and/or accurate weight recording and data storage procedures

Table 2-5 Assessment of the analytical capacity of local laboratories (Source: UNEP/MoE/GEF, 2016)

Analyte	Testing	Matrices	Analytical Techniques
Chlordecone	YES	N/A	HRGC-HRMS and GC-ELCD
Aldrin	YES	Air, Compost, Fish, Hazardous wastes, Industrial wastes, Leachate, Municipal solid wastes, Municipal wastewater, Sediments, Sludge, Soils, Water	GC-ELCD
Alpha-HCH	YES		HRGC-HRMS and HPLC-MS
Beta-HCH	YES		HRGC-HRMS and HPLC-MS
Chlordane	YES		HRGC-HRMS and GC-ELCD
DDT	YES		GC-ELCD and ELISA
Lindane	YES		HRGC-HRMS and GC-ELCD
Endrin	YES		HRGC-HRMS and GC-ELCD
Dieldrin	YES		HRGC-HRMS and GC-ELCD
PeCB	YES		HRGC-HRMS
Endosulfan	YES		ELISA
Heptachlor	YES		ELISA
HCB	YES		HRGC-HRMS and GC-ELCD
Mirex	YES		HRGC-HRMS and GC-ELCD
Toxaphene	YES	N/A	HRGC-HRMS and GC-ELCD
HBB	YES	N/A	HPLC-MS
Hexa BDE and Hepta BDE	YES	Air, Compost, Fish, Hazardous wastes, Industrial wastes, Leachate, Municipal solid wastes, Municipal wastewater, Sediments, Sludge, Soils, Water	HRGC-HRMS and Colorimetric methods (UV-VIS/ fluorescent spectroscopy)
PFOs, its salt and PFOS-F	YES	N/A	HPLC-MS
HBCD	YES	Fish, Sediments and Water	HPLC-MS
Tetra BDE and Penta BDE	YES	Air, Compost, Fish, Hazardous wastes, Industrial wastes, Leachate, Municipal solid wastes, Municipal wastewater, Sediments, Sludge, Soils, Water	HPLC-MS
PCDF	YES	Air, Compost, Fish, Hazardous wastes, Industrial wastes, Leachate, Municipal solid wastes, Municipal wastewater, Sediments, Sludge, Soils, Water	HRGC-HRMS and GC-ELCD
PCDD	YES	Air, Compost, Fish, Hazardous wastes, Industrial wastes, Leachate, Municipal solid wastes, Municipal wastewater, Sediments, Sludge, Soils, Water	HRGC-HRMS and GC-ELCD
PCBs	YES	Air, Compost, Fish, Hazardous wastes, Industrial wastes, Leachate, Municipal solid wastes, Municipal wastewater, Sediments, Sludge, Soils, Water	HRGC-HRMS and GC-ELCD
Toxic gases	NO	N/A	N/A

Analyte	Testing	Matrices	Analytical Techniques
Drugs/ Pharmaceuticals	YES	N/A	HRGC-HRMS and GC-ELCD and HPLC-MS
Fumes	NO	N/A	N/A
Solvents	YES	Air, Compost, Fish, Hazardous wastes, Industrial wastes, Leachate, Municipal solid wastes, Municipal wastewater, Sediments, Sludge, Soils, Water	HRGC-HRMS, GC-ELCD and HPLC-MS
PAHs	YES	Air, Compost, Fish, Hazardous wastes, Industrial wastes, Leachate, Municipal solid wastes, Municipal wastewater, Sediments, Sludge, Soils, Water	HRGC-HRMS, GC-ELCD, HPLC-MS, and Colorimetric methods
Petrochemicals	YES	N/A	HRGC-HRMS, GC-ELCD
Alcohols/ Glycols	YES	Air, Hazardous wastes, Industrial wastes, Leachate, Municipal solid wastes, Municipal wastewater, Sediments, Sludge, Soils, Water	HRGC-HRMS, GC-ELCD
Heavy metals	YES	Air, Compost, Fish, Hazardous wastes, Industrial wastes, Leachate, Municipal solid wastes, Municipal wastewater, Sediments, Sludge, Soils, Water	Flame AAS
Food additives	YES	N/A	HRGC-HRMS, GC-ELCD, and colorimetric methods
Natural toxins	YES	N/A	HPLC-MS
PCP	NO	N/A	N/A
HCBD	NO	N/A	N/A
PCNs	NO	N/A	N/A

Other relevant research and educational institutions within the environment field are listed below:

- Tripoli Environment and Development Observatory/Urban Community of Fayhaa; and
- Universities and Research Centers which provide undergraduate and graduate programs related to the environment (i.e. American University of Beirut (1866), Université Saint-Joseph (1875), Lebanese American University (1924), University of Balamand (1937), Université Saint-Esprit de Kaslik (1950), Lebanese University (1951), the Beirut Arab University (1960), Notre Dame University (1987) and the American University of Technology (1998)).

2.5.2 Overview of the National Social Protection Strategy

In Lebanon, the social protection system is scattered and non-unified. Several schemes exist, including social insurance programmes for public servants and for military and private sector workers, syndicate pension plans, and small social assistance programmes.

Vulnerable people including those with disabilities, elderly, women, and children rely on unsustainable sources of income including informal employment and family support. The country lacks a coherent national social protection system, which has led so far to fragmentation and

duplication of assistance while coverage and provision of protection to the poorest and most vulnerable remain inadequate.

The GOL adopted two national plans: National Social Action Plan Toward Strengthening Social Safety Nets and Access to Basic Social Services 2007, and National Social Development Strategy (NSDSL) in 2010 (Bastagli et al., 2019). A decade later, the GOL launched the Roads and Employment Project (REP) to rehabilitate roads in different regions of the country, and create employment opportunities. The REP project followed the population growth and the increase in unemployment rates in the country. In addition, GOL developed and launched the Emergency National Poverty Targeting Program (NPTP) Project to alleviate poverty rates in the country. Lately, MOSA launched the Daem Network for Social Protection. The network comprises two programmes: safety programme, and e-finance card programme (MOSA, 2022).

Despite the consecutive attempts of GOL represented by MOSA in those programmes, as of September 2021, the UN estimates that roughly 75% of the total population lives in poverty (UN, 2021).

The lack of social security basics and the cumulative effects of the consecutive crises has drowned most of the Lebanese population into poverty, leading them to have limited to no access to proper services, including medical, educational, and transportation among others. In an attempt to alleviate poverty in the country, GOL through MOSA has launched two major projects elaborated below.

2.5.2.1 National Poverty Targeting Program

The National Poverty Targeting Program (NPTP) in Lebanon is managed by the Ministry of Social Affairs (MOSA). The rationale behind this program is to alleviate poverty in Lebanon and improve the lives of 237,958 beneficiaries.

NPTP is supported and funded by international organization including the World Bank (WB), The World Food Programme of the United Nations (WFP), and the German Cooperation.

2.5.2.2 Roads and Employment Project

As part of the efforts to create job opportunities for residents in Lebanon, and to improve the economic situation of households, the Roads and Employment Project (REP) was launched in 2017 with the financial support of a loan accredited from the WB to the GOL. The components of the project were amended in 2021, following the economic collapse and the devaluation of the Lebanese Pound, and the COVID-19 pandemic. Both crises severely affected the living conditions of the Lebanese population, bringing roughly 75% of the total population to live below the poverty line, with 36% of them living in extreme poverty.

2.5.3 Overview of Cultural Heritage Areas

Lebanon is a host country to many archaeological and cultural sites. Five properties are inscribed on the World Heritage List of UNESCO: Anjar, Baalbek, Byblos, Ouadi Qadisha and the Forest of the Cedards of God, and Tyre (UNESCO Website16).

[16] https://whc.unesco.org/en/statesparties/lb

Many other sites are on the tentative list of UNESCO. These sites are:

- Le centre historique de la ville de Batroun;
- Temple d'Echmoun;
- Ensemble des monuments historiques et des sites naturels du village de Menjez;
- Sacred Mount Hermon and its associated cultural monuments;
- Le site archeologique de Nahr el-Kalb;
- Centre historique de Saida;
- The castles of Mount Amel: Qalaat Al Chakif (Beaufoert castle), Qalaat Tibnin (Toron castle), Qalaat Chakra (Dubieh castle), Qalaat Deir kifa (Maron Castle), Burj Al Naoqoura (Naqoura tower);
- L'ancienne ville de Tripoli;
- La foire internationale Rachid Karameh de Tripoli-Liban; and
- Ras al-Qalaat promontory / Ras Al Natour promontory / Ras el-Mlelih Promontory.
- Abbassieh has two main heritage sites, the Hippodrome and the Necropolis of El-Buss. Together these suggest a heritage/amenity feature complex of strategic significance (UN-Habitat, 2017).

3 LAWS, REGULATIONS, AND INSTITUTIONAL FRAMEWORK

3.1 RELEVANT NATIONAL ENVIRONMENTAL LAWS, REGULATIONS AND POLICIES

The hierarchy of legislation in Lebanon is as follows: (i) Laws; (ii) Decree and, (iii) Ministerial Decision and Regulation. Laws are passed by the Parliament, which can be supplemented by Decrees and/or ministerial decisions. These decrees and regulations to be passed, which can stipulate procedures and standards to be met to ensure compliance with the law. In addition, there are several guidance documents that are designed to support best practices as required.

The overall management of the environment is under the responsibility of the Ministry of Environment. The MoE is responsible for the implementation of the Law on Environmental Protection and. At the regional levels, Governorates and Caza public authorities in addition to municipalities are responsible for the enforcement of the environmental legislation.

The framework law calls for an initial environmental examination (IEE) or full environmental impact assessment (EIA), depending on type and activity and the site of the project (EIA Decree 8633 / 2012), to be conducted for every private or public project, to be reviewed and approved by the MoE before project commencement. Site demonstration under Component 2 will be assessed accordingly.

IEE or EIA is required for every sub-project, depending on type and activity and the site of the project will be prepared accordingly. MOE is responsible for reviewing the EIA reports, and undertake the required follow-up, and monitoring. Annex 1 of EIA decree lists the projects that duly require an EIA study that includes solid waste projects establishing centers for the management, treatment, and discharge of the various sold waste.

The EIA Decree 8633/2012 describes the steps to be undertaken to prepare and approve an EIA (see ANNEX C:). It also provides an outline of the information required to be presented in the EIA report (see ANNEX D: and ANNEX E:). Decision 261/1 of 2015 provides guidelines for the review of EIA scoping reports and EIA reports. Appendices 6 and 8 of EIA Decree present the content required to be presented in IEE and EIA reports.

The national government authorities with their corresponding functions and responsibilities on solid waste management are detailed in Table 3-1 and Table 3-2.

Table 3-1 Governmental Authorities and their Main Responsibilities Relevant to Solid Waste Management (Source: SOER, 2020)

Authority	Main Responsibilities
Ministry of Environment (MoE)	In charge of drafting waste regulations, standards and guidelines; develop national strategies and plans, proposing economic instruments; approving, inspecting and monitoring local plans, treatment technologies, and import/export of waste; reviewing ToRs; approving EIAs and SEAs; monitoring the implementation of legislations and strategies; setting up a national database; and outreaching to the public.
NSWMA	In charge of coordinating issues pertaining to the solid waste sector, under the leadership of MoE. It consists of seven representatives of the public sector (MoIM, MoF, MoI, MoPH, MoEW, MoA). In addition to CDR and OMSAR, and 6 representatives of economic and academic bodies of environmental NGOs (OEA, ALI, academia, consulting companies, contracting companies and NGOs).

Authority	Main Responsibilities
	MoE Decision 108 of 2019.
Local Authorities	In charge of planning, implementing, and monitoring local waste management services (including collection and street sweeping in addition to treatment and disposal services, if environmentally and economically feasible); as well as raising awareness.
Private Service Providers	In charge of constructing, operating, self-monitoring and reporting on private or PPP projects.

Table 3-2 Main Stakeholders in Solid Waste Management (Source: SOER 2020)

	Stakeholder	Planning, Coordination & Information Management	Implementation	Supervision & Monitoring	Awareness
Primary[17]	MoE	X		X	X
	NSWCC	X		X	
	NSWMA		X	X	
	LA	X	X	X	X
	Private Service Providers		X	X	
	Waste Producers		X		
Transitional	CDR[18]	X	X	X	
	OMSAR[19]		X	X	
Secondary	MoIM[20]	X			
	MoI[21]	X			
	MoPH[22]		X	X	
	MoET[23]		X		
	MoF[24]		X		
	The Informal Sector[25]		X		
	The Private Sector[26]		X		X
	NGOs[27]		X		X
	Funding Agencies[28]	X	X		X

[17] As defined by Law No. 80 (2018)
[18] Relating to solid waste facilities servicing Beirut, Keserwan and part of Mount Lebanon (CoM Decision 1 dated to 17/3/2016)
[19] Relating to waste facilities funded by international donors, mainly outside the area serviced by CDR facilities
[20] Relating to local waste management plans, local financial instruments and SWM service fees (Decree 4082 dated 14/10/2000: Regulation of the Ministry of Interior and Municipalities)
[21] Relating to waste facilities permitting, implementation of the Extended Producer Responsibility (EPR) principle and creation of markets for secondary materials (Decree 13173/1998: Regulation of the Ministry of Industry)
[22] Relating to public health protection (Decree No. 8377 dated 30/12/1961: Organization of the Ministry of Public Health).
[23] 3 Relating to the implementation of EPR principle (Decree No. 2896 dated to 16/12/1959: Organization of the Ministry of Economy and Trade).
[24] Relating to its role of managing the Independent Municipal Fund, which is currently financing the collection and management of MSW in areas served by national facilities (Decree 2868 dated 16/12/1959: Organization of the Ministry of Finance).
[25] Relating to their contributing to material recovery and recycling
[26] 6 Relating to the role of industrial, commercial and other businesses in creating secondary material market and advertising for it, as well as valorization of high energy content in energy-intensive industries
[27] Relating to promoting waste prevention and sorting and raising public awareness
[28] Relating to their role in assisting authorities in developing legislation, as well as funding of SW projects, national and local capacity building and awareness raising

Table 3-3 Key Actors and Stakeholders in Air Quality Management (Source: SOER, 2020)

Responsibilities	MoE[29]	MoPH	MoEW	MoIM	MoPWT	MoI	UCF
Developing strategies, plans, programs, projects, activities and studies for safeguarding air quality, including through interventions in the power and transport sectors	X		X30		X31		
Establishing guidelines and regulations regarding indoor air quality and tobacco control in indoor spaces		X32					
Identification of sources, causes, methods and places of surrounding air pollution	X						
Installation and operation of power plants (through EDL)			X33				
Planning and implementation of oil and gas activities (through Lebanese Petroleum Administration (LPA))	X34		X35				
Proposing and enforcing traffic laws and regulations				X36			
Issuance, renewal and canceling of						X37	

[29] Law 690/2005: Regulating the MoE and defining its tasks and competencies
[30] Law 20/1966: Establishment of MoEW, later reorganized by virtue of Law 247 of 2000; Law 462/2002: Organization of the Electricity Sector
[31] Decree 2872/1959: Organization of MoPWT
[32] Law 657/2005: Ratification of WHO Framework Convention on Tobacco Control. This law resulted in establishing the National Program for Tobacco Control
[33]Law 20/1966: Establishment of MoEW, later reorganized by virtue of Law 247 of 2000; Law 462/2002: Organization of the Electricity Sector
[34] Law 132/2010: Offshore Petroleum Resources Law
[35] Decree 7968/2012: Establishing the LPA
[36] Law 243/2012: New Traffic Law
[37] Law 642/1997: Establishment of MoI; Decree 8018/2002 which determines the procedures and conditions for the authorization of establishment of industries

Responsibilities	MoE29	MoPH	MoEW	MoIM	MoPWT	MoI	UCF
industrial permits based on environmental, health and safety criteria							
Enforcement of ambient air quality and emission discharge standards, through environmental impact assessment and auditing	X						
Monitoring of ambient air quality	X						X38

[38] CoM Decision 18 dated 9/12/2004 for including Tripoli Environment and Development Observatory (TEDO) under UCF

Table 3-4 Responsibilities of National Authorities in the Chemicals Sector (Source: SOER, 2020)

Responsibility	MoE39	MoI40	MoA41	MoET42	MoPH43	LCA44	CD45	EDL
Reporting on multilateral conventions and agreements	X		X					
Setting legislation including classifica-tion, storage, use, labeling and ban-ning of hazardous chemicals	X	X			X			
Issuing permits related to the use and disposal of chemicals	X	X	X		X			
Policy making and planning for chemical/ pesticide management	X	X	X	X46	X			
Follow up and monitoring	X	X47	X	X	X	X		
Enforcement of legislation including control of chemical import and use	X		X48		X	X		
Proper use and disposal of chemicals					X	X	X	X

Lebanon's main legal framework for addressing environmental protection is the Law on Environmental Protection ('the Environment Law'), which was adopted in 2002. This law, along with other regulations and decrees related to solid waste management and environmental and social impact and risk management, are presented in Table 3-5 and Table 3-6. The overall approach in this ESMF shall be anchored to these policies.

[39] Law 690/2005: Regulating the MoE and defining its tasks and competencies
[40] Law 642/1997 amended by Law 20/2008: Creation of MoI
[41] Decree 5246/1994: Organization of the MoA and designation of its mandate
[42] Decree 6821/1973: Determination of MoET tasks
[43] Decree 8377/1961: Organization of the MoPH
[44] Decree 4461/2000: Customs Law
[45] Decree 50/1967 amended by Law 289/2014: Civil defense system and organization
[46] Decree 841/2008: Organizing the Consumer Protection Directorate
[47] Decree 9765/2003: Inspection procedures by MoI (Control Department)
[48] Law 31/1955: Designating the tasks of the MoA

Table 3-5 Policies, Laws and Regulations in Lebanon Related to Waste Management and Environmental Management (Source: SOER 2020)

Regulations	No.	Date	Title/Objectives
Law	80	10 October 2018	Integrated solid waste management law
Law	2	3 February 2017	Ratification of Minamata convention on Mercury
Law	29	24 November 2015	Ratification of the Basel convention amendment to control transboundary movements of hazardous wastes and their disposal
Law	280	30 April 2014	Grant of financial incentives to the municipalities surrounding the Abieh Ain Darfil landfill, and exempting them from certain deductions and dues due to them
Law	738	15 May 2006	Kyoto protocol to the United Nations framework convention on climate change aiming to fight global warming
Law	728	15 May 2016	Ratification of Rotterdam convention (convention on the prior informed consent for certain hazardous chemicals and pesticides in international trade)
Law	432	8 August 2002	Stockholm convention on persistent organic pollutants
Law	387	21 December 1994	Basel convention on the control of trans-boundary movements of hazardous wastes and their disposal
Law	253	21 March 1993	Montreal protocol on substances that deplete the ozone layer
Law	64	12 August 1988	Protection of the environment from hazardous wastes and hazardous materials
Law	126	30 June 1977	Barcelona convention for the protection of the Mediterranean Sea against pollution
Law	444	29 July 2002	Protection of the environment
Decree	5606	11 September 2019	Management procedures of hazardous waste
Decree	5605	11 September 2019	Household solid waste sorting from the source
Decree	8471	28 March 2012	Environmental compliance for establishments49
Decree	8633	28 March 2012	Environmental Impact Assessment
Decree	13389	14 September 2004	Specification of the types of healthcare wastes and their disposal methods (amendment to Decree 2002/8006)
Decree	8735	23 August 1974	On the preservation of public hygiene
CoM Decision	46/2018	11 January 2018	Policy Summary on integrated solid waste management
MoE Decision	1/16	10 February 2022	Updated Environmental Limit Values for air pollutants
MoE Decision	1/58	21 January 2020	Classification of RDF
MoE Decision	1/59	21 January 2020	Principles and procedures for storage of hazardous waste
MoE Decision	1/998	24 December 2019	Determines the procedures and principles for implementing the first chapter (HW generators and its obligations) of the second section of the principles of HW management Decree (5606 of 2019)
MoE Decision	1/999	24 December 2019	Determines the procedures and principles for implementing the second chapter (HW transporters and its obligations) of the second section of the principles of HW management Decree (5606 of 2019)
MoE Decision	1/108	5 March 2019	Appointing the ISWM coordination committee
MoE Decision	1/1295	28 December 2017	Environmental conditions for the establishment and

[49] Each establishment should submit an environmental audit report confirming their environmental compliance to the MoE. MoE, after approving the report, will issue an "Environmental Compliance Certificate" that should be revised every 3 years.

Regulations	No.	Date	Title/Objectives
			operation of sterilizing facilities for hazardous and infectious waste from health institutions and defining the principles for granting an environmental license to operate such facilities
MoE Decision	1/1294	28 December 2017	Environmental conditions for the transport of hazardous and infectious waste from health institutions
MoE Decision	1/260	12 June 2015	Procedure for the review of IEE reports
MoE Decision	1/261	12 June 2015	Procedure for the review of scoping and EIA reports
MoE Decision	1/262	12 June 2015	Procedure for the review of objections on the MoE's decisions on EIA reports
MoE Decision	1/8	30 January 2001	Updates/replaces Decision 1996 – 1/52 by developing National Standards for Environmental Quality (NSEQ) related to air pollutants and liquid waste emitted from classified establishment and wastewater treatment plants into receiving water bodies. Air Emission Limit Values are superseded by those in Decision 1/16 of February 10th, 2022
MoE Decision	1/71	19 May 1997	Regulates the import of waste and amends Decision No. 1/22 dated 1996/12/17
MoE Decision	1/161	31 October 1997	Amends Decision 1997 – 1/71
MoE Decision	1/52	29 July 1996	Specifying the national standards for environmental quality and the environmental limit values for air, water, and noise.
MoE Circular	1/7	16 November 2017	Amends Circular No. 1/8 dated 2015/11/16 related to some instructions related to Integrated solid waste management for Municipalities, Union of Municipalities, Qa'imakams and Governors
MoE Circular	1/11	24 March 2011	Template for the trimestral report to be submitted by licensed health care waste treatment facilities to the MoE

Table 3-6 The Key National and International Environmental Standards

Environmental Media	National Standard	International Standard
Ambient air quality	MoE Decision 8/1 of 30 January 2001 MoE Decision 52/1 of 29 July 1996 MoE Decision 7/1 of 16 November 2016 MoE Decision 1/16 of 10 February 2022 (for air emissions)	World Health Organization (WHO) Air Quality Guidelines, global update 2005
Noise		WHO Guidelines for Community Noise, 1999
Groundwater quality (for drinking)		WHO Guidelines for Drinking-water Quality, Fourth Edition, 2011
Groundwater (ambient)		EU Groundwater Directive 2006/118/EC
Surface water quality		US EPA National Recommended Water Quality Criteria Mekong River Commission: Technical Guidelines for the Protection of Aquatic Life Mekong River Commission Tech nical Guidelines for the Protection of Human Health
Effluent quality		International Finance Corporation-World Bank Group (IFC-WBG) EHS General Guidelines
Leachate management	No specific regulation on leachate standards	IFC-WBG EHS Guidelines for Waste Management Facilities

3.1.1 Leachate Management/Treatment

Since there are no current national standards for leachate treatment in Lebanon, the IFC-WBG EHS Guidelines on Waste Management Facilities shall be the basis for leachate management for the project.

Based on the IFC-WBG EHS Guidelines on Waste Management Facilities, Table 3-7 lists the recommendations on prevention, minimization, and control of leachate generation in municipal solid waste dumpsites/landfill sites.

Table 3-7 EHS Guidelines on Municipal Solid Waste Measures for Leachate Management/Treatment (Source: IFC-WBG EHS Guidelines 2007)

Landfill Siting
Must have stable geology
Must avoid being near particularly vulnerable/sensitive ecosystems
Must avoid being near groundwater / surface water resources
Design and Operation
Must follow existing national requirements and international standards to minimize leachate generation
Use of low-permeability landfill liners to prevent leachate migration and landfill gas
Use of leachate drainage and collection system
Minimize infiltration by using landfill cover (daily, intermediate, and final)
Minimize the daily exposed portion of the sanitary landfill facility where solid wastes are unloaded
Reduce infiltration of rainfall into deposited waste using perimeter drains and landfill cell compaction, slopes and daily cover materials
Prevent run-on of precipitation into the active area of the landfill by using berms or other diversions[50]
Collect and control run-off from the active area of the landfill
Leachate Treatment
Must be done onsite and/or discharge to municipal wastewater system
Treatment methods may include aerated lagoons, activated sludge, anaerobic digestion, artificial wetlands, re-circulation, membrane filtration, ozone treatment, peat beds, sand filters, and methane stripping

3.1.2 Groundwater and Leachate Monitoring

Based on the IFC-WBG EHS Guidelines on Waste Management Facilities, the following measures have been recommended for groundwater and leachate monitoring.

Table 3-8: EHS Guidelines on Municipal Solid Waste Measures for Leachate Monitoring

Groundwater Monitoring Wells
Must be installed outside the landfill perimeter
Location and depths must be sufficient to evaluate leachate migration from the landfill into the uppermost groundwater unit
Monitoring network must include one (1) monitoring well in the upgradient groundwater flow direction from the landfill and two (2) monitoring wells in the downgradient direction
Must follow existing national requirements and international standards
Sampling
Measure and record quantity and quality of leachate generated

[50] Systems should be designed to handle the peak discharge from a 25-year storm; Run-off is typically treated with leachate from the site ((IFC-WBG, 2007)

Changes in leachate quantity/quality not attributable to weather or other factors may indicate changes in the liner, leachate collection, or landfill cover systems
Monitoring wells must be regularly sampled and analyzed for constituents, selected based on:
Types, quantities, and concentrations of constituents
Mobility, stability, and persistence of waste constituents their reaction products in the unsaturated zone beneath the waste management area
Detectability of indicator parameters waste constituents, and reaction products in groundwater
Constituent concentrations in the groundwater background

3.2 RELEVANT NATIONAL SOCIAL LAWS, REGULATIONS, AND POLICIES

3.2.1 Social Risk Assessment as part of ESIA process

When developing an Environmental Impact Assessment (EIA) report, it is requested to also consider the social impact that the project may have on the surrounding community, including affected people, beneficiaries, and others. Decisions Nos. 260/1 and 261/1 of 2015 regulate the structure and content of IEE and EIA reports, respectively.

A summary of all relevant legislation mentioned throughout this section is provided in Table 3-9.

Key Legislation are discussed below, and all legislative texts are further elaborated in the Labor Management Plan (LMP).

Table 3-9 Summary Table of all Relevant In-Force Social Legislation in Lebanon

Legislation Type and No.	Year of Issuance	Reference Entity	Brief Description
Law 205	2020	Parliament	Criminalizes sexual harassment at any location.
Decision 291/	2018	MoL	Restricts a substantive number of jobs to Lebanese citizens in order to protect the workforce and reduce unemployment.
Law 28	2017	Parliament	Stipulates the right for any natural or legal person to have access to public information in Lebanon from any governmental institution. This law also obligates governmental administrations to publish and make available all financial and administrative data for the citizens.
Law 340 – Penal Code (Abolishment of Article 522)	2016	Parliament	Abolishment of Article 522 of the Penal Code that exempts a rapist from punishment if he marries his victim.
Decree 3791 (amending Decree 7426 of 2012)	2016	CoM	Set and apply the official minimum wage for employees and workers subject to the labor law and the cost of living ratio. Raises the minimum daily wage to 26,000 LBP.
Law 293	2014	Parliament	Law on the Protection of Women and Family Members from Domestic Violence. Advances women's rights and safety. Establishes important protection measures and related policing and court reforms.
Decree 8987	2012	MoL	Forbids the employment of adolescents and children under 18 years of age in jobs that pose a risk to their health, safety and behaviour.
Decree No. 7426	2012	MoL	Sets the minimum wage at 675,000 LBP.
Decree 11802	2004	CoM	Organizes occupational safety, safety and health in all institutions subject to labor law, and provides the general regulations for the occupational health and safety
Law 220	2000	Parliament	Stipulates the civil rights of people with a disability.
Law 207	2000	Parliament	Prohibits all forms of discrimination between men and women in the workplace concerning employment type, remuneration, employment, promotions and raises, vocational training and attire.
Decision 49/1	1997	MoL	Forbids the employment of adolescents and children under 18 years of age in non-industrial settings, unless a medical examination proves them apt to perform such work.
Labor Code and its amendments	1946	MoL	Sets the framework for the terms and conditions of Eemployment, and rules governing the relationship between employers and employees.

3.2.2 Labor Law

3.2.2.1 Terms and Conditions of Employment

The Labor Code of Lebanon dated 1946 sets the framework for the terms and conditions of employment, and rules governing the relationship between employers and employees. Key articles and clauses from the Labor Code (LC) include, but are not limited to:

- Minimum age of employment;
- Work contracts regulation and framework;
- Identification of workers;
- Minimum wages;
- Working hours;
- Conditions for rest, leave, and overtime;
- Severance pay; and
- The terms and conditions of Employment and further elaborated in the Labor Management Plan, which is part of the scope of this Project.

Additional legislation are complimentary to Labor Code including Decision No. 291 of 2018, Decree No. 7426 of 2012 and its amendment (Decree No. 3791 of 2016), Decree No. 8987 of 2012, Law No. 207 of 2000, and Decision No.49 of 1997 (Table 3-9).

3.2.2.2 Maternity and Family Leave

As per Labor Law, gender discrimination is not allowed in the workplace, and laying off women during their maternity leaves in forbidden. Additionally, the law clearly states that gender discrimination is not allowed.

However, some key social considerations have not been stipulated in Lebanese legislation, including, but not limited to, paternity leave, childcare leave or the right to breastfeed.

Further details about maternity and family leave are provided in the Labor Management Plan (LMP).

3.2.2.3 International Labor Standards

The International Labor Organization has developed a set of Conventions that cover a wide area of social and labour issues including basic human rights, minimum wages, industrial relations, employment policy, social dialogue, social security and other issues.

3.2.3 Occupational Health and Safety (OHS)

The Council of Ministers issued Decree 11802 in 2004 to organize occupational safety, safety and health in all institutions subject to labor law.

The Decree provides the general regulations for the prevention of occupational hazards and accidents, and the promotion of health and safety in all industrial establishments subject to the Labor Law. These cover prevention and safety, occupational health, the safe use of chemicals at work, as well as occupational noise standards.

3.2.4 Vulnerable Groups Regulatory Framework and Baseline

Vulnerable groups in Lebanon include women, children, people with disability, elderly, and displaced persons. Displaced persons are considered among vulnerable communities as they do not benefit from governmental services. Relevant clauses from legislative texts are elaborated in Section 3.2.

Additionally, specific legislation relating to the topics below are currently in force.

3.2.4.1 Gender and Sexual Exploitation and Abuse / Sexual Harassment

Law No. 205 issued in 2020 criminalizes sexual harassment which is defined as follows: any bad and repetitive behavior that is unordinary, unwelcome by the victim, carries a sexual connotation, and that constitutes a violation of the body, privacy, or feelings. Sexual harassment might take place at any location and through sexual words, acts, signs, allusions, and through any means including electronic means.

The Labor Code prohibits discrimination between workers based on their gender, with respect to type of work, amount of wage or salary, employment, promotion, professional qualification, and apparel (LC, art. 26). Equal rights shall be given to all employees.

However, Labor Code defines a set of prohibitions for women in specific fields and sectors (mining, production and use of explosives, and production of alcohol).

3.2.4.2 Child Labor

Labor Code clearly stipulates that engaging children in jobs, especially those that may put their health and safety at risk is prohibited. LC sets the norms to be followed as mentioned in Section 3.2.2.

3.2.4.3 Disability

Act No. 220 (2000) provides that a certain number of jobs in the public sector are allocated to persons with disabilities (Act No. 220 of 2000, art. 73). Quotas are also applicable to private sector employers, depending on their size (Act No. 220 of 2000, art. 74).

3.3 Environmental Social Framework of the World Bank

The environmental and social policy for World Bank financed projects is required to be applied under the Environmental and Social Framework (ESF). This is to ensure that the WB supported projects are environmentally and socially sound and sustainable. Likewise, this will inform the design of the projects and identify mitigation measures and actions to improve decision making.[51] The ESF enables the financing recipient to better assess the environmental and social risks of projects and to improve development outcomes. Consistent with the Bank's environmental and social policy, the Project is expected to meet the requirements set forth in the Environmental and Social Standards (ESS). These standards applicable to this project are listed in 0 (World Bank, 2017).

3.4 Environmental, Health, and Safety Guidelines of the World Bank

The Environment, Health and Safety guidelines of the World Bank Group applies to municipal solid and industrial waste management facilities that include the following processes:

- Waste collection and transport;

[51] Based on the GNB, ESF for IPF Operations, p. 1

- Waste receipt;
- Unloading, processing, and storage;
- Landfill disposal;
- Physio-chemical and biological treatment; and
- Incineration Projects (WBG, 2007).

Table 3-10: EHS Guidelines Related to Labor Management, Community Health and Environmental Management in Waste Management Facilities (Source: World Bank Group (2007))

Component	Description
Labor Management Occupational Safety	Occupational Safety Procedures for the landfill operation must include provisions related to: Accidents and injuries, including those involving trucks and moving equipment, unstable disposal site surfaces, and fires and explosions, Chemical exposure, including exposure to chemical burns, and Exposure to pathogens and vectors that can be health hazards. For informal living near waste management facilities, they often have poor living conditions with only minimal water and sanitary facilities. They are also especially at risk to exposure to hazardous and toxic waste and fumes. As much as possible, the economic displacement of these must be avoided, especially without provision of any alternatives. Facilities managing municipal solid waste must work together with government entities to allow the collection and sorting of solid waste, if possible, initiatives to help them form formal entities, such as cooperatives or micro-enterprises, can be done to formally contract them into the process of the facility. Once such work is formalized, the workers must be officially registered, provided with protective equipment, provided with washing and sanitation facilities, and receive regular health examinations and vaccinations under a health surveillance program. The design of the facility must also consider easier access of the recyclables and reduce their contact to wastes that pose hazards. (p. 23-26)
Community Health and Safety	Long-term Operation, Decommissioning or Closure: Specific procedures on closure must emphasize preservation of long-term integrity and security of the site. The closure and post-closure plan must include mitigating impacts to human health and environment after the closure. All plans must be aligned with the defined post-closure use. Community Health and Safety The following impacts likely to occur during the operation and decommissioning phases must be looked into: *Waste scavenging*: should not be allowed under any circumstances in hazardous and non-hazardous industrial waste management facilities. Only facilities handling municipal solid waste may consider incorporating the employment of waste-pickers into the operations of the facility. *Physical, chemical, and biological hazards*: access to facilities, especially for areas that hold toxic waste, must be restricted and implement security procedures. *Litter*: garbage outside the facility must be managed to avoid the exposure of the adjacent community to hazardous substances and potentially spread disease. *Noise*: measures to management noise should be taken to void causing nuisance to the adjacent areas., *Dust and odors*: Buffer areas must be included in the design, especially between processing areas and potential receptors, especially residences, hospitals and

Component	Description
	schools. Processing areas must be located in areas at the downwind from these areas to manage and control exposure of community to dust and odors. (Section 1.1.1, p.10-11, 14; Section 1.3 p.26)
Environmental Protection and Management	On emission and noise management Additional guidelines on emission management specific for Waste Management Facilities include: Inclusion of landfill gas collection system and its use if practical, Use of gas blowers, and Installation and regular sampling of boreholes. Additional guidelines on noise management specific for Waste Management Facilities include the following: Construction of a buffer zone, Road quality maintenance Use of equipment with low-noise emission levels, Use of sound-insulating materials, acoustic screens and silencing equipment, Enclose inherently noisy equipment in a fixed structure, and Inclusion of noise considerations in the design process.

3.5 GAP ANALYSIS

The policies of the World Bank and the related Lebanese legislation were reviewed and analyzed to identify gaps and measures to bridge them, as detailed in Table 3-11.

Table 3-11 Gap Analysis of Existing World Bank and Lebanon Policies

Item	Applicable WB Policy	Lebanon Relevant Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
General	"Associated Facilities" means facilities or activities that are not funded as part of the project and, in the judgment of the Bank, are: (a) directly and significantly related to the project; and (b) carried out, or planned to be carried out, contemporaneously with the project; and (c) necessary for the project to be viable and would not have been constructed, expanded or conducted if the project did not exist.		There are no associated facilities related to this project.	MoE
Environmental and Social Impact Assessment	ESS1: The conduct of an assessment of the environmental and social risks and impacts (i.e., direct, indirect, cumulative) is required for proposed World Bank-financed and associated facilities across its project phases (i.e., preconstruction, construction, operation, decommissioning, closure, and reinstatement/restoration phases, whichever are relevant). Borrowers are required undertake the following: Environment and Social Assessment, identification and evaluation of potential environmental and social risks and impacts; Stakeholder Engagement, preparation of stakeholder engagement plans (SEP), information disclosure, and meaningful consultation as provided	Law 444 (Protection of the Environment) Sets the framework for environmental protection. Provides the principles and rules for protecting different environmental matrices (air, water, soil…) from pollution with wastewater, hazardous wastes, chemicals, and noise, etc.; and specifies the penalties for violating environmental laws.	WB ESS and Lebanon policies on EIA are aligned in terms of assessing environmental impacts of projects as a whole, focusing on the natural environment as well as on the socio-economic impact that the project may have on the surrounding community, including affected people, beneficiaries, and others. The inclusion of public participation in the EIA process is required. The ESIAs and ESMPs that will be developed for the sub-projects will specifically include focus on social assessment and management plus vulnerable groups as well as will include specific stakeholder engagement plans. For the sub-projects involving waste-pickers, Livelihood Restoration Plans (LRPs) will be prepared, adopted and implemented	MoE

Item	Applicable WB Policy	Lebanon Relevant Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
	by ESS-10; Environmental and Social Commitment Plan (ESCP), timebound planning of actions and measures for identified potential risks and impacts; and, Monitoring and Reporting, performance tracking and evaluation of actions identified in the ESCP. For projects that include existing facilities for rehabilitation, a review and audit must be conducted to identify corrective actions to align the existing facility with the requirements of the ESS and must be indicated in the ESCP. All high-risk projects and sub-projects must be in accordance to ESS, while Substantial-risk to low-risk projects must be in accordance to national laws and the ESS deemed relevant by WB. A CBA or other analyses will be required for instances wherein selected option in site, design or technology poses higher environmental and social risks compared to other options. The necessary capacity and trainings related to the implementation and monitoring of the ESCP must be included as part of its measures.		in case their livelihoods are impacted.	

Item	Applicable WB Policy	Lebanon Relevant Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
	This application of this ESS is contingent to ensuring the compliance to ESS10, and the other ESS as necessary within the context of the project. (ESS-1 Par 1011, 15, 23, 28-30; ESS-1 Guidance Notes GN 15.1-GN17.2)			
		Decree 8633 28 March 2012 Environmental impact assessment sets principles and measures necessary to assess the environmental impact of development Projects. The EIA decree addresses the objectives of the regulation, definitions, as well as various stages of the national EIA process such as screening, scoping, implementation, and review of the EIA report, in addition to the period of validity, and the appeal process. The EIA Decree also lists all the activities for which EIA or permit conditions are mandatory, and those that require an IEE.		
		MoE Decision 1/260 12 June 2015 Procedure for the review of IEE reports MoE Decision 1/261 12 June 2015 Procedure for the review of scoping and EIA reports		
		MoE Decision 1/262 12 June 2015 Procedure for the review of objections on the MoE's decisions on EIA reports		

Item	Applicable WB Policy	Lebanon Relevant Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
Labor Conditions and Occupational Safety	ESS1: Environmental and social assessment must include relevant risks and impacts including implications to health, safety and wellbeing of workers of the facility (ESS-1 Par 28)	The Labor Code of Lebanon dated 1946 sets the framework for the terms and conditions of Employment, and rules governing the relationship between employers and employees. It regulates key issues such as Minimum age of employment, Wages, Rest, Leave, and Overtime, Maternity and Family Leave, and Severance Pay among other issues. Decree 11802 in 2004 organizes occupational safety, safety and health in all institutions subject to labor law. The Decree provides the general regulations for the prevention of occupational hazards and accidents, and the promotion of health and safety in all industrial establishments subject to the Labor Law. These cover prevention and safety, occupational health, the safe use of chemicals at work, as well as occupational noise standards. Decree 8987 of 2012 forbids the employment of adolescents and children under 18 years of age in jobs that pose a risk to their health, safety and behavior	The WB ESS law prohibits the employment of children under the age of 18 in hazardous work and Decree 8982 as well. However, national laws only cover children employed in the formal sector. Most child labor, especially the ones with poor labor conditions, are in the informal sector where waste-picking is also part of. The LMP will be developed to require the contractors to comply as well as monitor their compliance.	MOE

Item	Applicable WB Policy	Lebanon Relevant Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
	ESS2: Labor management procedures for all types of workers to be employed or engaged by the project must include minimum benefits, termination agreements, principle of nondiscrimination and equal opportunity, minimum age of workers, occupational health and safety, and grievance mechanism to establish labor standards in the workplace. ESS 2 para 19, and footnote 13, notes that a child under the age of 18 may be employed or engaged in connection with the project if there is no hazardous work, an appropriate risk assessment is conducted prior to the work commencing, and the recipient conducts regular monitoring of health, working conditions, hours of work	Applicable relevant social legislation presented. Additional laws relevant for ESS 2 are developed below. The Labor Code prohibits discrimination between men and women. Law No. 205 of 2020 criminalizes any act of sexual harassment, especially in the workplace.	Recruitment is not expressively covered in Labor Code. Law No. 205 of 2020 still needs enforcement at the level of implementation and the sequence of procedures to be followed in order to protect victims from sexual harassment. The Labor Management Procedures (LMP) cover these gaps. A Code of Conduct shall be developed in line with Lebanese legislation and the WB policies.	MOE
	EHS Guidelines for Waste Management Facilities on Occupational Health and Safety: Occupational Safety Procedures for the landfill operation must include provisions related to: (1) accidents and injuries, including those involving trucks and moving equipment, unstable disposal site surfaces, and fires and explosions (2) chemical exposure, including exposure to chemical burns (3) exposure to	Applicable relevant environmental and labor laws presented. No specific national guidelines for Waste Management Facilities on Occupational Health and Safety exit.		

Item	Applicable WB Policy	Lebanon Relevant Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
	pathogens and vectors that can be health hazards. For informal living near waste management facilities, they often have poor living conditions with only minimal water and sanitary facilities. They are also especially at risk to exposure to hazardous and toxic waste and fumes. As much as possible, the economic displacement of these must be avoided, especially without provision of any alternatives. Facilities managing municipal solid waste must work together with government entities to allow the collection and sorting of solid waste, if possible, initiatives to help them form formal entities, such as cooperatives or micro-enterprises, can be done to formally contract them into the process of the facility. Once such work is formalized, the workers must be officially registered, provided with protective equipment, provided with washing and sanitation facilities, and receive regular health examinations and vaccinations under a health surveillance program. The design of the facility must also consider easier access to the recyclables and reduce their contact to wastes that pose hazards. (p. 23-26)			

Item	Applicable WB Policy	Lebanon Relevant Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
Pollution	ESS3: Policies related to requirements and standards related to the sustainable use of resources in the various stages of the project must be laid out. Additionally, measures for prevention and mitigation short and long-term pollution (i.e., air, water, noise) and waste (i.e., hazardous, nonhazardous, and chemical) must also be provided.	Law 444 (Protection of the Environment) mandates the formulation of sub-decrees on Air Pollution Monitoring and Noise Disturbance, Water Pollution Control, and Environmental Impact Assessment Process. Stockholm Convention ratification law, under which Lebanon is committed to reduce UPOPs emissions.	Resource efficiency and pollution prevention and management measures shall be developed under the ESMP to be prepared, submitted and implemented. Emissions will be monitored to ensure abidance by the applicable regulations.	MOE
	General EHS Guidelines: International Standards on Air Quality and Noise Level was included in the guidelines: Ambient Air Quality: WHO Ambient Air Quality Standards set in 2005 were adopted. Noise Level: WHO Guidelines on Community Noise set in 1999 was adopted. (p.4, 53)	Law No. 78 of 2018: Ambient Air Protection defines the basic principles and provisions for the protection of ambient air quality. The National Standards for Environmental Quality (NSEQ) are defined in Decision 52/1 issued in 1996. The Decision specifies the Environmental Limit Values (ELVs) for each of the following relevant resources: Drinking water standards; Surface water for human use standards; Standards for water bodies supporting aquatic life; Discharge or dumping of liquid and solid wastes in surface water bodies, groundwater or seawater within international borders; Limit values for air pollutant emissions from oils burning; Limit values for air pollutant emission from municipal solid waste; and, Ambient air quality standards; Ambient noise standards and		

Item	Applicable WB Policy	Lebanon Relevant Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
		occupational Noise Exposure.		
	EHS Guidelines for Waste Management Facilities on emission and noise management: Additional guidelines on emission management specific for Waste Management Facilities include: (1) inclusion of landfill gas collection system and its use if practical, (2) use of gas blowers, and (3) installation and regular sampling of boreholes. Additional guidelines on noise management specific for Waste Management Facilities include: (1) construction of a buffer zone, (2) road quality maintenance (3) use of equipment with low-noise emission levels, (4) use of sound-insulating materials, acoustic screens and silencing equipment, (5) enclose inherently noisy equipment in a fixed structure, and (6) inclusion of noise considerations in the design process.			
Community Health and Safety	ESS1: Environmental social assessment must include relevant risks and impacts in the health, safety and well-being of project affected communities, along with the community safety provisions of the EHS Guidelines. (ESS-1 Par 28)	Law 444 and Decree 8633 (EIA) The Labor Code and Decree 11802	Prepare, adopt, and implement measures and action to assess and manage specific risks and impacts to the community arising from Project activities including remediation of dumpsites or rehabilitation of dumpsites the ESMPs for the sub-projects to be prepared in accordance with the ESMF.	MoE, Municipalities, contractors

Item	Applicable WB Policy	Lebanon Relevant Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
	ESS4: The risks and impacts to the health, safety, and security of the identified project-affected persons and community must be identified and minimized. All potential risks across all phases of the projects must be identified and evaluated while taking into consideration the circumstances of disadvantaged and vulnerable groups.			
	EHS Guidelines for Waste Management Facilities: Long-term Operation, Decommissioning or Closure: Specific procedures on closure must emphasize preservation of long-term integrity and security of the site. The closure and post-closure plan must include mitigating impacts to human health and environment after the closure. All plans must be aligned with the defined post-closure use. Landfill Siting: In the identification of landfill sites, the nearest residential developments must be over 250 meters from the site option. Community Health and Safety: The following impacts likely to occur during the operation and decommissioning phases must be looked into: *Waste scavenging*: should not be	In 2018, Law No. 80 came into force to draw up the integrated solid waste management framework based on the principles of Law No. 444 of 2002. It combines the ISWM draft law of 2006 with thermal treatment waste to energy plants to be constructed in big cities (Tripoli, Beirut, Saida and Jieh). The ISWM law includes the following: Article 4: Priorities of integrated solid waste management (considers the principle of preventive action and minimizing solid waste generation as a priority); Article 7: Preventing random disposal, open dumping and burning of solid waste; Article 8: The “Polluter Pays Principle”; Article 10: National Strategy for SWM; Article 11: Local SWM programs; Articles 14 to 16: Responsibilities resulting from SWM; Article 20: Solid waste collection and transfer;		

Item	Applicable WB Policy	Lebanon Relevant Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
	allowed under any circumstances in hazardous and non-hazardous industrial waste management facilities. Only facilities handling municipal solid waste may consider incorporating the employment of . *Physical, chemical, and biological hazards*: access to facilities, especially for areas that hold toxic waste, must be restricted and implement security procedures. *Litter*: garbage outside the facility must be managed to avoid the exposure of the adjacent community to hazardous substances and potentially spread disease. *Noise*: measures to management noise should be taken to void causing nuisance to the adjacent areas., *Dust and odors*: Buffer areas must be included in the design, especially between processing areas and potential receptors, especially residences, hospitals and schools. Processing areas must be located in areas at the downwind from these areas to manage and control exposure of community to dust and odors. (Section 1.1.1, p.10-11, 14; Section 1.3 p.26)	Article 21: Sorting at source; Article 22: Solid waste treatment: reuse, recycling, composting, digestion, and energy recovery; Article 24: Final Disposal; Articles 25 to 27: Hazardous waste management; Article 28: Financing sources for ISWM; Article 29: non-monetary incentives; Articles 30 to 33: Responsibilities; Articles 34 to 37: Enforcement and penalties.		
Land Acquisition and Livelihood Restoration	ESS5 Objectives of ESS5 are: To avoid involuntary resettlement or,	The Constitution of Lebanon establishes the right to land ownership, and the right of the State to eminent domain.	. There is potential for land use restrictions to happen with impact on livelihoods. An RPF shall be prepared to guide RAPs and	MOE

Item	Applicable WB Policy	Lebanon Relevant Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
	when unavoidable, minimize involuntary resettlement by exploring project design alternatives. To avoid forced eviction. To mitigate unavoidable adverse social and economic impacts from land acquisition or restrictions on land use by: (a) providing timely compensation for loss of assets at replacement cost and (b) assisting displaced persons in their efforts to improve, or at least restore, their livelihoods and living standards, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher. To improve living conditions of poor or vulnerable persons who are physically displaced, through provision of adequate housing, access to services and facilities, and security of tenure. To conceive and execute resettlement activities as sustainable development programs, providing sufficient investment resources to enable displaced persons to benefit directly from the project, as the nature of the project may warrant. To ensure that resettlement activities are planned and implemented with appropriate disclosure of information, meaningful consultation, and the		LRPs as needed. In cases of land use restrictions, impacts on waste-pickers in case of access restriction to recyclables collection, livelihood restoration plans will be prepared.	

Item	Applicable WB Policy	Lebanon Relevant Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
	informed participation of those affected			
		Lebanese Expropriation Law (Law 58/1991 and its amendments)		
	ESS5: The risks and impacts related to the permanent or temporary physical and economic displacement of project-affected persons across various tenure arrangements shall be assessed and evaluated. The safeguard upholds the avoidance of involuntary resettlement, and for instances wherein it cannot be avoided, measures to minimize and mitigate the adverse impacts to the displaced shall be established.			
Stakeholder Engagement	ESS1: As part of the information disclosure, the findings of the E&S assessment of high-risk and substantial risk projects shall be provided prior to appraisal.	Decree 8633 (EIA) – Article 12 Public Access to Information Law	A Stakeholder Engagement Plan (SEP) that complies with the provisions of WB ESS10 is included in the ESMF to ensure sustained stakeholder engagement, and appropriate conduct of information disclosure and consultations. The SEP will be updated, adopt and implemented throughout implementation. Prepare, disclose, and implement the SEPs for subproject activities, consistent with	MOE, Municipalities

Item	Applicable WB Policy	Lebanon Relevant Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
			ESMF and ESS10. For the sub-projects involving waste-pickers, Livelihood Restoration Plans (LRPs), with meaningful consultation with affected persons in accordance with ESS5. Specific attention will be paid to women and children waste-pickers to develop suitable measures in line with ESF on the basis of social baseline studies for each of the applicable sub-projects.	
	ESS10: Meaningful engagement and consultation of stakeholders must be conducted across all stages of the project cycle, thus ensuring that timely, relevant, understandable information are provided to all the identified project-affected parties. Specific measures for the identified PPAPs must be identified and laid out in a Stakeholder Engagement Plan.			
Vulnerable Groups	ESS1: Environmental social assessment must include adverse risks and impacts that may disproportionately affect certain groups, especially the disadvantaged and vulnerable. As necessary, separate consultation to identify the risks, impacts, and		The ESMP of the sub-projects involving vulnerable groups which may be impacted will include livelihood restoration and improvement programs for affected persons. Specific attention will be paid to woman and children waste-pickers to develop suitable measures in line with ESF on the basis of social baseline studies for each of the applicable sub-projects.	MOE

Item	Applicable WB Policy	Lebanon Relevant Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
	specific needs of these groups can be arranged. (ESS-1 Par 28-29; ESS-1 Guidance Notes GN 28.3-29.1)			
	Directive on Addressing Risks and Impacts on Disadvantaged or Vulnerable Individuals or Groups: the bank directive defines disadvantaged or vulnerable individuals as "individuals who, by virtue of, for example, their age, gender, ethnicity, religion, physical, mental or other disability, social, civic or health status, sexual orientation, gender identity, economic disadvantages or indigenous status, and/or dependence on unique natural resources, may be more likely to be adversely affected by the project impacts and/or more limited than others in their ability to take advantage of a projects benefits" (World Bank, 2016)			

4 ENVIRONMENTAL AND SOCIAL MANAGEMENT MECHANISMS AND PROCEDURES

4.1 ENVIRONMENTAL AND SOCIAL IMPACT OF THE PROJECT

The project aims to provide investments to demonstrate i) 3R practices to reduce waste entering dumpsites/landfills in selected SW service zones and ii) BATs/BEPs to eliminate open burning at selected dumpsites.

Overall, the project is expected to be beneficial to the country and the people by reducing pollution and protecting the environment, with significantly positive environmental and social benefits through the introduction of circular economy principles and tools. The successful implementation of the project will effectively improve collection, reduction, and disposal of solid waste in the targeted geographical areas and accordingly reduce UPOPs. The expected environment and health benefits that accrue from the reduction of dioxins emissions from the waste disposal and open burning processes, and therefore reduced exposure to PCDD/PCDFs of biota and people.

Circular economy will bring major economic, environmental and social benefits[52] to industries, contributing to innovation, growth and job creation. Implementing 3R practices in the targeted geographic areas will bring such benefits to the local communities. It is expected to significantly contribute to diverting wastes from landfills, which is critical in Lebanon whereby land is scarce and there is substantial competition for land and an acute NIMBY syndrome.

Key existing environmental and social concerns at the potential project sites in the priority project areas include the following:

Table 4-1 Environmental, Social and Public Health Concerns at the Sites

Environmental	Dumpsites in Lebanon do not comply with national and/or international minimum solid waste management infrastructure and operating standards; Dumpsites lacking lined engineered cells, leachate collection, drainage, and leachate treatment has resulted in environmental impacts to surface and ground water quality and soil through uncontrolled, untreated leachate discharge; Lack of intermediate cover and capping and closing of the dumps impacts air quality and surrounding environment through odor, GHG emissions, and flies and windblown waste; Fires are common through lack of proper landfill management; this again impacts air quality; Odor, dust, and smoke are a serious issue; Open burning in dumpsites is a prevalent practice in Lebanon significantly contributing to generation of UPOPs; Unregulated dumping of hazardous waste, it has been regulated by laws and regulations, but practices have not been enforced. Medical waste is required to be disposed of separately. These have an impact on the dumpsites both in terms of water quality and provides a public health risk; communities typically rely on underground, or surface water and water pollution affects community health and safety; and

[52] Key benefits include: resource efficiency in industries' global supply chain – producing quality, quantity and consistency of a secondary raw material and creating value and brand image; risk management – raw material shortage, disruption in the supply chain; and environmental efficiency – eliminating toxic material, reducing waste, pollution, CO_2 footprint, etc.

	Noise and pollution result from poorly managed transportation of waste on open trucks.
Social	There is no monitoring of informal waste-pickers working in dumpsites. There are no regulations that ensure their health and safety. These waste-pickers may include women and children. Some of the waste-pickers live near the waste dumps and derive their main income from waste picking. Communities living near dumpsites and along waste transport routes are routinely impacted by pollution from the SWM sites and its operations. These impacts include air pollution from burning of waste and vehicle exhaust; noise pollution from trucks; and pollution of water sources. There is lack of controlled access to the dumpsites, which may pose risks to the health and safety of waste-pickers and other members of the surrounding communities. Communities have limited awareness of their role and responsibility in good solid waste management, waste segregation, waste reduction, and recycling (3R). Burning of waste and dumping in open spaces and water courses are common practices. Public awareness campaigns are limited.
Public Health and OHS	Poor operation of the dumpsites and poor waste placement result in dangerous conditions on-site where unstable waste masses are prone to collapse, posing risks to sanitation workers, waste-pickers, and surrounding communities. Lack of training, awareness, and provision of safety equipment (PPE) put both sanitation staff and waste-pickers at risk. Illegal dumping of hazardous waste, in particular hospital waste, on the landfill put the health and safety of workers and waste-pickers at risk. Poorly operated transfer stations and transport equipment pose risks to health and safety of sanitation workers and waste-pickers.

Though the project will reduce pollution and protect and improve the environment, it is possible that potential environmental and social impacts and risks may still come out with varying degrees during the specific activities of the project. Since many specific activities in this project need to be determined during the implementation process, this framework document only makes a qualitative analysis of environmental and social risks and impacts based on the existing preliminary suggestions of the project. Detailed analysis, assessment and rating of potential adverse environmental and social risks will be undertaken under subcomponent-specific environmental and social due diligence.

This project is composed of four (4) components, which are: (1) Component 1: Strengthen Regulatory Framework and Capacities for Sustainable Waste Management in the Circular, (2) Demonstrations on 3R Practices and BATs/BEPs at Open Dumpsite in Selected Geographic Areas, (3) Project Monitoring and Evaluation, and (4) Project Management. Component 1 mainly include technical assistance activities which will inform and support waste management at the national level and site-specific investments under Component 2, and might also trigger downstream activities as discussed in the following section. Components 3 and 4 are related to the management of the project with no negative environmental and social impacts.

4.1.1 Technical Assistance (TA) Activities

The technical assistance activities of this project include Component 1: Strengthen Regulatory Framework and Capacities for Sustainable Waste Management in the Circular Economy. This component aims to improve the policy framework, build capacity and long-term planning for applying a circular economy

model in waste management and improve HWM through a series of technical assistance (TA) activities. Regulatory reforms including standards for various products and tax incentives and green subsidies for industries to improve their efficiency of material flows and reduce leakages, would be important first steps to catalyse transformative change and open opportunities for production of new eco-friendly products and for creation of waste valorisation processes.

The proposed technical assistance activities require no civil construction works. However, establishment of policies and regulations under Component 1 may lead to downstream activities such as promoting 3R practices, construction of waste management facilities, promoting BATs/BEPs, reducing UPOPs, and others. These downstream activities might have potential environmental and social risks and impacts that will be thoroughly assessed once they are identified and implemented as demonstration activities under Component 2. A SESA is being developed for the Draft National Solid Waste Strategy and would be addressing most of the above elements. The SESA is currently in the scoping stage and is expected to be finalized during summer 2022.

The training, monitoring and evaluation and other contents in Components 3 and 4 do not involve any physical engineering contents such as civil construction or facility installation. No downstream activities will be caused by them, so there will be no direct or indirect environmental or social impacts.

All the TA activities need to conduct effective consultation and engagement with the stakeholders at both the national and local levels. Insufficient stakeholder engagement may cause imperfect management of related impacts and risks to aggravate the downstream impacts and risks generated. The inadequate engagement of the stakeholders possibly causes low efficiency in the implementation of 3R practices, and may affect the outcomes of the project.

4.1.2 Demonstrations on 3R Practices and BATs/BEPs at Open Dumpsite in Selected Geographic Areas

Component 2 aims to provide investments to demonstrate i) 3R practices to reduce waste entering dumpsites/landfills in selected SW service zones and ii) BATs/BEPs to eliminate open burning at selected dumpsites.

Local authorities, NGOs and private sector stakeholders will be involved and selectively supported with technology transfer/production change, technical trainings, and networking to improve their overall material flows, profitability, viability and reduce their impacts on the environment and people.

Co-financing from other funding sources will ensure the viability of the GEF investments while the legal and institutional reforms identified under Component 1 will contribute to the long-term financial sustainability of the proposed models. Experiences learned from these demonstrations activities will be replicated and scaled up under the Litani River lending project and throughout the country after the project life.

4.1.2.1 Environmental Risks and Impacts at the Construction/Rehabilitation phase

For solid waste sorting, collection, and recycling/composting facilities, at the construction or rehabilitation phase there is a risk of damages and disturbance to surface vegetation, as well as dust and noise, production of wastewater and solid waste. There are also safety and health risks of the construction workers, including the risk of COVID-19. These risks are considered moderate as the main risks for sorting,

collection and treatment are occurring during operation stage. Risks mitigation measures will be identified and consulted during the sub-projects' site specific IEEs/ESMPs and/or ESIAs.

The closure and rehabilitation of the existing dumpsites as well as the use of new or existing landfills and treatment facilities such as composting and material recovery facilities can cause direct environmental impacts. Anticipated adverse impacts include:

(i) Proliferation of flies, rodents and other disease-carrying vectors;
(ii) Air and noise pollution from earthworks and movement of materials and heavy equipment;
(iii) Soil and water resources pollution due to accidental spillage of oil and other lubricants from using and washing of construction equipment and discharge of domestic sewage at the site;
(iv) Destruction and disturbance of surface vegetation and/or river water bodies during the construction period;
(v) Accumulation of construction wastes and (vi) failure to ensure occupational health and safety of workers (including the risk of COVID-19); and
(vi) The risks of material transportation and mechanical operation to the personal safety of surrounding communities.

As part of the update of the 2011 Master Plan for the Closure and Rehabilitation of Uncontrolled Dumps in Lebanon, a methodology was developed to assess the impacts of open dumps on the environment. This methodology focuses on two main impacts, based on their potential significance: impacts on water resources and impacts on air quality.

The methodology developed defines the significance criteria and baseline conditions that need to be known in the assessment, as well as a procedure to determine significance rating. The baseline conditions considered for impacts on water resources are:

- Topography and surface drainage
- Hydrogeology: groundwater basins, wells and springs
- Land use
- Water quality

The baseline conditions considered for impacts on air quality are:

- Prevalent wind direction
- Land use and presence of nearby sensitive receptors

The procedure for the determination of significance ratings for water resources and air conditions are presented in two flowcharts in ANNEX I:

The study also identified the environmental (and social) impacts that are generally associated with the presence of open dumps that include, but are not limited to:

- Visual amenity impacts: open dumps tend to be visually intrusive and depending on their exposure to visual receptors, such an impact could be significant;

- Impacts on the marine environment particularly from coastal dumps: leachate and even waste debris are likely to find their way into the marine environment leading to the degradation of water quality and to potential impacts on nearby socio-economic activities like fisheries and even coastal tourism;
- Spreading of vectors and diseases: uncontrolled waste accumulation typically attracts insects that can then become vectors for diseases potentially leading to health impacts in the surrounding areas of the open dumps;
- Impacts on the value of land and on land-use: open dumps could lead to depreciation of the value of land and real estate;
- Safety impacts from potential uncontrolled fires: open dumps typically lead to anaerobic degradation of wastes that generate methane, which depending on its concentration in the air, is explosive and can lead to uncontrolled fires with associated safety impacts as well as environmental (air pollution).
- Health impacts associated with water and air pollution: degradation of water and air quality can severely affect the health of receptors (those potential users of the water and the air surrounding the dumpsite).

The environmental risk for the construction or rehabilitation of dumpsites and for material recovery facilities and composting facilities will be undertaken within the site specific IEEs/ESMPs and ESIAs including SEP that will be developed, disclosed and consulted before the start of civil works activities.

Table 4-2 Environmental Risks and Mitigation Measures – Construction/Rehabilitation Phase

Impact	Description	Mitigation Measures
Air quality	Civil works will be required in case of closing/rehabilitation, MRF, composting facility, access road, and other facilities. Construction activities can cause temporary ambient air pollution, and may cause additional uncontrolled release of gas.	• Monitor air quality in residential areas during construction phase to be put in place • Monitor possible gas release • Limit construction hours (day times) • Stabilize the exposed surfaces • Minimize activities that suspend dust particles • Apply water to the areas to be excavated, loading and unloading areas and unpaved roads • Develop a wheel wash at the entrance to public roads or exit of the landfill construction site • Implement speed controls on-site • Maintain enough loading capacity of lorries and barges to avoid spillage • Cover soil stockpiles with erosion control blankets • Use hoarding to avoid wind-blown dust • Apply good construction practices
Noise	Civil works will be required for closing/ rehabilitation, MRF, composting facility, access road, and other facilities. Construction activities can cause temporary noise pollution.	• Generally, it is expected that the noise will not be high enough to interrupt sleep or disrupt normal activity. • It is anticipated that construction activities will not be operational during the late hours; therefore the impact on evening averages of ambient noise will be little. • Optimize the use of machines and noisy equipment • In case of receiving complaints from neighboring areas regarding noisy operations acoustic barriers can be placed

		• Construction works should be stopped at night-time
Storage of excavated soil and daily waste cover	Soil needed for cover of dumpsites	• The area allocated for soil storage should be selected so that no un-favored pattern of surface water collection should be developed (e.g. stagnant water ponds for long times). • Ensure that the height of the spoil will not cause unaccepted visual impacts to adjacent areas • Use excavated soil in the landfill development and daily operations: usage as daily cover of waste, or usage in establishing side embankments for containing the waste. • Use excavated soil for coverage for closing of dumps (re-cultivation layers of the final cover) • Soil excavated in the direct vicinity of the existing dump site has to be sampled to assess the extent of contamination. If found contaminated, it shall only be used for daily operation
Waste Management	Construction and dumpsite rehabilitation activities will lead to the generation of wastes	• Prepare Construction waste management plans as part of ESIA/ESMPs • Segregate construction wastes • Ensure construction wastes are collected and disposed of in appropriate facilities

4.1.2.2 Environmental Risks and Impacts - Operation Phase

The operations phase of the project includes several main categories of activities that may have diverse environmental risks and impacts, namely:

- Collection of solid waste: the environmental impacts are mostly positive as waste will be collected which is currently not collected. There are no related construction activities. The operation of waste collection and vehicles has no difference from conventional vehicles and environmental risk rating is low.
- Sorting and transportation: there is the risk of discharge of wastewater, noise and solid waste. There can also be safety and occupational health risks of waste workers, including falling, safety of machine operation, exposure to hazardous waste, and risk of breathing harmful gases, etc.
- Operation of rehabilitated dumpsites and composting and material recovery facilities: may cause adverse environmental impacts including:
  (i) generation of leachate, dumpsite gas, litter and dust, which might bring about the local proliferation of flies, rodents and other disease-carrying vectors;
  (ii) inadequate closure of dumps could lead to uncontrolled emission of waste gases, waste burning, and the exposure of deposited waste to the atmosphere and affect air quality;
  (iii) poorly executed waste cover, which could contribute to the spread of pests and disease-carrying vectors;
  (iv) poor leachate control in both closed and new waste management facilities, which could adversely impact groundwater and surface water resources and pose a human health hazard;
  (v) generation of odors in case of inadequate design or operational practices (particularly in composting and biological treatment plants and/or waste disposal facilities);
  (vi) improper occupational health and safety systems, which might cause risks to safety and health of operators/workers;
  (vii) malfunctioning of equipment, which might cause the risk of contact with hazardous waste and harmful gases inhalation;

(viii) the traffic interference of vehicles and improper roadway safety, which might cause risks to surrounding communities, and the risks caused by accidents; and
(ix) inefficient use of energy and other resources.

The environmental risk for the operation of dumpsites, composting and material recovery facilities will be undertaken within the site specific IEEs/ESMPs and ESIAs including SEP that will be developed, disclosed and consulted before the start of civil works activities.

Table 4-3 Environmental Risks and Mitigation Measures – Operation Phase

Impact	Description	Mitigation Measures
Dumpsite leachate	Existing dumpsites all lack leachate collection and treatment systems, thus causing severe pollution to the environment. Project will strongly reduce pollution due to rehabilitation/ closure of existing sites.	• Lining and leachate collection and treatment if practical • Waste placement and daily cover • Ensure access to safe water supply for local communities • Ground water quality monitoring
Dumpsite gas	Existing dumpsites all lack gas collection and treatment systems, thus causing air pollution. Project will significantly reduced emissions.	• Waste coverage • Gas collection and treatment if practical • Disposing organic waste in composting facilities
Ecosystems, water, biodiversity	All current sites are developed and operated as open dumpsite, without any measures in place to prevent pollution.	• Waste coverage • Leachate collection and treatment if practical • Installation of lining systems • Zoning of vital habitats and ecosystems • Monitoring of species presence and pollution • Flood protection measures • Not accepting hazardous waste
Odor	Existing sites cause significant odour due to operations as open dumpsite. Project activities will significantly reduce odour compared to current status.	• Waste coverage • Well-designed and operated Material recovery and composting facility
Hazardous waste	Currently no monitoring of disposal of hazardous waste at existing sites. Reduced risk for disposal of hazardous waste mixed with municipal waste due to improved operations and regulations.	• Regulations for dumpsite and landfill operation to provide a list of acceptable and non-acceptable waste. Non-acceptable waste needs to be strictly forbidden from admission • Awareness to avoid a mixing of waste • All workers to be provided with protection equipment, training in waste handling, and strict supervision. • Prepare emergency response plan
Visual impacts and aesthetics	Rehabilitation of the current sites and mitigation measures (incl. daily waste coverage) will lead to improvements in current aesthetics, particularly affecting nearby communities.	• Daily waste coverage • Windbreak trees • Fencing of site and buffer zone

Impacts after dumpsites closure	Key environmental impacts without adequate closure include air pollution due to continuing waste decomposing processes, risks of open fires, and contamination of groundwater due to uncollected leachate.	• Final closure cover: final closure cover is key to reduce and prevent water pollution from leachate as well as minimizing odour impacts, landfill gas generation, visual impacts, disease vectors, and prevention of slope collapsing. • Final capping system be installed progressively through time after the waste has been placed to its ultimate level over each cell or portion thereof. • Establishment of impermeable linings may be considered • Measures to minimize remaining leachate after closure will depend on detailed assessments and monitoring of groundwater pollution, soil permeability, and impacts on any nearby residential areas.

4.1.2.3 Social Risks and Impacts

Potential social risks and impacts for this project include:

4.1.2.3.1 Construction/Rehabilitation:

Possible resistance among waste-pickers – Despite its good intentions and anticipated positive impacts, some waste-pickers may consider the project as a threat to their current source of livelihood. They may think that the project will limit their activities or, worse, prevent them from continuing with their current activities. Waste-pickers are also considered non-legal workers.

4.1.2.3.2 Construction and Operation:

(i) The project may impose restrictions on the use of or access to land, causing temporary or permanent economic displacement to specific stakeholders

(ii) Risk of further marginalization of vulnerable groups – Physical and economic displacement resulting from the project may further marginalize vulnerable sectors. Hiring processes/policies may not be fair and inclusive, creating bias against vulnerable groups, such as women or other adults with limited educational background. Workplace conditions may not be compliant with local laws and policies, as well as with international standards. Women, children, and the elderly, most especially, may continue to work with waste picking under unsafe work environment or arrangement,

(iii) Improper management of negative environmental impacts from the project's construction/rehabilitation and operation phases may pose risks to the health and safety of workers and community members alike. For the construction/rehabilitation phase, these adverse impacts include noise, air, and water pollution; accidents caused by the operation of heavy machinery and by increased vehicular traffic and associated risks linked to road accidents specifically for dumpsite rehablitation in closer vicinity to communities; and possible spread of infectious and vector-borne diseases caused by the influx of workers and other individuals seeking to benefit from the potential economic gains from the project and by the disturbance of vegetation. For the operation phase, there are also risks of adverse impacts in terms of noise, air and water pollutoin, accidents and potential road accidents of the waste trucks.

(iv) Competition over local utilities, services, and resources - The influx of workers and other individuals seeking to benefit from the potential economic gains from the project may strain

the current resources of the host municipalities. The influx of individuals may also cause competition over basic facilities and services as well as Sexual Exploitation Abuse and Sexual Harassment (SEA/SH) as a result of labor influx.

(v) Potential risk of weak public participation and public information disclosure lead to having insufficiently informed stakeholders and particularly the vulnerable groups.

(vi) The project will however have positive impacts particularly in terms of job opportunities and overall improvement in quality of life.

Table 4-4 Social Risks and Mitigation Measures – Construction/Rehabilitation Phase

Impact	Description	Mitigation Measures
Economic displacement and livelihoods impacts	This may include impacts on waste pickers at the existing dumpsite; livelihood impacts on children; impacts on landowners; impacts on nearby communities. Children waste pickers, cannot be permitted to participate in waste recycling activities and will require livelihood restoration support and further livelihood support options.	• General impact on waste pickers will be positive as waste pickers will continue to have access to the waste resources under improved Occupational, Health and Safety conditions. • Meaningful consultations with neighbouring communities, waste pickers and other potential affected people a potential site • Priorities site options that ensure continued access to waste resources for waste pickers • In case of lost access to waste resources provision of Livelihood restoration assistance • Livelihood support options for children waste pickers as per the ESF. • Ensure awareness of job opportunities within surrounding communities and consideration for vulnerable groups through further livelihood support activities
Community Health and Safety	Rehabilitation and extension works at the dumpsites and construction of other waste facilities can have negative impact to neighboring communities' health and safety from potential environmental pollution, nuisances, odour, and accidents.	• Supervision of the construction works and clear obligations and code of conduct for firms. • Regular information on progress and Environmental and Social compliance for local communities • Establishing a clear grievance redress system • Monitor labor management procedures • Communicate information about the hours of construction with the local population
SEA/SH	Influx of workers may induce risks of SEA/SH.	• Supervise application of OHS regulations and code of conduct on SEA/SH • Public hearings and meaningful consultations. • Restriction from access to the construction site • Establishing a clear grievance redress system

Table 4-5 Social Risks and Mitigation Measures - Operations Phase

Impact	Description	Mitigation Measures
Community Health and Safety and Occupational Health and Safety	Rehabilitation and closure of existing sites and development of new sites, can have negative impact to neighboring communities' health and safety from potential	• The application of modern dumpsite/landfill operations and inclusion of performance indicators for management and operation performance in contracts, for instance waste compaction and daily soil coverage, will limit the potential for the

	environmental pollution, nuisances, odour, and accidents.	development of resident populations of vermin and pests • Gas collection and composting to remove larger part of the organic fraction • Leachate collection and treatment • Lining system and daily waste cover and in case of closure final waste cover • Fencing of site, planting trees, • Provision of PPE, training and adherence to OHS procedures • Provision of appropriate PPEs and training • Health checks •
SEA/SH	Influx of workers may induce risks of SEA/SH.	• Supervise application of OHS regulations and code of conduct on SEA/SH • Public hearings and meaningful consultations. • Restriction from access to the construction site • Establishing a clear grievance redress system
Job opportunities	The project is foreseen to create various job opportunities particularly for villages in close vicinity to the landfills. This may include jobs for daily operations at the dumpsite, waste sorting at the material recovery facility, composting facility, collection, and other areas along the waste management chain. Operations will require jobs for various backgrounds and qualifications including for poor people with low and medium skills.	• Ensure awareness of job opportunities within surrounding communities and consideration for poor and vulnerable groups • Transparent information sharing about the created job opportunities particularly in local areas. • Fair recruitment procedure to ensure equal employment opportunities and non-discriminatory actions. • Local sourcing of supplies and materials whenever possible
Impacts on property value	The project foresees a wide range of measures that will positively affect land prices around the existing dumpsites.	• Gas collection and treatment • Leachate collection and treatment • Lining system • Daily waste cover or in case of closure final waste cover • Waste sorting • Fencing and buffer zones

4.2 RISK CLASSIFICATION AND IMPACT MANAGEMENT FOR THE SUB-PROJECTS

According to the preliminary qualitative analysis, the site activities may cause a range of environmental and social risks and adverse impacts on the population and environment as described in the previous section.

For Component 2, the activities related to the implementation of 3R practices in key waste streams and, for the implementation of BAT/BEP at selected open dumpsites needs to undergo a detailed environmental and social impact analysis.

Component 2 of the Project will support subprojects, including construction/installation of sorting and material recovery facilities; composting and recycling facilities; collection equipment; and dumpsites rehabilitation and operation.

The anticipated subprojects are screened to determine the significance of associated environmental and social risks. The screening is undertaken in line with WB ESF Environmental and Social Risk Classification rating risks as High, Substantial, Moderate and Low Risks, based on a range of relevant factors which may include:

- Type, location, sensitivity, and scale of the project;
- Nature and magnitude of the potential environmental and social risks and impacts;
- Capacity and commitment of the implementing agencies to manage the environmental and social risks and impacts consistent with the ESF);
- Legal and institutional considerations;
- Nature of the mitigation and technology being proposed;
- Governance structures and legislation; and
- Considerations relating to stability, conflict or security.

Moreover, MoE will classify the proposed sub-project as either requiring an “Initial Environmental Examination (IEE)” or an “Environmental Impact Assessment (EIA)” as per the requirements of the National EIA Decree 8633.

The “Statement of information required” for contents of the IEE and EIA reports are presented in ANNEX D: as per Decree 8633.

After screening the site-specific activities, the corresponding documents will be prepared in accordance with the procedures and requirements specified in this framework during the project implementation process.

As per the analysis, mitigation measures and environmental and social risks of subprojects envisaged under the Project in the previous chapter, Table 4-6 describes the risk ratings given for the different types of project activities and the environmental and social management tools to be developed and implemented within the project.

Table 4-6 Sub-projects Environmental and Social (E&S) Risk Classification and E&S Management Tools

Risk Rating	Definition	Project Activity	Applicable E&S Tools
High	The project will possibly cause a wide range of significant environmental and social risks and adverse impacts on the population and environment. Some of the impacts can't be mitigated by now, or with special situations such as requiring complex and / or unproven mitigation and/or compensation measures or techniques.	None identified.	Not Applicable
Substantial	Some of the E&S impacts of the project are possibly significant, but with reliable mitigation and/or compensation measures will be designed.	Dumpsite rehabilitation/ closure and/or operation, material recovery, composting.	ESIA, ESMP LRP (if triggered)
Moderate	The project has potential E&S risks or adverse impacts which are possibly not significant and can be mitigated in predictable ways.	Waste sorting, transportation, recycling, material recovery.	ESMP
Low	The potential adverse risks and impacts on humans and / or the environment may be small or negligible.	Sorting at source, collection,	E&S screening and inclusion of potential impact as part of the ESMP

For all sub-projects rated "Substantial", subproject site-specific ESIA or ESMPs will be prepared, consulted, adopted and implemented in accordance with the requirements of ESS1, once specific dumpsites are determined and agreed through intensive consultations with the stakeholders, in accordance with ESS10, and detailed subprojects' engineering designs are at the advanced stage of preparation.

As a general rule, the establishment of new waste management facilities would require an ESIA study while the rehabilitation/closure/improvement of existing facilities would require an ESMP. The main difference is that projects subject to ESIA studies will be subject to a scoping phase first with the preparation of a scoping report to be properly consulted with affected stakeholders and stakeholders prior to preparation of the ESIA.

The project will work with municipalities and ministries and help the key agencies in developing and implementing citizen engagement strategies as part of their services. Community and citizen grievance mechanisms will be developed and implemented.

The site-specific ESIA or ESMP will be prepared in accordance with national legislation and World Bank ESS1, incorporating requirements of other relevant ESSs, and in compliance with the applicable national regulations. The ESIA/ESMP report, strengthened by the standards of ESS1 of the World Bank as the primary means of documenting the environmental and social sustainability of a project, provides guidance to project decision makers on the environment, as well as social acceptability of the project activities, and permits planning and investment decisions to be made on a comprehensive understanding of the anticipated project impacts.

In the light of key characteristics of the physical, biological, and socio-economic environment of the potential project sites, which are deemed to be of significance in determining the potential impacts of project activities, the site-specific ESIAs/ESMPs will identify and evaluate the following:

- Assessment of the E&S baseline conditions in the target sites including mapping of waste pickers if any;
- Available measures and alternatives for solid waste management in the area;
- Direct and indirect environmental and social impacts likely to arise from project activities;
- Appropriate measures to minimize potential significant environmental and social impacts;
- An environmental and social management plan to mitigate environmental and social impacts;
- Cumulative impact assessment, emergency response plans, and risk hazard analysis as applicable;
- Appropriate compensation for impacts that cannot be mitigated;
- Opportunities for stakeholders to register grievances through an adequately functioning GM;
- Feedback from stakeholders to inform project design in inclusive stakeholder engagements Opportunities for public benefit throughout the lifetime of the project;
- Institutional arrangements to oversee the proposed project activities including the necessary capacity building program; and,
- A comprehensive monitoring program to evaluate the impacts of project activities.

The site-specific environmental and social assessment of these activities, or subprojects, will be carried out after the sites have been selected and the specific details, including the location, conceptual design, and detailed engineering design, will be determined during the first year of the project implementation. The preliminary risk rating will also be reconsidered at this stage. The depth and scope of subproject site-specific environmental and social due diligence will be defined based on the detailed environmental and social screening, and will generally require the preparation of:

1) “Environmental and Social Impact Assessment (ESIA)”: With content of identification and assessing the potential environmental and social risks of the proposed project, analyzing the scheme selection, formulating appropriate reduction measures, putting forward management requirements, and follow-up monitoring and reporting arrangements, this form is generally applicable to the subprojects of ‘High’ and ‘Substantial’ risk ratings. The ESIA will analyze the site-specific risks and propose appropriate mitigation measures following the Bank issued guidance notes following the selection of sites. This instrument will be mainly used for the establishment of new waste management / treatment facilities.
2) Environmental and Social Management Plan (ESMP): By putting forward the detailed measures to avoid, mitigate, handle and compensate for the environmental and social impacts, and formulating action plans for implementing these measures, this form is generally applicable to the subprojects of ''High'', ''Substantial'' and ''Moderate'' risk ratings. The ''Environmental and Social Management Plan'' can be a separate document (e.g., for complex "High risk" projects) independent of the ''Environmental and Social Impact Assessment''. ESMPs will be prepared for improvement/rehabilitation/closure of existing projects and other activities classified as moderate or Low-risk activities as well as of existing facilities if any, including an environmental audit of these facilities.

3) Labor Management Procedure: This project involves direct workers, contracted workers, primary supplier workers and community workers. The purpose of the LMP is to manage risks of project workers. The tasks of LMP are to identify the major labor needs and risks of the project and assist in labor management. LMP is a "dynamic" document, which needs to be continuously reviewed and updated by PMU in the process of project planning and implementation. (Please see ANNEX H: for the outline of LMP.)
4) For the sub-projects involving waste-pickers, and whereby it has been determined that their livelihoods would be significantly negatively affected by the project, a Livelihood Restoration Plans (LRP) will be prepared, adopted and implemented with meaningful consultation with affected persons in accordance with ESS5. This will include both livelihood impacts from physical displacement and economic displacement and include livelihood restoration and improvement programs for affected persons. Specific attention will be paid to woman and children waste-pickers to develop suitable measures in line with ESF on the basis of social baseline studies for each of the applicable sub-projects.

4.3 PREPARATION OF THE DOCUMENTS OF THE SUBPROJECT'S ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

According to the subproject risk classification and the requirements of the corresponding E&S impact assessment document form confirmed by the World Bank, the PMU shall employ qualified environmental and social consultants to prepare the site-specific environmental studies for the subproject according to the applicable environmental and social standards (ESS) under the ESF of the World Bank and the applicable national regulations. Appointed consultants should be part of the pre-qualification list of environmental consultants in Lebanon[53].

During the preparation of sub-projects, the PMU needs to prepare corresponding environmental and social assessment documents according to the requirements confirmed by the World Bank. During this period, it is required to continuously update and implement the Project's Stakeholder Engagement Plan, including its Grievance Redress Mechanism (GRM).

The World Bank requires that the depth and breadth of environmental and social assessment should match the risk and impact level of the project, as well as the measures and information release of stakeholders should also be consistent with the risk and impact level of the project. Depending on the actual situation of specific subprojects, the corresponding sub-projects ESIAs and ESMPs will be prepared for the waste management infrastructure.

No matter what types of documents are adopted, the environmental and social assessment of all subprojects shall comply with the requirements of the relevant 'Environmental and Social Standards' of the World Bank ESF and the applicable national regulations.

Environmental and social assessment is required to comprehensively assess the E&S risks and impacts in the whole project cycle, including direct, indirect and cumulative impacts.

Based on the accurate project description and environmental and social status information, environmental and social assessment shall assess potential environmental and social risks and impacts, analyze alternative plans to the project, and determine methods to improve project screening, site selection,

[53] Prequalified environmental consultants are listed in CDR's decision 1/1978

planning, design and implementation, so as to formulate management and mitigation measures against the adverse environmental and social impacts in accordance with the sequenced order of management measures. As for the cases of pollutant discharge, it is required to take the remaining environmental capacity, present and future land use, important sites of biodiversity in surrounding region, potential cumulative impacts and impacts of climate change into consideration. According to ESS10 of the World Bank, environmental and social assessment should include the participation of the stakeholders, which is an integral part of the assessment.

Associated facilities will be covered by the ESIA/ESMP process as per the ESS1 and should be in line with the requirements of the national EIA decree 8633/2012.

According to the World Bank's ESS2, the environmental and social assessment is also required to take the relevant risks of child labor, forced labor and serious safety issues of major primary supply workers into account.

4.4 Approval of Environmental and Social Documents

The PMU will arrange for the disclosure and public consultations on subproject-specific ESIAs/ESMPs. Upon completion of the public consultations, the consulted draft will be provided to the WB, enclosing detailed minutes of consultations. Due to COVID-19 circumstances, the modality of the public consultations will be discussed and agreed with the WB, and might include virtual consultations and other means of reaching out to potential stakeholders such as emails, phone calls, etc. The Technical Note published by the World Bank in 2020 entitled "Public Consultations and Stakeholder Engagement in WB-supported operations when there are constraints on conducting public meetings" will be referred to.

The MOE regulates and monitors the EIA Process. MOE is responsible for the following: (i) review and approval of IEE/EIA reports in collaboration with other relevant ministries and (ii) monitoring the ESMP implementation of Project Proponents/Owners throughout the different project phases.

Decree 8633 requires that an IEE or EIA report be submitted to the MOE for review and approval. The IEE or EIA approval takes 60 working days, counted from the date that the MoE officially receives the IEE or EIA report.

ANNEX C: shows the IEE/EIA preparation and approval process. ESMPs prepared for this project will follow the IEE review procedures and timelines.

The World Bank will conduct a review of the subproject-specific ESIAs/ESMPs prepared in accordance with the ESMF and relevant ESSs before giving the clearance for disclosure and implementation.

4.5 Compliance to the Requirements of the Sub-Projects

The incorporation of relevant measures stated in the site specific ESIAs and ESMPs into the bidding documents and the contracts will be ensured by the PMU. This will be done to ensure that the contractors can properly incorporate and provide the cost of the required measures and then are subsequently compliant to the relevant requirements and conduct proper implementation of the actions and measures during the project construction and implementation phase. The requirements of the SEP will also be incorporated in the relevant contracts.

4.6 PROCEDURES FOR BUDGETING, IMPLEMENTATION, SUPERVISION, AND REPORTING

After the approval of the demonstration subprojects, the PMU shall continuously monitor the environmental and social management performance of the civil works subprojects as an integral part of the subproject supervision. The detailed requirements include:

1) For all subprojects under the project, the management shall include the review and assessment of the E&S performance of the subprojects. The site-specific ESIAs and ESMPs will include (a) an implementation schedule for measures that must be carried out as part of the project, showing phasing and coordination with overall project implementation plans; and (b) the capital and recurrent cost estimates and sources of funds for implementing the ESMP. This will be for all three (3) aspects (mitigation, monitoring and capacity development).
2) The PMU is required to ensure that the relevant actions of ESCP and the measures coming out of the ESIAs and included in the ESMPs are incorporated into the detail design, costing and bidding documents and construction contracts, and will be actually realized in the implementation. The good practice is often that ESIA company works in collaboration with engineering design once site specific instruments are being prepared to ensure incorporation.
3) The PMU shall guarantee that the subproject participants such as subproject, contractors and supervision units to establish an organizational structure which meets the requirements of E&S management, and arrange special personnel to be responsible for the works of E&S management. The requirements for specific ES management tasks and staff shall be reflected in respective TORs.
4) The PMU shall assess the performance in accordance with the requirements of the national laws and regulations applicable to the subproject, the ESMF, ESCP and the E&S requirements of the subproject. PMUs ensures ESF compliance, including having contractors implementing instruments for civil work activities. The assessment of performance is to be carried during implementation support missions and midterm and at Implementation Completion stage or if any circumstance which require an audit. The construction supervision consultancy will also contain specific ES monitoring and oversight functions.
5) The PMU shall inform the World Bank within 48 hours if it is informed of any environmental and social accidents that may have a significant adverse impact on the workers, the affected communities, the public or open environment. It is required to provide as much detailed information as possible about the accident, including the measures being taken or to be taken as well as the appropriate information provided by the contractors and regulatory agencies. Subsequently, A report will be provided within a one week on the accident and propose targeting measures to prevent it from happening again.

In addition, the PMU shall track and monitor the implementation of the actions committed in the ESCP and report it in the half-year E&S progress report.

4.7 SUB-PROJECT'S COMPLETION AND ASSESSMENT

The environmental and social management performance of the whole process must be reviewed after the implementation of a subproject. This provides a general overview of the experiences and lessons gathered from the process which would be a basis for the preparation of the completion of the report. The results of implementation of ESF instruments for the completion of each sub-project and project completion will be incorporated with the Project Implementation Completion Report/ICR, which elaborates ES management

lessons learned (good and bad practices), ES performance rating, and capacity of institutions (before and after).

5 CONSULTATION OF STAKEHOLDERS AND SOCIAL MOBILIZATION

Stakeholder engagement has been an important pillar of the project development and preparation of this ESMF. Two consultation meetings were conducted. Details are included in ANNEX J: .

The first stakeholder consultation meeting took place on Tuesday, January 18, 2022 at the Ministry of Environment. The objective of the meeting was to launch the project and explain the expected outcomes to relevant stakeholders (municipalities of priority areas), and to hear their feedback and opinion. In particular the local stakeholders related to pre-selected sites for dumpsite rehabilitation participated in the meeting and provided useful feedback on barriers to project implementation and their commitment to project implementation.

An online consultation session was successfully held on February 10, 2022, including 35 participants, of which 18 were women, representing central government, local authorities, private sector, academia, NGOs and international organizations. The main objective of the consultation was to present the ESMF as well as the Stakeholder Engagement Plan (SEP) and the Environmental and Social Commitment Plan (ESCP), and to seek the views and comments from stakeholders prior to disclosing the documents. The main issues and comments raised by various stakeholders included the following:

- It is critical to conduct robust feasibility studies for each sub-project to ensure they are sustainable from a financial point of view
- Most stakeholders have raised the importance to implement the project with the highest levels of transparency and to engage with stakeholders throughout all stages of the project implementation including during site selection and projects selection, review of tender documents and terms of references; this is critical to re-establish trust between the population and the government entities, in this case MOE; projects should be selected on the basis of clientelism as it has happened in the past; PMU plays an important role in this aspect
- It has been clarified that the grant from the Global Environment Facility (GEF) is for a total amount of USD 10 million to finance the two components of the project; about USD 6.5 million are available to implement projects at two (2) locations); Procurement activities will be carried out following the World Bank's system. PMU staff will be formed for this project to ensure the transparency of any procurement. TORs will be developed by the PMU
- Stakeholders raised the importance to build MOE's capacity to be able to implement the ESCP especially given the current situation and financial crisis whereby MoE is severely understaffed and has limited resources
- Stakeholders expressed concern in implementing projects that require a functional and independent judicial system and proper accountability and resources to enforce environmental and technical measures; stakeholders mostly referred to Refuse-Derived Fuels (RDF) and their use; any project related to waste-to-energy faces significant public opposition in Lebanon
- Other stakeholders and particularly waste experts, were however of the opinion that without RDF, it would be challenging to achieve significant diversion of wastes from landfills

- Stakeholders generally welcomed the piloting nature of the project and expressed the importance to develop sustainable waste management models to be replicated in the Lebanon
- The example of the closure of the Bourj Hammoud dumpsite, one of the largest dumpsites in Lebanon that used to cover Beirut and Mount Lebanon was raised; significant problems were faced with waste pickers whom used to recover wastes from the site; this further re-emphasizes the importance to engage with waste pickers during project design to ensure their integration in the projects where applicable
- Stakeholders also emphasized the critical role that the private sector and particularly the industrial sector plays in promoting circular economy principles and for creating a market for the recovery of materials; it is very important that Component 1 supports the creation of an enabling environment for circular economy and to provide incentives to the private sector to sustain their operations and create suitable market conditions; an example was provided of a major glass manufacturing industry that used to receive glass to produce recycled glass and which had to discontinue its operations because glass imported from Egypt was cheaper that recycled glass produced in Lebanon; this has led to the accumulation of glass wastes in the environment; recycled rubber in Lebanon is also currently more expensive from the one imported from Turkey for example; if this is not addressed, tires will continue to be burned leading to generation of UPOPs
- Component 1 should also create a competitive environment for national recyclable products and provide protection from cheap imported products
- Some stakeholders provided inputs to the Grievance Mechanism and explained successful experiences in other projects (eg. LEPAP) with the adoption of a multi-layered approach (first level complaint to the facility operator, second level to the municipality and third level to PMU)
- Stakeholders also asked about site selection and implementation criteria; it was clarified that the entry point to the project site would be through the dumpsite rehabilitation project but the 3R initiatives would be implemented on a wider area (eg. Caza or Union of Municipalities); it was highlighted that it is important to consider not only the dumpsite rehabilitation as a main element of site selection, but also whether the region has a favourable environment for a successful implementation of circular economy principles (eg. proximity to industrial sector, etc.)
- Most stakeholders emphasized the importance of an inclusive approach to waste management whereby all stakeholders are engaged: women, local communities, waste pickers and informal sector, municipalities, schools, and private sector; successful examples of sorting at the source projects were described whereby such an approach was instrumental to the project's success; the 3P partnership model was also proposed to be adopted (People, Private and Public); successful initiatives promoting home composting and partnering with poultry and pig farms to use organic wastes were explained; the importance of adopting a bottom-up approach in project implementation was raised by various stakeholders
- The importance of not charging the people with any fees was raised. Instead, the adoption of incentives should keep them engaged. All parties should be involved and should receive incentives to encourage them to sort their waste at source. Door-to-door campaigns, awareness campaigns at schools, and similar activities should be encouraged to train the communities on sorting from source. A monitoring system needs to be established to keep track of the sorted waste

- Several stakeholders mentioned the need to build on success stories and to learn from past failures; for example, commingled wastes should not be used as a source of compost for farmers (only green wastes and/or wastes sorted at source) and RDF can not be promoted if the regulatory environment is not in place (eg. remove PVC from RDF stream, develop specifications, etc.)
- It has been suggested to form local committees to monitor the implementation of the projects and provide a foundation to increase trust between people and the government and strengthen the projects governance; this approach can support overcome the NIMBY syndrome which is still very acute in Lebanon; innovative project governance solutions are needed
- Lebanon continues to rely on landfilling to manage wastes which is not sustainable; the example of a recent landfill project was provided whereby the landfill reached capacity in less than 2 years instead of its design capacity of 5 years; this further emphasizes the importance to promote 3R concepts and waste circularity principles in waste management
- Key pillars for the success of the project were proposed: policy and regulatory framework, institutional/governance, sound technology and financial sustainability; the regulatory framework must be well-developed to ensure successful implementation of the project; this includes for example a framework for Extended Producer Responsibility, clear permitting procedures and responsibilities in line with Law 80/2018, and specific waste stream regulations such as for packaging.

6 ARRANGEMENT AND STRENGTHENING OF INSTITUTION AND TRAINING PLANS

6.1 INSTITUTIONAL ARRANGEMENTS

The Ministry of Environment is the leading governmental institution concerned with environmental issues in the country. Within its core responsibilities are the management of the production, usage and disposal of hazardous chemicals and waste. The MOE is the national authority in charge of the implementation of the global environmental treaties including the Stockholm, Minamata and Basel Conventions. Other governmental agencies are cooperating in management of the chemical life cycle include the Ministry of Agriculture (MOA) and the Ministry of Industry (MOI).

The proposed project will be implemented by a newly established Project Management Unit (PMU) under MOE. The PMU for the ongoing PCB Management in the Power Sector project (to be closed by March 31, 2021), which has demonstrated its strong capacity, has been fully involved in shaping the project concept. It is expected that the experience and capacity gained from the PCB project will be transferred to the new PMU for preparation and implementation of the proposed project. A Steering Committee (SC) is also expected to be established to provide guidance and oversight to overall project implementation. The SC will include representatives from MOE, CDR, MOI, Ministry of Public Health, MOA, Ministry of Interior and Municipalities, Ministry of Finance, Ministry of Economy and Trade and other stakeholders as needed. The specific implementation arrangement will be further developed during project preparation.

6.2 CAPACITY ASSESSMENT AND NEEDS

The MoE has significant experience with application of Environmental and Social Framework through a number of World Bank Projects[54] and other international development organizations. Moreover, MoE has extensive experience working with numerous development partners in Lebanon.

The MoE PMU will have a full-time environmental management and social management specialist who will be tasked to connect with the World Bank and to implement the sub-projects' environmental and social management plan. Further **s**pecialized consultants to support the project implementation and management will be needed and will need to be sustainably embedded at the local (possibly within Municipalities) for the continuing responsibility and accountability of operation, management and monitoring of project activities in the targeted geographic areas.

A training program will be delivered to enhance the E&S management capacity for MoE, Municipalities, contractors, sub-contractors, and communities on:

1) ESF and ESMF;
2) ESIA/ESMP for each subproject;
3) SEP and GM;
4) ESCP; and Monitoring of the ESHS

[54] Specifically, the Landscape project with MOE, the Livelihood Enhancement and Association of the Poor with MOI and the Road Connectivity Improvement Project with MPWT.

5) Performance of the Project (and incidence and accidents reporting)
6) Community Health and Safety;
7) GBV Risk Prevention and Management;
8) COVID-19 Prevention;
9) LMP and Labor GM
10) Codes of Conduct for the contractors' workers and Training on the Requirements of Codes of Conduct including ESHS, OHS, GBV, VAC, SEP and GM.
11) Violence Against Children, including awareness campaigns

The PMU under the Ministry of Environment will prepare and submit to the WB regular monitoring reports on the environmental and social performance of the Project, including but not limited to the implementation of the ESCP, status of preparation and implementation of E&S documents required under the ESCP, stakeholder engagement activities, functioning of the grievance mechanism(s).

7 GRIEVANCE MECHANISM (GM)

An effective and responsive Grievance Mechanism facilitates project progress by reducing the risk that unaddressed complaints eventually lead to implementation delays, lengthy court procedures, or adverse public attention. The primary purpose of the GM however will be to provide clear and accountable means for project beneficiaries and affected persons to raise complaints, including concerns of possible tensions and feelings of exclusion, as well as to seek remedies when they believe they have been harmed by the project. The final design of the GM will be validated and adjusted as needed during the course of project implementation in consultation with relevant stakeholders to ensure its relevance and ease of use. Based on best practices, the final institutionalized GM should encompass a system that involves the following key steps:

- Uptake: Multiple uptake channels for complaints should exist to ensure widespread accessibility.
- Sorting and Processing: There should be a system to categorize, assign priority, and route grievances to the appropriate entity for handling and resolution.
- Acknowledgement and Follow-Up: Complaints should be acknowledged (in writing). The acknowledgement should outline the GRM process, provide contact details and indicate how long it is likely to take to resolve the grievance. Clear timetables should be publicly available.
- Verification, Investigation, and Action: The merit of each grievance should be judged against clearly defined standards. Investigators should be neutral and not have a stake in the outcome. Action should be taken on every grievance.
- Monitoring and Evaluation: There should be a process to track grievances and assess progress being made to resolve grievances. There should be indicators to measure grievance monitoring and resolution, best displayed via a simple graphical dashboard. If there is data being collected, this data should be used to make policy and/or process changes to minimize similar grievances in the future.
- Feedback: Complainants should be surveyed for their satisfaction and feedback on the credibility of the process. Feedback should be publicly made available. The GRM should ideally recognize and enforce a right to appeal decisions. Target communities and other interested parties should be informed of this right, if recognized.
- Analysis: A process should be in place to analyze the effectiveness of the GM periodically, within set timeframes.

The proposed GM for this project will be disclosed as part of the ESMP and SEP and publicly available. The GRM will be accessible to all relevant stakeholders who can use this mechanism to send their suggestions, concerns and complaints related to the project.

7.1 OBJECTIVES OF A COMPLAINTS MANAGEMENT MECHANISM

The grievance redress mechanism aims to provide individuals and communities who feel aggrieved by Project activities with accessible, timely, effective and culturally appropriate opportunities to raise their complaints and concerns about the Project. It also aims to identify, propose and implement fair and appropriate solutions in response to the complaints and concerns raised.

Specifically, the objectives are to:

- Establish a system for receiving, recording and processing complaints and concerns in a timely manner with particular attention to vulnerable groups;
- Provide an effective, transparent, timely, fair and non-discriminatory system that would allow aggrieved persons to complain and avoid litigation;
- Encourage the social and amicable settlement of complaints and avoid recourse to the courts as far as possible;
- Minimise bad publicity and avoiding/minimising delays in Project implementation;
- Ensure the sustainability of Project interventions and ownership by stakeholders; and
- Provide clarification in response to requests for information.

7.2 RAISING AWARENESS OF THE GRIEVANCE MECHANISM

The existence of the grievance mechanism will be consistently publicised during all stakeholder engagement activities as described during meetings, focus group discussions and other types of formats as well as through the grievance mechanism leaflet which shall be used to provide a one-page summary of the function of the mechanism, details of the resolution and appeal process, and provide written contact details to raise a complaint.

7.3 TYPES OF COMPLAINTS AND CONFLICTS TO BE DEALT WITH

The types of conflicts/complaints that may arise are as follows:

- Nuisance factors (dust, noise, vibrations);
- Environmental impacts (air pollution, water pollution, litter, etc.);
- Claims related to socio-economic activities (waste picking, labour, etc.);
- Claims related to restricted use of land (in or in the vicinity of dumpsites, landfills, waste facilities);
- Health and safety related incidents (injuries during 3R practices and during closure/construction/ rehabilitation activities of dumpsites and landfills);
- Claims related to Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH);
- Labor-related grievances;
- Claims related to injuries or fatalities from major accidents.

  Major incidents need to be reported to the World Bank within 48 hours. All grievances should be given attention and importance, however certain grievances, in addition to injury-related grievances, should be provided urgent attention, particularly SEA/SH-related grievances, labor-related grievances and grievances related to impact on livelihood.

7.4 UPTAKE CHANNELS TO REGISTER GRIEVANCES

A grievance can be raised in the following ways:

- Formal mail, phone call, SMS or email to MoE;
- Contact via designated Municipalities and NGOs that will collect grievances from vulnerable groups and for SEA/SH related grievances; and
- Direct contact with Project Personnel or Contractors physically present in the project's area.

Contact details for personnel responsible for managing the Grievance Mechanism are provided here:

Contact Person	Phone	Email	Address
Ms. Samar Malek	+961 1 976 555 Ext 434	S.Malek@moe.gov.lb	Ministry of Environment Azarieh Bld - 7th & 8th floor, the new Block A-4, Block A-4 and B5. mailbox. 2727/11 Beirut - Lebanon

7.5 THE GRIEVANCE MECHANISM PROCESS

The grievance mechanism process consists of the following steps:

a) Registration of complaints and acknowledgement of receipt;
b) Investigation;
c) Responding with a proposed resolution;
d) The opportunity to appeal; and
e) Follow-up and conclusion.

a. Registration of complaints and acknowledgement of receipt

Once information that a grievance has been received is channeled into MoE from whatever source, the Grievance Register (Annex 2) will be updated by the E&S Specialist and the person/entity raising the grievance will be contacted by MoE/PMU Leader to request additional information within 3 working days from receipt of the grievance.

The Grievance Register shall immediately be populated by the PMU E&S Specialist with the following information using the Grievance Register (Annex 2):

- A unique reference number of the complaint;
- The date and time on which the complaint was lodged;
- How the grievance was first brought to the attention of MoE (uptake channel);
- Information about the complainant (name, gender, telephone number and preferred contact details, their place of residence and address); complainant has the right also to raise the grievance anonymously;
- The use of the referral pathway, if any;
- A brief description of the complaint to include details of the location, people involved so that a timeline of events can be created;
- The category of the complaint;
- Whether it is a major incident and requires reporting to World Bank within 48-hours;
- Time and date in which the complaint was closed/resolved;
- Whether the complainant chose to appeal.

The person raising the grievance shall then be provided with an acknowledgement within three working days from the point the grievance was first raised, in an appropriate manner that reflects their preferred contact details (typically a letter or email), by PMU E&S Specialist. The

acknowledgement of receipt shall contain information about the next steps in the procedure, target timeframe and the contact details of the person who has been assigned to investigate and manage the grievance.

b. Investigation

The grievance shall be investigated, and an Investigation Report prepared and issued by the MoE/PMU within 15 working days from registration of the grievance. The PMU E&S Specialist is responsible to delegate the investigation to relevant personnel based on the type of grievance received. The PMU E&S Specialist will review the investigation report and approve it prior to sharing with the person/entity raising the grievance.

If the grievance relates to a minor issue, then it is likely that the investigation can be completed in advance of the 15 working days. The investigation shall involve an examination of the circumstances of the case, interviews with the parties involved and consultations with stakeholders. The report shall include details of the proposed steps to be taken to resolve the grievance based upon the facts. If such steps require disbursement of financial resources, the case shall be raised to the PMU Leader for review and appropriate action.

c. Responding with a proposed resolution

The PMU E&S Specialist will inform the person raising the grievance, within 20 working days from the date when the grievance was registered, of the outcome of the Investigation Report and the proposed steps to be taken to resolve the grievance. This shall be conducted through a physical meeting with all persons who are able to be present and while taking all necessary precautions related to COVID-19 in line with World Bank's relevant guidance note. If a physical meeting is not possible, the meeting can be held remotely via means that are accessible to the person raising the grievance.

If the person accepts the resolution steps, then these will be implemented within the agreed timeframe and the person raising the grievance will be requested to sign their acceptance of the proposed solution so that it can be closed in the Grievance Register (Annex 2). As a target, all complaints should be closed within 30 working days from registration of the grievance. Feedback will be requested from the person to check how satisfied they are with the overall resolution of the grievance.

If the person does not accept the resolution steps, then they will be able to appeal (see below).

d. The opportunity to appeal

If the originator of the grievance is not satisfied with the resolution, he/she has the right to appeal. In the event that a person wishes to appeal then, PMU E&S Specialist shall invite the services of an independent party (such as a non-governmental organization, civil society group or independent consultant) and ask them to provide one, or more, representatives to help mediate the case. At any time during the grievance resolution process, a complainant is able to seek independent legal advice or involve a court of law.

Vulnerable groups will be assisted to raise their grievances by the Beirut Bar Association, which can appoint voluntary lawyers to investigate such claims. NGOs engaged in the project can also play a role in defending legal rights of vulnerable groups.

The E&S Specialist will assure adequate follow-up of the appeal process to ensure the case is closed as promptly as practicably possible.

e. Follow-up and conclusion

Once a resolution of the complaint has been agreed or a decision to close the file has been made, the final step will be the implementation of the settlement, the monitoring of the results and the conclusion of the complaint.

Where needed, the E&S Specialist will prepare a 'lessons learned' document that outlines the steps taken to avoid similar grievances from re-occurring in the future. These shall then be disseminated across the Project and activities through tool-box talks, notice signs, meetings and other activities to work towards improving the Project's environmental and social performance over time.

Reporting on Gender Based Violence (GBV) and cases of abuse by staff will be highlighted and community members will be encouraged to report cases of violence they witness in or around the work sites and related public spaces. This would help to ensure that women and girls especially have a voice when they experience any kind of violence during project implementation. Where applicable, this can be done by raising awareness of safe and anonymous mechanisms that anyone can use to report GBV and harassment, as well as awareness on the redress mechanisms offered through the program and other local institutions.

The GRM does not exclude the formal legal process of the national law. If a grievance remains unresolved following application of the project GRM process, the affected person can initiate legal proceedings in accordance with national law and may have recourse to the Appeals Court as warranted.

ANNEXES

ANNEX A: ENVIRONMENTAL AND SOCIAL (E&S) SCREENING OF SUBPROJECT

This screening table is filled by the PMU and submitted to the World Bank for approval.

Screening factor	Y	N	Risk rating				Remark / Suggestion
			L	M	S	H	
E&S Risk of the Subproject							
1. Whether the subproject involves 'Associated Facilities'? (The 'Associated Facility' means a facility or activity which is not funded as a part of the project, and judged by the World Bank as: (a) Directly and significantly related to the project; (b) Simultaneously implemented or planned with the project; or (c) Constructed for the project and is necessary for the project.)							If so, then the relevant E&S requirements of the subproject are applicable to the 'Associated Facilities'.
2. Is the subproject located in nature reserves (existing or planned), scenic areas, forest parks, drinking water conservation areas or areas with high ecological or cultural value?							If so, the project will not be supported.
3. Does the subproject's area intersect with natural habitats?							If so, the project will not be supported.
4. Does the subproject's area intersect with important natural habitats? That is, is there any important, vulnerable or endangered species of plants or animals inhabiting in the area?							If so, the project will not be supported.
5. Does the implementation of the subproject affect common natural habitats (such as forest, river or wetland) out of nature reserves?							If so, it is required to provide the relevant impact assessment and mitigation methods in the ESIA.
6. Does the sub-project involve Land Acquisition, resettlement and/or economic displacement? Does the component involve restrictions on the use of land and resources including access to recyclables, so that the community or its internal group loses the traditional or customary right to use resources or recognized right of use? Does the component render any land unusable or any migrant unable to enter?							If yes, an RP and/or LRP should be prepared according to ESS5.
7. Does the sub-project impact (i) waste-pickers, (2) are any of the full or part time waste pickers are under 18 years old but over 14 years old; and (3) are any of the full or part time waste pickers under 14 years old							This age category will not be included in any project activities given that Lebanese labor law and ESS2 requirements prohibit child labor.

Screening factor	Y	N	Risk rating				Remark / Suggestion
			L	M	S	H	
8. Does the sub-project expect any labor influx for the works and if the case does this labor influx cause potential impacts to Gender Based Violence?							If yes, then mitigation measures need to be defined to mitigate the GBV risks.
9. Is there any indigenous peoples/ethnic minority community in the component area, or is any indigenous peoples / ethnic minority community collectively attached to the component area?							Not applicable to the Project
10. Does the component involve reconstruction or expansion on any existing facility, or otherwise relate to it?							If yes, an environmental and social audit should be conducted according to ESS1-ESS10.
11. Is there any known archaeological, historical or other cultural heritage within the scope of the subproject?							
12. Do the public or non-governmental organizations around the subproject express strong opposition to the construction of the project?							
13. Will the subproject bring great safety and health risks to the surrounding communities?							If so, the risk rating of the subproject is classified as S or H.
14. Does the construction and operation of the subproject pose great health and safety risks to the workers?							If so, the risk rating of the subproject is classified as S or H.
15. Will the subproject cause social conflicts related to the recognition of community hazards or unfulfilled benefits to a certain extent?							If so, the risk rating of the subproject is classified as S or H.
Compliance of Existing Enterprises Related to the Project							
16. Does the subproject enterprise have legal business permission and license?							To review relevant documents and records.
17. Does the sub project enterprise comply with the relevant national environmental laws and regulations and discharge standards of 'the three wastes'?							To review compliance records (monitoring reports, certificates, etc.) and consult with relevant departments.
18. Is the subproject enterprise facing major unresolved environmental penalties or environmental responsibilities? (e.g. pending legal proceedings involving environmental issues)							To consult with relevant departments for data research.
19. Is the subproject enterprise facing environmental and social impact complaints from the surrounding residents or non-governmental organizations?							To conduct media search and consultation with the local communities and non-governmental organizations.
20. Has the subproject obtained the approval document or registration of EIA report issued by environmental protection department?							To review the approval documents through online audit of relevant departments' websites.

Screening factor	Y	N	Risk rating				Remark / Suggestion
			L	M	S	H	
21. Has the subproject obtained the relevant land use certificate or land use approval document issued by the land department?							To review the approval documents through online audit of relevant departments' websites. For the existing enterprise, it is required to carry out Due Diligence on land acquisition.
22. Does the subproject need to be examined and approved by relevant departments such as safety, soil and water conservation, geological disasters, flood control and so on? If necessary, state the approval status.							
Overall environmental and social risks: (The overall level of E&S risk is determined by the highest risk rating of the issues above.)							**Documents required:**

ANNEX B: DUMPSITE SITE SCREENING & SELECTION CRITERIA

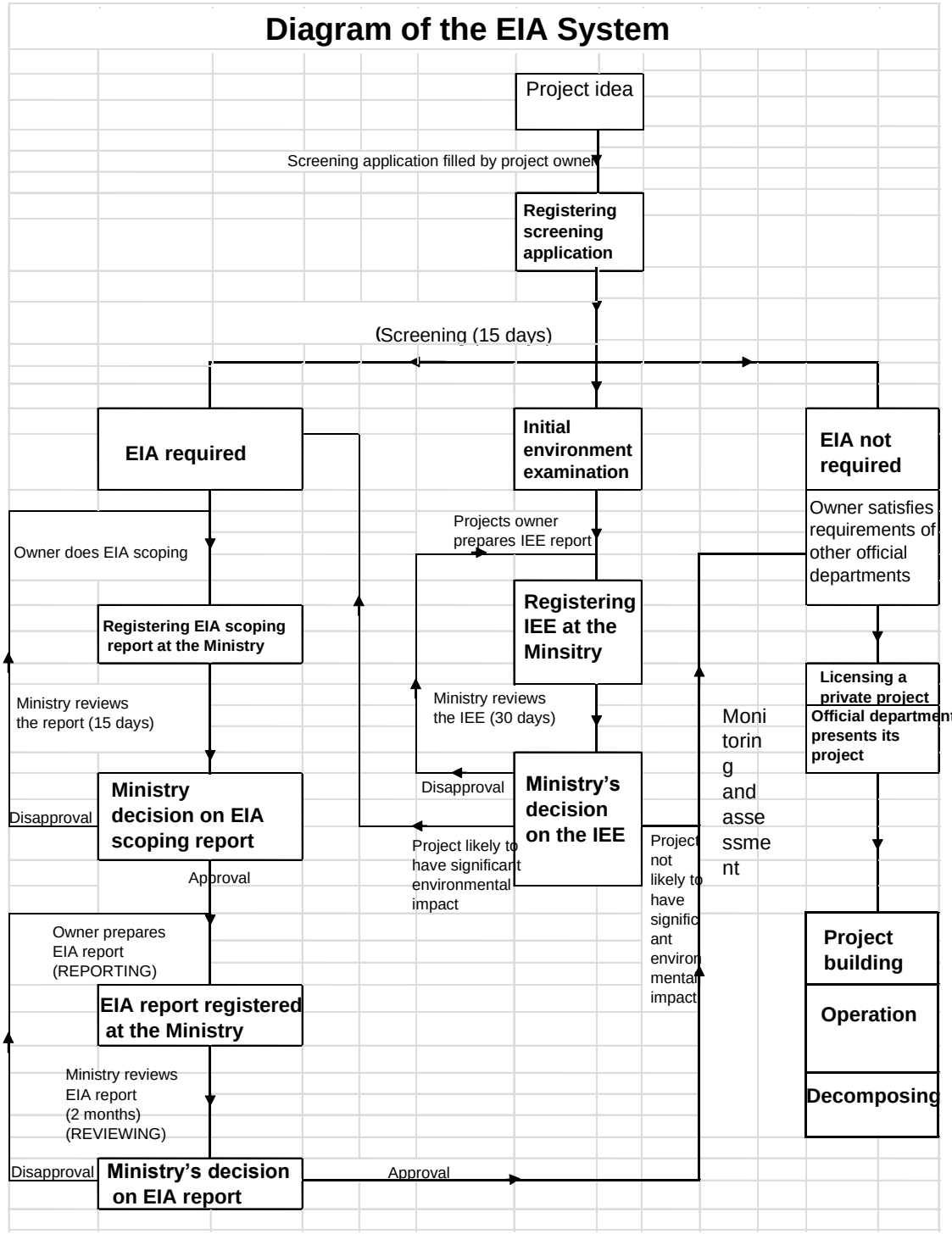
1. **Located outside the Upper Litani basin:** Since financing of dumps closure in the Upper Litani can be financed by funding available from the Qaraon project, all dumps in Upper Litani basin were excluded from the shortlisting exercise.
2. **Dump is operational:** This was based on the dumps survey mainly along with some recent updates based on consultation with stakeholders. Moreover, dumps that were closed recently but not rehabilitated were retained.
3. **Volume of waste at site (m^3):** The volume of wastes for each dump was measured directly on site in the 2017 survey. During the last 4 years, the volume of waste in dumps have definitely increased and thus a new methodology was used to calculate the new volumes to compensate for the accumulated additional volumes. Four scenarios were identified to update the volume calculations (identified above). Dumps with volume of waste less than 5,000 m3 or larger than 200,000 m3 were considered either as too small or too big for the intervention and thus were excluded.
4. **The quantity of waste currently dumped at site (t/d)** was collected during the field surveys in 2017. This factor is very important to categorize the size of an active dumpsite and to differentiate it from an abandoned dumpsite. Relatively small dumps in which the daily quantity of waste was lower than 5 t/d were eliminated.
5. **Distance to rivers and streams:** These were originally extracted from the topographic maps of Lebanon 1: 50,000 scale using heads-up digitizing. After appending all digital blue line maps, a distance to line approach was conducted giving a continuous raster data file. The resultant was then intersected with the spatial distribution of the dump sites and collected in the dumpsites database. Dumps distance to rivers or streams that is less than 150 m was considered in the narrowing down exercise.
6. **Distance to urban areas:** The map of urban agglomeration was plotted in GIS and the distance to urban areas was established. This in turn was overlapped with the dumpsites point location layer to include the distance of each dump to urban areas. The distance of dumpsites to urban agglomeration that are less than 500 m were retained in the narrowing down exercise.
7. **Duration of dump exposure (in years):** It represents the overall duration that the dump has been in existence, hence exposing potential receptors to its impacts. The criteria used was to eliminate newly formed dumps, if any. The criteria used was that the dump should be existing for more than 5 years (ie since 2016). This will eliminate all newly formed dumps in the recent years.
8. **Presence of an existing or planned waste management system** serving the region after consultation with major stakeholders (MOE, OMSAR) and based on the SOER report. The presence of an alternative solution is a very critical factor for the decision-making process to close or rehabilitate a dump.
9. **Open burning of waste:** This was also based on observations during site visits at the time of the 2017 survey. Open burning is the major factor for UPOPs generation. Consequently,

open dumps where waste was/is being burned will qualify for next stages of narrow down. This needs to be rechecked following the meeting at MOE.

10. **Commitment of stakeholders to close dump:** To be elaborated following the meeting at MOE.
11. **Availability of co-financing:** To be updated following the meeting at MOE.

ANNEX C: **DIAGRAM OF THE NATIONAL EIA SYSTEM**

As per Annex 9 of EIA Decree 8633:



ANNEX D: STATEMENT OF INFORMATION REQUIRED FOR THE "INITIAL ENVIRONMENTAL EXAMINATION (IEE)" REPORT

As per Annex 7 of EIA Decree 8633:

Statement of information required for the "Initial Environmental Examination (IEE)" report

The initial environmental examination report should include the following information (not necessarily in this order):

1. Executive summary.
2. Table of contents
3. Introduction: defining the project, the project owner, the person of office conducting the initial environmental examination, as well as a brief explanation of the type, size and location of the project.
4. Policy, legal and administrative frameworks: an investigation of the enforceable regulations, principles, and standards observed by the environment sector at the local and national levels, laws governing the sector under which the project is included. The information should address specifying the official department concerned, and its potential at the local and national levels.
5. Description of the proposed project: description of project components, the relevant maps according to the appropriate scale and photos, information of project location, comprehensive design, size, capacity, work program, services, the duration of operation, etc.
6. Description of the surrounding environment of the project: gathering and evaluation basic information of environmental characteristics of the study location (physical, chemical, biological, social and economic environment) taking into consideration any expected modifications before the commencement of the project or any likely changes in future.
7. Potential environmental impact of the project: identification, estimation, and assessment of all potential effects of the project on the environment (physical, chemical, biological, social and economic consequences) whether positive or negative, direct or indirect, over the short or long term.
8. Environmental management plan: this paragraph summarizes a group of impact mitigation measures, monitoring and control tools, and institutional procedures taken during building, operating, or decommissioning a project, with a view to eliminating or mitigating negative environmental effects to locally acceptable levels, if any, or to global standards. This paragraph should include the estimated cost of the environmental management plan.
9. Conclusion
10. Annexes:

- Summary of project documents.
- Tables and information statements

- List of scientific and non-scientific references used
- List of the names of who prepared the initial environmental examination report (individuals and institutions).

Note: The Ministry of Environment has the right to modify items required in this annex in accordance with environmental essentials that are applicable to standards and role of the project. Special consideration is given to the application of article 12 “Information Publication”.

ANNEX E: STATEMENT OF INFORMATION REQUIRED IN THE "ENVIRONMENTAL IMPACT ASSESSMENT (EIA)" REPORT

As per Annex 7 of EIA Decree 8633:

Statement of information required in the "Environmental Impact Assessment (EIA)" report

The EIA report should include the following information (not necessarily in this order):

1. Executive summary.
2. Table of contents
3. Introduction
    - Objective and rationale of the project:
        - Definition of the project and the project owner
        - Brief description of the type, size and location of the project
        - Importance of the project to the country
    - The EIA scoping, which include the person or the agency that prepared the study
4. Policy, legal and administrative frameworks:
    - Official department concerned, its capabilities at local and national levels
    - Environmental legislation, other regulations related to the environment, the policy observed in the country
    - Environmental requirements for any of the parties participating in financing the project
    - Applicable Environmental agreements or treaties the country have joined
5. Public participation:
    - Official agencies
    - NGOs
    - Groups affected by the project
6. Description of the proposed project:
    - Type of the project
    - Location of the project: maps showing the project site and its impace
    - Size of the project, including the related activities
    - Proposed program for construction and operation
7. Description of the surrounding environment of the project:

7.1 Physical and chemical environment:

- Topographical and geological aspects, and the impact of earthquakes and other hazards
- Study of surface and underground water
- Measuring sea and coasts
- Available means of discharging polluted water, and the quality of water
- Surround air quality, sources of air pollution
- Climate and weather service
- Noise

7.2 Biological environment:

- Vegetation and animal life
- Fish and water living creatures
- Rare or endangered species
- Sensitive areas (forests, protected areas, natural parks,etc)

7.3 Socio-economic environment:

- Demographics (population, social fabric, employment, income distribution, customs and traditions, people expectations etc)

- Development activities (infrastructure, industry, agriculture, institutions, tourism, recreation etc)
- Land use
- Traffic
- Public health
- Historic and archaeological heritage
- Aesthetic values
- Culture and civilization values (customs and tradition,aspirations)

8. Potential environmental impact of the project:

8.1 Physical and chemical environments

8.2 Biological environment

8.3 Social and economic environment

9. Preliminary analysis of project alternatives:
    - Non establishment of the project
    - Alternative projects with same objectives
    - Same project with different technologies
    - Comparing various environmental and economic potentials
10. Environmental management plan:

a. Negative impact mitigation program:
    - Summary of significant environmental consequences
    - Technical detail of each mitigation measure (applicable to which impact, the conditions of their application, designs, detailed fittings and operational procedures)
    - Potential environmental effects of these measures
    - Linkage between these measures and other mitigation programs
    - Cost of negative impact mitigation program

b. Monitoring and control program:
    - Specific technical detail of control means (control standards, control techniques, periodicity of the required control, control location, measurement procedures, keeping and analyzing information, and emergency measures)
    - Reporting and report submission
    - Detailed budget, acquisition program and the required supplies
    - Cost of monitoring and control program

c. Institutional capacity development program:

- Detailed description of institutional procedures required for the above environmental measures (responsibility for implementing mitigation measures and control/follow up procedures etc).
- Technical assistance programs
- Acquisitions and supplies
- Organizational changes
- Cost of institutional capacity development program

11. Conclusion:

- Net profit justifying the establishment of the project
- Explanation of how to mitigate negative impact
- Prior preparations for following up control and supervision

12. Annexes:

- Minutes of public participation
- Summary of project-related documents
- Tables and information statements
- List of related reports

- List of scientific and non scientific references used
- List of the names of who prepared the EIA report (individuals and agencies)

Note: The Ministry of Environment has the right to modify items required in this annex in accordance with environmental essentials that are applicable to standards and role of the project. Special consideration is given to the application of article 12 “Information Publication”.

ANNEX F: INDICATIVE OUTLINE OF ESMP

An ESMP consists of the set of mitigation, monitoring, and institutional measures to be taken during implementation and operation of a project to eliminate adverse environmental and social risks and impacts, offset them, or reduce them to acceptable levels. The ESMP also includes the measures and actions needed to implement these measures. The Borrower will (a) identify the set of responses to potentially adverse impacts; (b) determine requirements for ensuring that those responses are made effectively and in a timely manner; and (c) describe the means for meeting those requirements.

Depending on the project, an ESMP may be prepared as a stand-alone document or the content may be incorporated directly into the ESCP. The content of the ESMP will include the following:

A. Mitigation	The ESMP identifies measures and actions in accordance with the mitigation hierarchy that reduce potentially adverse environmental and social impacts to acceptable levels. The plan will include compensatory measures, if applicable. Specifically, the ESMP: a. Identifies and summarizes all anticipated adverse environmental and social impacts (including those involving indigenous people or involuntary resettlement); b. Describes—with technical details—each mitigation measure, including the type of impact to which it relates and the conditions under which it is required (e.g., continuously or in the event of contingencies), together with designs, equipment descriptions, and operating procedures, as appropriate; c. Estimates any potential environmental and social impacts of these measures; and d. Takes into account, and is consistent with, other mitigation plans required for the project (e.g., for involuntary resettlement, livelihood restoration, Indigenous Peoples, or cultural heritage).
B. Monitoring	The ESMP identifies monitoring objectives and specifies the type of monitoring, with linkages to the impacts assessed in the environmental and social assessment and the mitigation measures described in the ESMP. Specifically, the monitoring section of the ESMP provides: a. a specific description, and technical details, of monitoring measures, including the parameters to be measured, methods to be used, sampling locations, frequency of measurements, b. detection limits (where appropriate), and definition of thresholds that will signal the need for corrective actions; c. monitoring and reporting procedures to (i) ensure early detection of conditions that necessitate particular mitigation measures, and (ii) furnish information on the progress and results of mitigation.
C. Capacity Development and Training	• To support timely and effective implementation of environmental and social project components and mitigation measures, the ESMP draws on the environmental and social assessment of the existence, role, and capability of responsible parties on site or at the agency and ministry level. • Specifically, the ESMP provides a specific description of institutional arrangements, identifying which party is responsible for carrying out the mitigation and monitoring measures (e.g., for operation, supervision, enforcement, monitoring of implementation, remedial action, financing, reporting, and staff training). • To strengthen environmental and social management capability in the agencies responsible for implementation, the ESMP recommends the

	establishment or expansion of the parties responsible, the training of staff, and any additional measures that may be necessary to support implementation of mitigation measures and any other recommendations of the environmental and social assessment.
D. Implementation Schedule and Cost Estimates	For all three aspects (mitigation, monitoring, and capacity development), the ESMP provides a. an implementation schedule for measures that must be carried out as part of the project, showing phasing and coordination with overall project implementation plans; b. the capital and recurrent cost estimates and sources of funds for implementing the ESMP. These figures are also integrated into the total project cost tables.
E. Integration of ESMP with the Project	The Borrower's decision to proceed with a project, and the Bank's decision to support it, are predicated in part on the expectation that the ESMP (either stand alone or as incorporated into the ESCP) will be executed effectively. Consequently, each of the measures and actions to be implemented will be clearly specified, including the individual mitigation and monitoring measures and actions and the institutional responsibilities relating to each, and the costs of so doing will be integrated into the project's overall planning, design, budget, and implementation.

ANNEX G: ENVIRONMENTAL, HEALTH, AND SAFETY GUIDELINES FOR THE WASTE MANAGEMENT FACILITIES

I. Overview of Relevant Laws to Environment, Health and Safety

The purpose is to provide regulation on solid waste management and safety precautions to ensure the protection of community health and environmental preservation.

On Household Waste Management

On Hazardous Waste Management

II. World Bank Policy

The Environment, Health and Safety guidelines of the World Bank Group applies to municipal solid and industrial waste management facilities that include the following processes:

- Waste collection and transport;
- Waste receipt,
- Unloading, processing, and storage;
- Landfill disposal;
- Physio-chemical and biological treatment; and,
- Incineration Projects (WBG, 2007).

Table G-1: EHS Guidelines in Waste Management Facilities

Phase	Description
Landfill Siting	**Environmental Conditions for Waste Management Facilities** The guidelines provide that the proximity of groundwater and recharge area, surface water. Private or public drinking, irrigation, or livestock water supply, and perennial stream must be considered in landfill siting. Also, the exposure of the site option to hydro-meteorological and seismic hazards, must be considered in the site selection. (Section 1.1.1, p.10-11, 14) Community Health and Safety In the identification of landfill sites, the nearest residential developments must be over 250 meters from the site option.
Landfill Design and Development	Guidelines for the design and development of waste management include the following: Noise Management • Construction of a buffer zone, • Road quality maintenance • Use of equipment with low-noise emission levels, • Use of sound-insulating materials, acoustic screens and silencing equipment, • Enclose inherently noisy equipment in a fixed structure, and • Inclusion of noise considerations in the design process. **Emission Management** • Inclusion of landfill gas collection system and its use if practical, • Use of gas blowers, and • Installation and regular sampling of boreholes
Landfill Operations	Labor Management Occupational Safety Occupational Safety Procedures for the landfill operation must include provisions related to: • Accidents and injuries, including those involving trucks and moving

Phase	Description
	equipment, unstable disposal site surfaces, and fires and explosions, • Chemical exposure, including exposure to chemical burns, and • Exposure to pathogens and vectors that can be health hazards. Facilities managing municipal solid waste must work together with government entities to allow the collection and sorting of solid waste, if possible, initiatives to help them form formal entities, such as cooperatives or micro-enterprises, can be done to formally contract them into the process of the facility. Once such work is formalized, the workers must be officially registered, provided with protective equipment, provided with washing and sanitation facilities, and receive regular health examinations and vaccinations under a health surveillance program. The design of the facility must also consider easier access of the to recyclables and reduce their contact to wastes that pose hazards. (p. 23-26) Community Health and Safety The following impacts likely to occur during the operation phase must be looked into: • Waste scavenging: should not be allowed under any circumstances in hazardous and non-hazardous industrial waste management facilities. Only facilities handling municipal solid waste may consider incorporating the employment of waste-pickers into the operations of the facility • Physical, chemical, and biological hazards: access to facilities, especially for areas that hold toxic waste, must be restricted and implement security procedures. • Litter: garbage outside the facility must be managed to avoid the exposure of the adjacent community to hazardous substances and potentially spread disease. • Noise: measures to management noise should be taken to void causing nuisance to the adjacent areas., • Dust and odors: Buffer areas must be included in the design, especially between processing areas and potential receptors, especially residences, hospitals and schools. Processing areas must be located in areas at the downwind from these areas to manage and control exposure of community to dust and odors. • For informal living near waste management facilities, they often have poor living conditions with only minimal water and sanitary facilities. They are also especially at risk to exposure to hazardous and toxic waste and fumes. As much as possible, the economic displacement of these must be avoided, especially without provision of any alternatives. (Section 1.1.1, p.10-11, 14; Section 1.3 p.26)
Decommissioning or Closure	Specific procedures on closure must emphasize preservation of long-term integrity and security of the site. The closure and post-closure plan must include mitigating impacts to human health and environment after the closure. All plans must be aligned with the defined post-closure use.

Source: World Bank Group (2007)

ANNEX H: LABOR MANAGEMENT PROCEDURES (LMP)

The Labor Management Procedures report follows the outline below:

1. Overview of Labor Use on the Project
    a. Introduction
2. Assessment of key potential labor risks
3. Brief overview of labor legislation: terms and conditions
    a. Terms and conditions of employment
    b. Non-discrimination and equal opportunity
4. Brief overview of labor legislation: occupational health and safety
    a. Occupational health and safety
    b. COVID-19 Prevention
5. Responsible staff
6. Policies and procedures
7. Age of employment
8. Terms and conditions
    a. Terms and conditions for direct migrant workers
    b. Terms and conditions for contracted workers
9. Grievance mechanism
    a. Procedures
    b. Gender-based violence related procedures
10. Contractor management
11. Community workers
12. Primary supply workers

ANNEX I: ENVIRONMENTAL ASSESSMENT OF UNCONTROLLED DUMPS

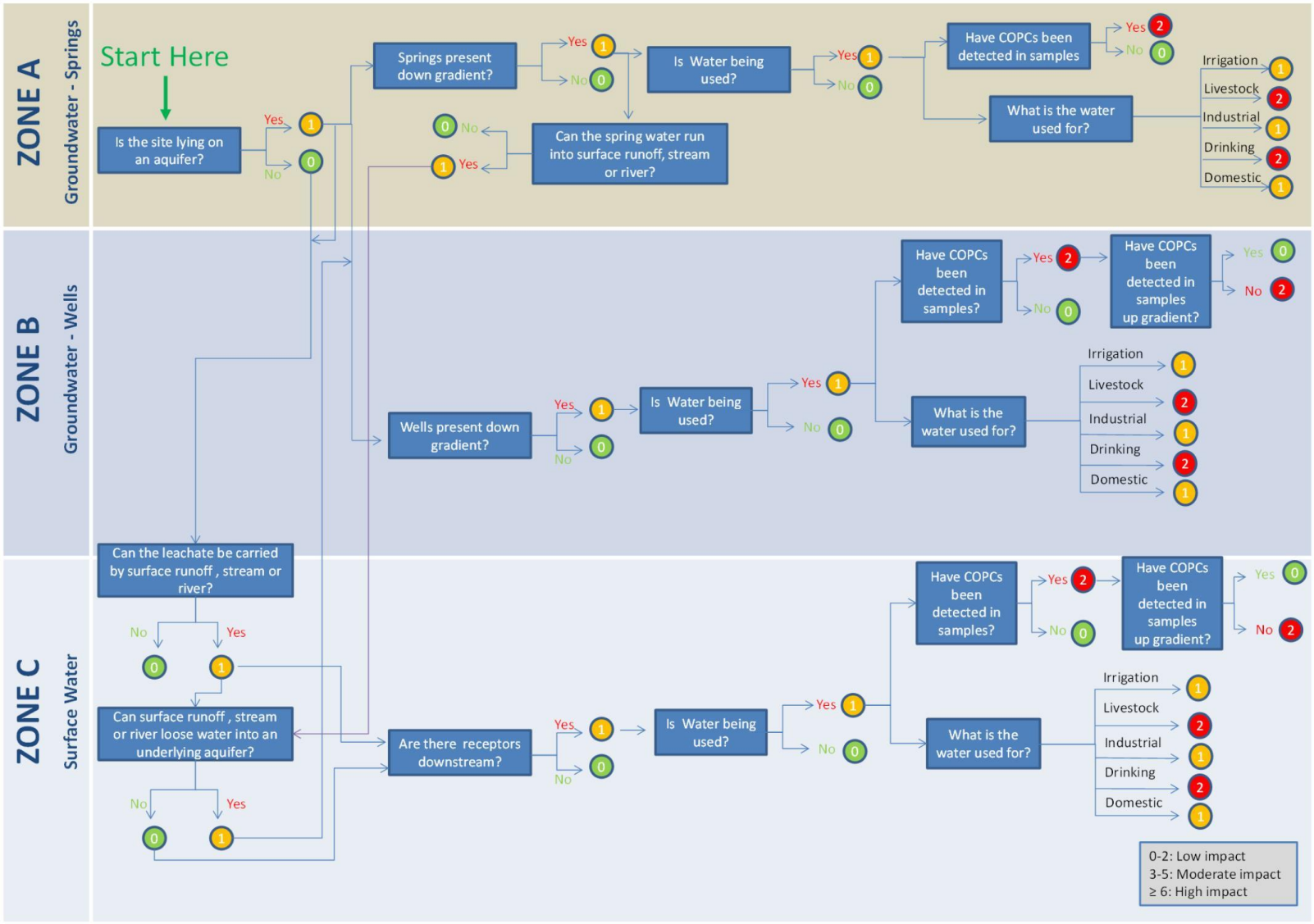
As part of the update of the 2011 Master Plan for the Closure and Rehabilitation of Uncontrolled Dumps in Lebanon, a methodology was developed to assess the impacts of open dumps on the environment.

Uncontrolled dumps may lead to impacts on water resources, air quality, soil, visual amenity, historical sites, biodiversity, and marine environment, among others. This methodology focuses on two main impacts, based on their potential significance: impacts on water resources and impacts on air quality.

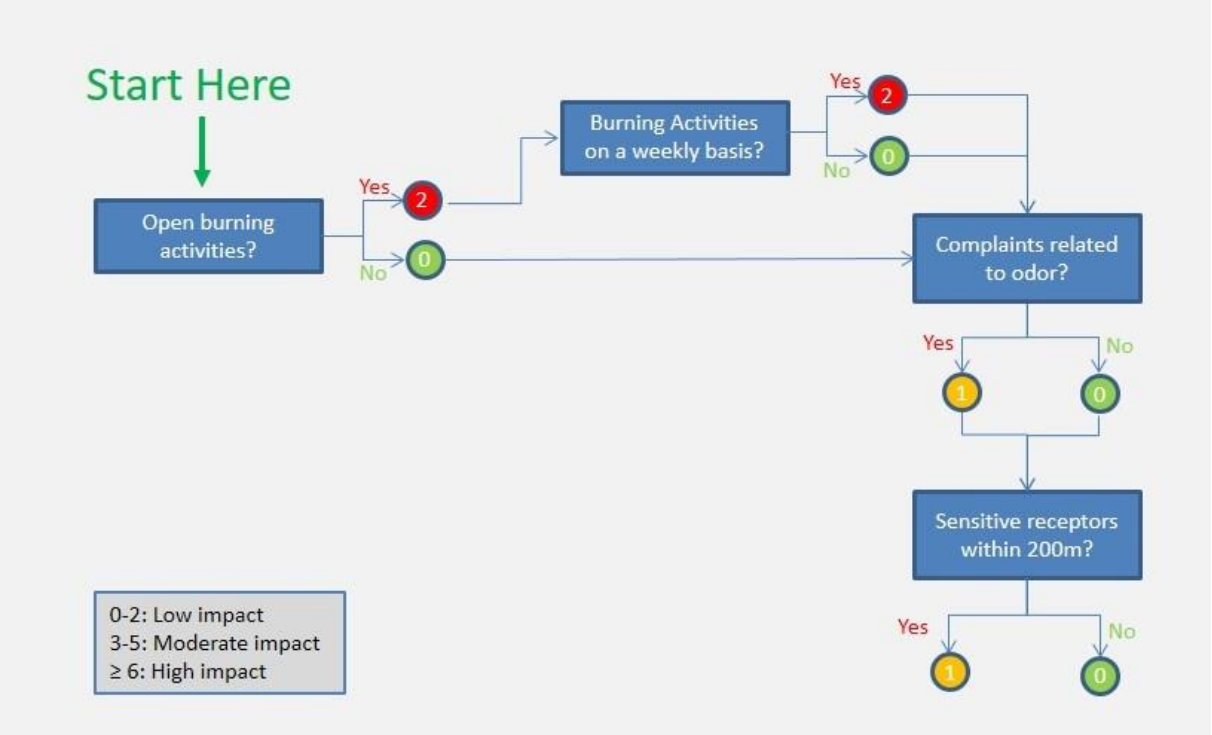
The methodology developed defines the significance criteria and baseline conditions that need to be known in the assessment, as well as a procedure to determine significance rating. The baseline conditions considered for impacts on water resources are:

- Topography and surface drainage
- Hydrogeology: groundwater basins, wells and springs
- Land use
- Water quality
- The baseline conditions considered for impacts on air quality are:
- Prevalent wind direction
- Land use and presence of nearby sensitive receptors

The procedure for the determination of significance ratings for water resources and air conditions are presented in the two flowcharts below.



Water Resources Impacts Assessment Flow Chart



Air Quality Impacts Assessment Flow Chart

Each answer in the flowcharts generates a predefined score. This score is set to reflect the degree of the impact. A score of 0 means there is no impact while a score of 1 or 2 implies that there is a potential negative impact on the environment that is more severe for the higher value. The total score of each zone is obtained by summing up individual criteria scores and is interpreted in accordance with the following score ranges:

- 0-2: Low impact
- 3-5: Moderate impact
- 6 and above: High impact

For dumps with high impact significance on water resources, the source of the pollution must be eliminated, primarily through closure and rehabilitation of the dump. The Updated Master Plan presents detailed methodologies for the closure and rehabilitation of the dumpsites. The following are possible rehabilitation options for dumpsites with municipal solid waste:

- Excavate, pre-treat and transfer waste to waste treatment/sanitary landfill;
- Transfer to a sanitary landfill;
- Convert to a sanitary landfill;
- Grade, cap and manage gases;
- Excavate, treat and transfer;
- Excavate, line, grade, cap, manage gases and collect leachate; and
- Group with other dumpsites and transfer to sanitary landfill.

For dumpsites with a high impact on air quality, mitigation measures can be applied to reduce impacts resulting from open burning activities of waste. These can include, depending on the significance of the impact:

- Forbidding open burning practices;
- Applying soil cover to prevent odor emissions and reduce their dispersion;
- Installing a gas collection and flaring system.

The methodology was tested on a pilot basin and validated. Some recommendations in the implementation of the water resources impact assessment methodology are:

- Adequate sampling points might not always be accessible and might be a limitation;
- Because most of the aquifers in Lebanon are of karstic nature, subsurface water conduits/pathways can be extremely complicated, with high flow. Consequently, contaminants can be quickly flushed, leading to no detection at sampling point.

It is important that qualified experts (hydrogeologists) be involved in the implementation of the water resources impact assessment methodology.

ANNEX J: STAKEHOLDER ENGAGEMENT ACTIVITIES, MINUTES OF PUBLIC CONSULTATIONS, SUMMARY OF MAIN TAKE-AWAYS AND ATTENDANCE SHEETS

Stakeholder Engagement Activities Undertaken for the Preparation of the ESMF

Minutes of the first stakeholder engagement activities conducted at MOE on January 18, 2022 are summarized in Table J-1. List of attendees is included in Table J-2.

The second consultation meeting was conducted online on February 10, 2022. List of attendees is included in Table J-3. A copy of the presentation is also included in this Annex.

Table J-1: Summary of Stakeholder Engagement Activities during the Preparation of the ESMF – First consultation event

SWM facility	Type of facility	Caza/Mohafazat	Open dumps	Status of dump	Challenges and opportunities	Other donors/Cofinancing	Union of Municipalities	Municipality
Ain Baal	Sorting and Composting (not operating since 1.5 years)	Tyre/South	Qana Deir Qanoun	Open Burning Open burning but small according to head of Union	Financial challenges as a result of the crisis. Municipal budgets are very scarce to secure O&M in USD at market rate tyre are recovered and 330 t/d goes to open dumps Absence of cost recovery schemes Started a SAS campaign in Deir Qanoun Need composting	Kuwait funding of the Naffakhieh SLF & WB/Lower Litani River Basin	Tyre	Qana Deir Qanoun El Naher
Abbasiyeh	Sorting hangar at dump	Tyre/South	Abbasiyeh	Burning from time to time, sizeable dump accomodating around 30 t/d of MSW	Willing to implement new projects given their experience in the management of the HCWM facility 40-60 t/d are generated and are sent to dump Open burning practiced Have started SAS in the village Have a small sorting hangar on the dump Commitment to close the dump and do an ISWMP	Kuwait funding of the Naffakhieh SLF / WB/Lower Litani River Basin		Abbasiyeh

SWM facility	Type of facility	Caza/Mohafazat	Open dumps	Status of dump	Challenges and opportunities	Other donors/Cofinancing	Union of Municipalities	Municipality
Iqlim el Touffah planned system	Sorting, Composting, landfilling (planned)	Nabatieh/ Nabatieh	Houmine el Faouka	Old dump, open burning practiced	Municipal budgets are very scarce Challenges in secyring O&M Part of of Promare - Master plan - EU funding Open dumps operating and burning Risk of forest fires as a result of dumps burning Lack of cost recovery for SWM Positive attitude and willing to commit to start somewhere Three dumps -open burning in qana, Siddiqine and Rishknanai Budget very small Renting the dump for 3 Million LBP to recover recyclables Issue of syrian refugees constituting more than 30 % of population	EU / Promare funding for Iqlim el Touffah & WB/Lower Litani River Basin	Iqlim el Touffah	Houmine el Faouka
			Siddiqine	Old dump, open burning practiced				Siddiqine

SWM facility	Type of facility	Caza/Mohafazat	Open dumps	Status of dump	Challenges and opportunities	Other donors/Cofinancing	Union of Municipalities	Municipality
Jurd El Kaiteh	Sorting, composting and landfill	Akkar/North	Fnaydeq	Old dump, open burning practiced	Positive attitude and willing to benefit from project three dumps - open burning Have developed a master plan approved by MOE Part of Promare by EU Disposal in Srar of rejects Have two facilities (Michmich and Fnaydek) Cost recovery was developed in the master plan Financial challenges Have a technical unit for SWM at the level of the Union	EU/Promare funding for Jord El Qaiteh & possibly USAID /DAWERR	Jurd el Kaiteh	Fnaydeq
			Jdaidet el Qaiteh	Old dump, open burning practiced	Represented by Head of Union			Jdaidet el Qaiteh
			Mishmesh	Old dump, open burning practiced	Open burning Dumps along river and gets washed away Quantity of waste reduced as a result of the crisis Very low collection rate for municipal fees Budget constraints			Mishmesh

SWM facility	Type of facility	Caza/Mohafazat	Open dumps	Status of dump	Challenges and opportunities	Other donors/Cofinancing	Union of Municipalities	Municipality
					Willing to cooperate			
Sahel El Zahrani	Sorting, composting and landfill (planned-No financing)	South	Sarafand Marwaniyeh Saksakiyeh	Currently no open burning, previously yes Old dump, open burning practiced Old dump, open burning practiced	NIMBY syndrome for locating a SWM facility O&M costs are very high Transportation challenges Willing to cooperate for closure of dumps Have 3 centers for recovering of recyclables at the level of Sahel El Zahrani Union dumps are open burning on regular basis (Ansariyeh, Loubiyeh, Aadloun) Need composting facility Willing to allocate a land for the waste from neighbouring villages only Build a sanitary landfill in one of the existing open dumps	UNDP	El Zahrani	Sarafand Marwaniyeh Saksakiyeh

Table J-2 List of participants in the Stakeholder Consultation Meeting held on January 18, 2022

Governmental Insitutions
Ministry of Environment
Private Sector
ELARD
Academia
American University of Beirut
Local Authorities
Municipality of Mishmish
Municipality of Houmine El Faouka
Union of Municipalities of Iqleem at-Tuffah
Municipality of Siddiqine
Municipality of Deir Qanoun En-Nahr
Municipality of Abbassiyeh
Municipality of Sarafand
Union of Municipalities of Jurd El Kaiteh
Municipality of Tyre
Union of Municipalities of Tyre
Union of Municipalities of Sahel El Zahrani
International Organizations
World Bank

Table J-3 List of attendees to the Stakeholder Consultation Meeting held on February 10, 2022

Governmental Institutions
Council for Development and Reconstruction (CDR)
Ministry of Environment
OMSAR
Local Authorities
Union of Municipalities of Iqleem at-Tuffah
Union of Municipalities of Jurd El Kaiteh
Private Sector
Dawerr
ECODIT
ELARD
Freelance

Green Mount Recycling
MAN Enterprise
Verdetech sarl
Non-Governmental Organizations (NGOs)
Arab Reform Initiative
Beam of the Environment Association (BEA)
Democracy Reporting International
DTCare
DTCare
Madinati
Rene Moawad Foundation
Viridis Investment Fund of Foundation Diane
Women Association of Deir El Ahmar
Academia
American University of Beirut
University of Balamand
International Organizations
Human Rights Watch
United Nations Development Programme
World Bank
World Health Organization of the United Nations

ANNEX K: WORLD BANK STANDARDS ON ENVIRONMENTAL AND SOCIAL FRAMEWORK

ESS	Summary	Relevant	Commentary
ESS1: Assessment and Management of Environmental and Social Risks and Impacts	The conduct of an assessment of the environmental and social risks and impacts is required for projects (and associated facilities) proposed for World Bank financing. The assessment shall identify, review and evaluate the risks and impacts of the projects vis-à-vis its potential contributions. The results from the assessment will inform the design of project, including the identification of mitigation measures, through applying a mitigation hierarchy of (1) anticipating and avoiding risks and impacts, (2) minimizing or reducing risks when avoidance is not possible, (3) identifying measures to mitigate impacts from risk minimization or reduction, such as livelihood restoration, and (4) compensating and offsetting in the event that significant residual impacts remain.	Relevant	The Project includes technical assistance activities and civil construction and operation activities. The environmental benefits of the project are seen to be significant. By improving the collection and recycling of solid waste, composting, thus a large volume of wastes will be reduced. It also includes the closure and rehabilitation of open dumps. However, the implementation of this project could cause substantial environmental and social risks and impacts in many aspects particularly if sound mitigation measures are not implemented. The project will implement an approach that combines support for policy development, regulatory improvements, and demonstration of BATs/BEPs for open dumps in selected geographic areas. This will aid the implementation of solid waste management policy and legislation as well as capacity development at both the national and the local levels. It will improve the various levels of solid waste and UPOPs reduction in Lebanon, from waste collection, transport, and recovery, treatment, recycling, and disposal, along with rehabilitation of open dumpsites. It will also engage private waste management companies, municipalities, and citizen engagement and public information. The implementation of policies on waste and POPs management will contribute towards the reduction of the amount of waste that needs to be collected or landfilled. It will increase recovery and recycling and contribute to reduced pollution. The project would support Lebanon in its compliance to Stockholm Convention in reducing UPOPs emissions and abiding by its committed 2017 NIP POPs. The subprojects on demonstration on 3R practices and rehabilitation of dumpsites in selected geographic areas will improve performance of the waste disposal. The potential negative environmental impacts identified include dust, noise, wastewater, soil erosion, traffic interference, ordinary

ESS	Summary	Relevant	Commentary
			garbage, etc., as well as community health & safety, occupational health & safety. The main E&S impacts of the project come from the facilities' operation such as: odor, leachate, air pollutants, fire and explosion risk of biogas; storage and transportation of the recyclable waste processing centers; Pollutant leakage and remediation of contaminated land and groundwater bodies caused by closure operation of the dumpsites. These will have an impact on the environment, community health & safety and occupational health & safety. In view of the fact that the project includes a number of technical assistance and infrastructure construction subprojects, the specific details of which have not yet been determined, therefore the Environmental and Social Management Framework (ESMF) is prepared to formulate the principles, procedures and measures for the environmental and social impact assessment of specific subproject during the implementation period. The Environmental and Social Commitment Plan (ESCP) is developed to ensure that the project will be compliant with ESMF measures and actions during the project implementation. The Stakeholder Engagement Plan (SEP) is also prepared which will require the borrower to continuously carry out stakeholder participation and information disclosure activities at the early stage as well as the whole life cycle of the project.
ESS2: Labor and Working Conditions	The development of labor management procedures for all types of workers to be employed or engaged by the project will be required to ensure that labor standards are upheld, such as minimum benefits, termination agreements, principle of nondiscrimination and equal opportunity, minimum age of workers, occupational health and safety, grievance mechanism, and other labor management regulations set out by national law.	Relevant	During the implementation period, the project will involve direct workers, contracted workers, primary supplier workers and potentially community workers. Therefore, the requirements on working conditions, workers' rights, appeal mechanism, occupational health and safety in this standard will be applicable to the project. There are occupational health and safety risks and impacts that mainly come from the construction and operation stages of the project. These include: traffic safety, mechanical injury and falling during construction period; disease and falling during transfer station operation;

ESS	Summary	Relevant	Commentary
			mechanical and high temperature injuries, as well as hazardous and chemical materials production, storage and transportation during operation of recyclable waste processing centers; fire and explosion risk in open dupms; leakage of pollutants caused by the rehabilitation/restoration of dumpsites, as well as the risks and impacts on the operators' health and safety. There is also the risk of COVID-19 infection and transmission within communities. The ESMF includes a labor management procedure template to guide the development of corresponding management procedures and labor grievance mechanism in the preparation of specific subprojects.
ESS3: Resource Efficiency and Pollution Prevention and Management	The policy sets out the requirements related to the sustainable use of resources (i.e., energy, raw materials, water) and the prevention of short and long-term pollution (i.e., air, water, noise) and waste (i.e., hazardous, nonhazardous, and chemical) due to the project.	Relevant	The project will involve the processing of recyclable waste, which will require water consumption and energy consumption. It is recommended to adhere to the principle of cleaner production during the processing sections. As for facilities and dumpsites construction and rehabilitation subprojects, their construction and operation will produce wastewater, waste gas, solid waste and noise. These will also involve storage and transportation of household wastes, producing, storage and transportation of hazardous and chemical materials. The closure of old dumpsites will often involve the remediation of contaminated land and groundwater and other problems left over from the past. As per ESMF, the project shall put forward requirements on pollution management and resource conservation of its technical assistance activities and civil construction activities' environmental and social impact according to the World Bank's ESF, World Bank group's Environmental, Health and Safety Guidelines (EHSGs) and relevant Good International Industry Practice (GIIP). The relevant mitigation and management measures are described in the 'General management regulations' of this framework, and the corresponding documents of Environmental and social assessment report and Environmental and social management plan' of future subprojects.
ESS4:	The risks and impacts to health,	Relevant	Implementation of this project may create

ESS	Summary	Relevant	Commentary
Community Health and Safety	safety and security of the communities that may be affected by the project must be minimized. The potential risks and impacts across the project cycle must be evaluated. Furthermore, the circumstances of the vulnerable groups must not be further exacerbated by the impacts of the project. The project must adhere to the national standards related to building standards, traffic and road safety, ecosystem protection, health and safety and emergency preparedness, along with Environmental, Health, and Safety Guidelines and Good International Industry Practice.		health & safety impact on the surrounding communities. During the construction/rehabilitation process, the increased number of transport vehicles, temporary storage and transportation of household waste and hazardous substance, using, production, storage and transportation of chemical and hazardous materials, fire and explosion possibilities at the dumpsites, and the process of closure of the dumpsites can cause risks and impacts on residents' health and safety. The detailed impact analysis will be conducted in the environmental and social impact assessment of those specific subprojects. The detailed management measures will be covered in the corresponding management plan. Additionally, there are potential risks on (minor) labor influx, GBV and road safety during construction/rehabilitation phase. The sub-project's ESMPs will need to include mitigation measures on these. Stakeholder Engagement Plan (SEP) has been prepared for this project, which will continue to conduct consultation and ensure the participation of surrounding communities in the project implementation process.
ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	The risks and impacts related to the permanent or temporary physical and economic displacement of project-affected persons with or without formal, recognizable usage rights due to land acquisition and changes in land use brought about by the project shall be assessed and evaluated. The standard upholds the avoidance of involuntary resettlement, and for instances wherein it cannot be avoided, measures to minimize and mitigate the adverse impacts to the displaced shall be established. Feasible resettlement options shall be offered to the physically displaced wherein the resettlement areas allow living conditions that are at least equivalent or consistent with	Relevant	The ESS5 aims to avoid or minimize involuntary resettlement, to avoid forced evictions, and to mitigate the unavoidable and adverse social and economic impacts of land acquisition or land use restrictions in several ways. This also includes impacts on waste-pickers in case of access restriction to recyclables collection, livelihood restoration plans will be prepared. Yet the waste pickers could be involved in the new rehabilitated waste facilities and introduced 3R practices , hence creation of jobs and enhancement of livelihood conditions. This standard is not applicable to the technical assistance and to the subprojects, since the civil works activities will be conducted in existing waste facilities and dumpsites, unless new land acquisition is required, which is not foreseen in the project.. There is potential for land use restrictions to happen with

ESS	Summary	Relevant	Commentary
	established standards. These that are economically displaced shall be compensated according to the assets and other replacement costs that will allow them to restore and reestablish their livelihoods and income-earning capacity.		impact on livelihoods. An RPF shall be prepared to guide RAPs and LRPs as needed. For those activities involving the upgrading of existing sites, the site-specific Environmental and Social Impact Assessment and Management Plan shall be conducted to assess the legal compliance status and the possible remaining problems.
ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	The policy requires the identification and assessment of threats and potential impacts to biodiversity, and natural, critical, and modified habitats that may directly or indirectly be affected by the project. Baseline conditions have to be gathered to assess the extent of the risk and impacts identified. Once significant risks are found, a Biodiversity Management Plan will have to be developed and implemented.	Not Relevant	The waste facilities and dumpsites that the project will target already exit. Thus, the project activities will not modify habitats and have adverse impacts on biodiversity.
ESS7: Indigenous Peoples / Sub-Saharan African Historically Underserved Traditional Local Communities	An assessment of the nature and degree of the expected direct and indirect economic, social, cultural and cultural heritage, and environmental impacts of the project to indigenous peoples, including potential encroachment, transformation and degradation of their land and resources. Measures to avoid and mitigate short to long term impacts should be identified and developed in consultation with the affected indigenous peoples. Special action is required where Bank investments affect IP whose social and economic status restricts their capacity to assert their interests and rights in land and other productive resources.	Not Relevant	Not applicable to Lebanon
ESS8: Cultural Heritage	The risks and impacts to tangible and intangible cultural heritage, including legally protected cultural heritage areas, archaeological sites and material, built heritage, movable cultural heritage, natural features with cultural significance, are required to be identified and assessed. This includes possible changes in the physical environment, such	Not Relevant	The waste facilities and dumpsites that the project will target already exit. Thus, the project activities will not impact cultural heritage.

ESS	Summary	Relevant	Commentary
	as excavations, demolitions, movement of earth; proximity to protected area and their respective buffer zones; and proximity to recognized cultural heritage site. Avoidance of any adverse impact to cultural heritage should be upheld whenever possible. A Cultural Heritage Management Plan shall be developed upon identification of risks and impacts is not possible.		
ESS9: Financial intermediaries	Financial Intermediaries receiving financial support from the World Bank should monitor and management environmental and social risks of their portfolio, subprojects and financial products (i.e., project finance, corporate finance, medium and small enterprise finance, micro finance, housing finance, leasing, and trade finance).	Not Relevant	This standard is not applicable to this project as it does not include any involvement of financial intermediaries.
ESS10: Stakeholder Engagement and Information Disclosure	Engagement of stakeholders should be implemented across the project cycle. Consultations must be conducted to ensure that timely, relevant, understandable information are provided to project-affected parties and other parties involved. The process should include stakeholder identification and analysis; planning of engagement; disclosure of information; stakeholder consultation; addressing and responding to grievances; and reporting to stakeholders. Upon identification of individuals and groups identified, a Stakeholder Engagement Plan must be developed that will stipulate the plans for stakeholder engagement across the implementation timeline. The SEP shall detail how communication with stakeholders will be handled, and how potential obstacles to participation may be addressed. Consideration of vulnerabilities	Relevant	ESS10 requires the engagement of stakeholders at the early stage of the project and should be implemented across the project cycle. Consultations will be conducted to ensure that timely, relevant, understandable information are provided to project-affected parties and other parties involved. The process should include stakeholder identification and analysis; planning of engagement; disclosure of information; stakeholder consultation; addressing and responding to grievances; and reporting to stakeholders. Upon identification of individuals and groups identified, a Stakeholder Engagement Plan has been drafted, consulted and disclosed, that stipulates the plans for stakeholder engagement across the implementation timeline. The SEP will set out how communication with stakeholders will be handled, and how potential obstacles to participation may be addressed. Consideration of vulnerabilities of the stakeholders, such as waste pickers, must be taken into consideration in the engagement of these parties. Mitigation measures must be appropriate and aligned

ESS	Summary	Relevant	Commentary
	of the stakeholders must be taken into consideration in the engagement of these parties. Mitigation measures must be appropriate and aligned with the respective needs and concerns of the stakeholders.		with the respective needs and concerns of the stakeholders. Grievances will be managed under the SEP's GRM.

Source: World Bank (2017)