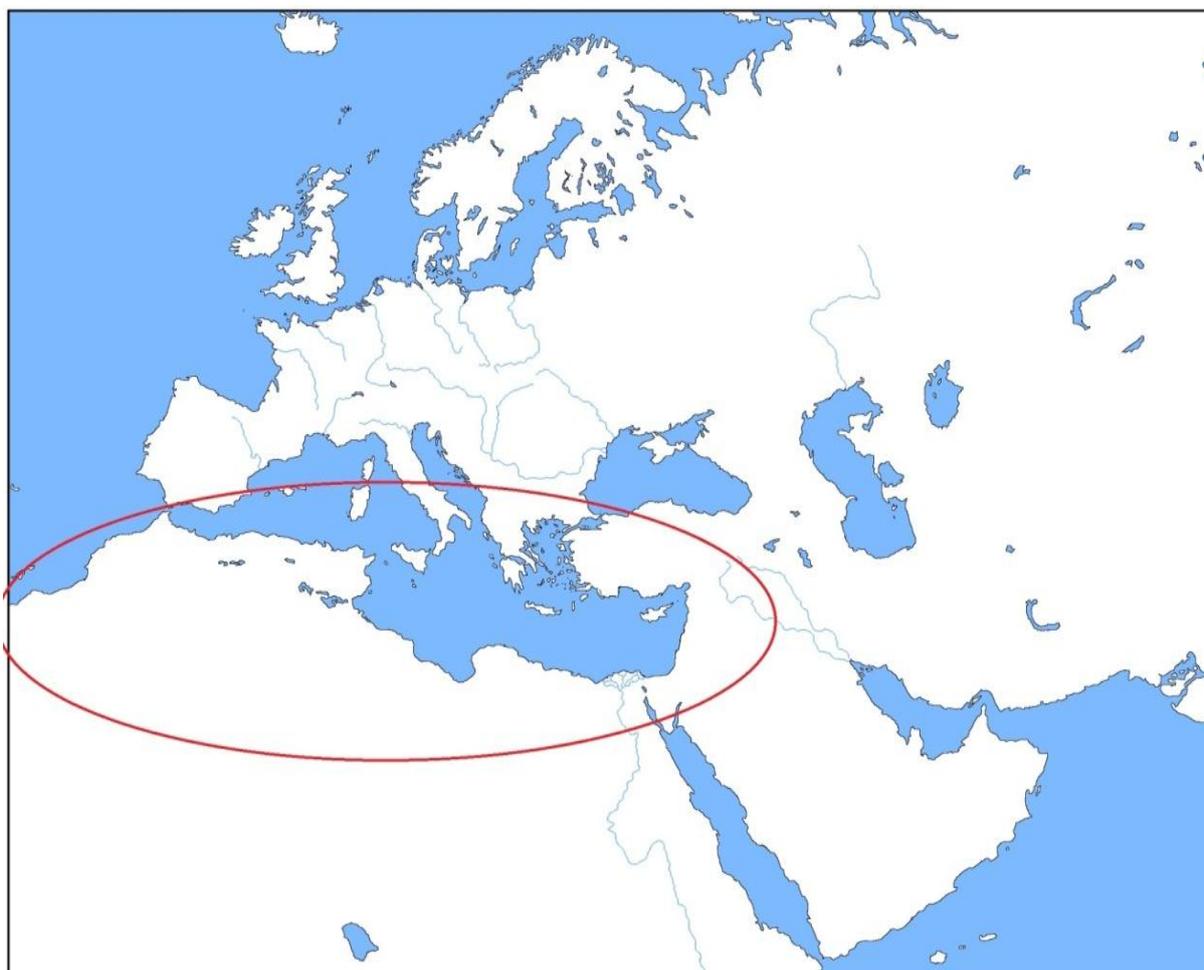


**EUROPEAN NEIGHBOURHOOD AND PARTNERSHIP INSTRUMENT  
Towards a Shared Environmental System « SEIS »**

**LEBANON COUNTRY REPORT**



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## LIST OF ACRONYMS

MoE	Ministry of Environment
AQMS	Air Quality Monitoring System
AQRU	Air Quality Research Unit
AUB	American University of Beirut
CAS	Central Administration of Statistics
CDR	Council for Development and Reconstruction
CNRS	National Council for Scientific Research
CoM	Council of Ministers
DEWA	Division of Early Warning
EIA	Environmental Impact Assessment
ENPI	European Neighbourhood and Partnership Instrument
EU	European Union
GHG	Green House Gas
GoL	Government of Lebanon
HCWM	Health Care Waste Management
HS	Harmonized System
LEDO	Lebanese Environment and Development Observatory
LRA	Litani River Authority
METAP	Mediterranean Environmental Technical Assistance Programme
MoEW	Ministry of Energy and Water
MoF	Ministry of Finance
MoI	Ministry of Industry
MoIM	Ministry of Interior and Municipalities
MoPH	Ministry of Public Health
MoPWT	Ministry of Public Works and Transport
NFP	National Focal Point
OMSAR	Office of the Minister of State for Administrative Reforms
PRTR	Pollutant Release and Transfer Register
SEA	Strategic Environmental Assessment
SEEAW	System of Environmental-Economic Accounting for Water
SEIS	Shared Environmental Information System
SELDAS	Strengthening The Environmental Legislation Development Application System In Lebanon
SOER	State and Trends of the Lebanese Environment
SWM	Solid Waste Management
TEDO	Tripoli Environmental and Development Observatory
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development
USJ	Université Saint Joseph
WWTP	Wastewater Treatment Plants

## **EXECUTIVE SUMMARY**

This report has been developed within the framework of the ENPI SEIS project which aims at supporting the partner countries in gradually developing or extending their national environmental information systems in line with the SEIS principles in terms of content, infrastructure, and institutional cooperation. This project is managed by the European Environment Agency and is being implemented over the period from September 2010 to September 2014.

As defined by the representatives of ENPI South region countries in the Brussels consultation meeting in November 2010, four (4) thematic areas were acknowledged to be priority sectors - namely in terms of improved environmental information and understanding - and by Lebanon as being environmental priorities, which are water (fresh and marine waters), waste management, wastewater and industrial emissions.

The Country Report comes after a country visit to Lebanon in October 2011 and is considered as a first step in the implementation of the SEIS project and as an evaluation of the current information network. It is meant to highlight the current situation in Lebanon through the identification of players, available information, and infrastructure. This report also presents an outlook on foreseen plans to improve current information collection modalities and for sharing practices among institutions.

Chapter 1 covers Inter-institutional cooperation describing the main stakeholders dealing with the environmental data and the linkage between them. Chapter 2 focuses on content and describes available data flows and available environmental indicators. This chapter also describes data collection steps and data processing, where available. Chapter 3 describes the available infrastructure, i.e. the different available monitoring systems.

Chapter 4 presents the drawbacks and limitations for implementing the different recommendations of the workshop and for SEIS in general and a number of activities to be undertaken based on the fact that environmental data are basically available, but mechanisms to share them are missing.

The last chapter is dedicated to follow up steps for the implementation of the ENPI-SEIS project in Lebanon in particular 1) informing and engaging executives in the SEIS process, 2) mapping of information 3) development of complete Water Accounts

It is worth noting that the establishment of an operational Pollutant Release and Transfer Register (PRTR) and the regular updating of water accounts have been identified as priorities in the case of Lebanon. Nonetheless, such activity is considered precarious in the absence of the required legal framework needed for the implementation of the PRTR.

## I INTER-INSTITUTIONAL COOPERATION

### I.1 ENVIRONMENTAL INSTITUTIONS AND PLAYERS

Lebanon is a small and mountainous country in Western Asia located on the eastern edge of the Mediterranean Sea, covering an area of only 10,452 km<sup>2</sup>. It contains 210 km of coast line along the Mediterranean Sea. The physiographic regions consist of fertile coastal plains, the Lebanon western mountain range, the Bekaa valley (Lebanon's chief Agricultural area) & the Lebanon eastern mountain range. Lebanon contains many rivers and streams, most of which having their origin in springs. The climate is generally Mediterranean with hot dry summers and cold rainy winters. Average annual rainfall is estimated at 840 mm, most participations fall between November and March. The highest mountain peaks are covered with snow for most of the year. The estimated population in 2009 was 3875000; the population density in Lebanon is considered high (about 400 persons/ km<sup>2</sup>); 80 percent of the Lebanese population lives in urban areas.

Environmental priority issues in Lebanon can be summarized as follows:

- Continuous monitoring of air and water quality
- Groundwater depletion, seawater intrusion in coastal areas
- Groundwater pollution (e.g. wastewater, pesticides, industrial effluents, leaking underground storage tanks)
- Rate and impact of soil erosion on ecosystem health and productivity
- Deforestation
- Coastal and marine environment/pollution
- Radioactive waste, hazardous waste and medical waste
- Urbanization

Lebanon has seen a qualitative and quantitative growth in environmental institutions. The section below presents a general overview of key environmental institutions and organizations in the country, focusing on the legislative body, the executive body, and the judiciary system. These institutions are the main entities working on the collecting of data and the producing of related analysis on the priority areas.

#### **The Ministry of Environment - [www.moe.gov.lb](http://www.moe.gov.lb)**

The Ministry of Environment (MoE) was established by Law 216/1993. It is the second youngest<sup>1</sup> ministry in Lebanon. Initially based in a small alley in Antelias north of Beirut, the ministry was relocated to the heart of the capital in December 2004 where it is currently based. The mandate of the MoE was amended by Law 690/2005 and the long-awaited restructuring of the ministry was enacted four years later by Decree 2275 (dated 15/06/2009). This decree defines the function and responsibilities of each unit including staff size and qualifications. A detailed organizational structure according to Law 690/2005 and

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<sup>1</sup> The youngest ministry in Lebanon is the MoI (established in 1997).

Decree 2275/2009 is presented in Figure 1. The ministry prepared a work plan for the period 2010-2012 in line with the government declaration and with a focus on multilateral environmental agreements ratified by the Government of Lebanon (GoL). The work plan is a prelude to updating the National Environmental Action Plan which was prepared in 2005-2006 but was never officially endorsed. The mission of the Ministry is to combat pollution and natural resources degradation and to set conditions and standards for allowable limits of emissions, waste water discharge, and the use of pesticides on agricultural land. Unfortunately, the vision of the ministry remains fragmented, with limited integration of waste management plans and lack of integrated work on trends in industry, agriculture and land use.

In the absence of any direct environmental law, environmental matters used to be addressed indirectly by different legislations and various systems in different sectors. On 2 April 1993, the law 216/93 was adopted and it was a pioneering step in the administration of environmental protection and conservation of natural resources, enabling Lebanon's participation in global environmental conventions.

On July 26 2002, the Lebanese parliament approved the environmental protection act (law no. 444) which set the basic principles and general provisions to regulate environmental protection and participation in terms of management, preservation and maintenance of environmental media (resources), to assess the effects of projects on the environment, and which also defined the responsibilities and the penalties imposed on those who abuse the resources or cause environmental damage or pollution.

Since then, a number of long awaited legislative texts have been endorsed by the CoM, the latest being:

- The Environmental Impact Assessment (EIA) decree,
- The draft law on the environmental public prosecution,
- The draft law on protected areas,
- The draft law on integrated solid waste management,
- The draft law on the protection of air quality,
- The Strategic Environmental Assessment (SEA) decree,
- The decree for Environmental Compliance for Establishments, and
- The National Council for the Environment decree

The above laws were transferred to the Parliamentary committees for endorsement, yet the decrees will soon be in force after being published in the National Gazette.

### **The Central Administration of Statistics (CAS) [www.cas.gov.lb](http://www.cas.gov.lb)**

The Central Administration of Statistics (CAS) is a public administration within the Presidency of the Council of Ministers (CoM). It is organized according to Decree 1793/79 and Decree 2728/80 and today boasts 100 full-time employees. CAS collects data from many sources in Lebanon including ministries, institutions, ports, airports, etc. but also generates data on a number of environmental, socio-economic chapters. Under the UN Fundamental Principles of Official Statistics and the EU Statistics Code of Practice, the institution produces data and indicators on:

- 1) Social (residents in Lebanon, households, employment rate, etc.),

2)Economic (industrial foreign trade including imports and exports, sea transport: loaded/unloaded cargo, air transport: total landings, public finance: total internal and external VAT collection amounts, etc.), and

3)Environmental (water resources, rainfall series, forest fires, etc.) statistics at the national level.

The CAS has conducted several national censuses over the past years to collect baseline data on buildings and establishments, education and health. The results are published in CAS reports; interested stakeholder groups or individuals require special authorization to obtain these reports and other CAS bulletins. Some of the data is aggregated and posted on the CAS website.

### **Other Committees and Intergovernmental Agencies**

The MoE and the Parliamentarian Committee for Environment deal with many other agencies, some of which have a dedicated environmental unit. Among many, examples include the Council for Development and Reconstruction (Department of Land Use Planning and Environment) and the Ministry of Public Works and Transport (Directorate General of Roads and Buildings / Department of Environment and Traffic). Additionally, the MoE is a member of several intergovernmental agencies such as the Higher Council of Urban Planning (member), the National Council for Quarries (chaired by MoE), and the Higher Council for Hunting (also chaired by MoE), the Lebanese Standards and Norms Organization Institute (LIBNOR). These councils are mentioned in relevant sections of the 2010 State and Trends of the Lebanese Environment (SOER). Equally important, Lebanon has so-called regional Industrial Permitting Committees (including the Ministry of Industry Mol, Ministry of Environment MoE, Ministry of Public Health MoPH, and the Ministry of Public Works and Transportation MoPWT Urban Planning) and Health Councils at the Mohafaza level.

The Health Councils comprise the Governor as well as representatives from the ministries of Environment, Public Health, Industry, and Urban Planning. At the syndicate level, the Order of Engineers and Architects, the Syndicate of Lawyers, Syndicates of Doctors, and Chambers of Commerce have dedicated environmental committees. Collectively, these councils and committees help mainstream the environment in all sectors of the economy but are not involved (unless in exceptional cases) in any kind of data collection.

The National Council for Scientific Research (CNRS) is an autonomous public institution reporting directly to the President of the CoM. It was established in 1962 and assigned with the task of formulating national science and technology policy, initiating, guiding, supporting and conducting scientific research programmes and activities in Lebanon. It advises the Government on all science and technology issues. The CNRS conducts research through its specialized centers and supports research projects having an impact on the socio-economic development of the country. The CNRS conducts a number of studies on marine sciences, land cover and land use in the country, environment, in collaboration with the different concerned ministries.

Lebanon has two (2) political parties dedicated to the environment: The Green Party of Lebanon was established in 2004 (who prepared a first draft of the Environmental Prosecution law), followed by the Lebanese Environmental Party in 2005. In addition, more than 150 national NGOs are performing small jobs or environmental campaigns all over the country.

Furthermore, and in response to recurrent national and international disasters, the GoL established the National Emergency Response Committee (NERC) (CoM Decision 103/2010 dated 29/11/2010 amended by CoM Decision 104/2010 dated 13/12/2010). The committee comprises 22 members representing the Ministry of National Defense, MoIM, MoPH, MoPWT, Ministry of Post and Telecommunications (MPT), MoE, MoEW, Ministry of Education and Higher Education (MEHE), and the Ministry of Information as well as the Civil Defense and the Lebanese Red Cross.

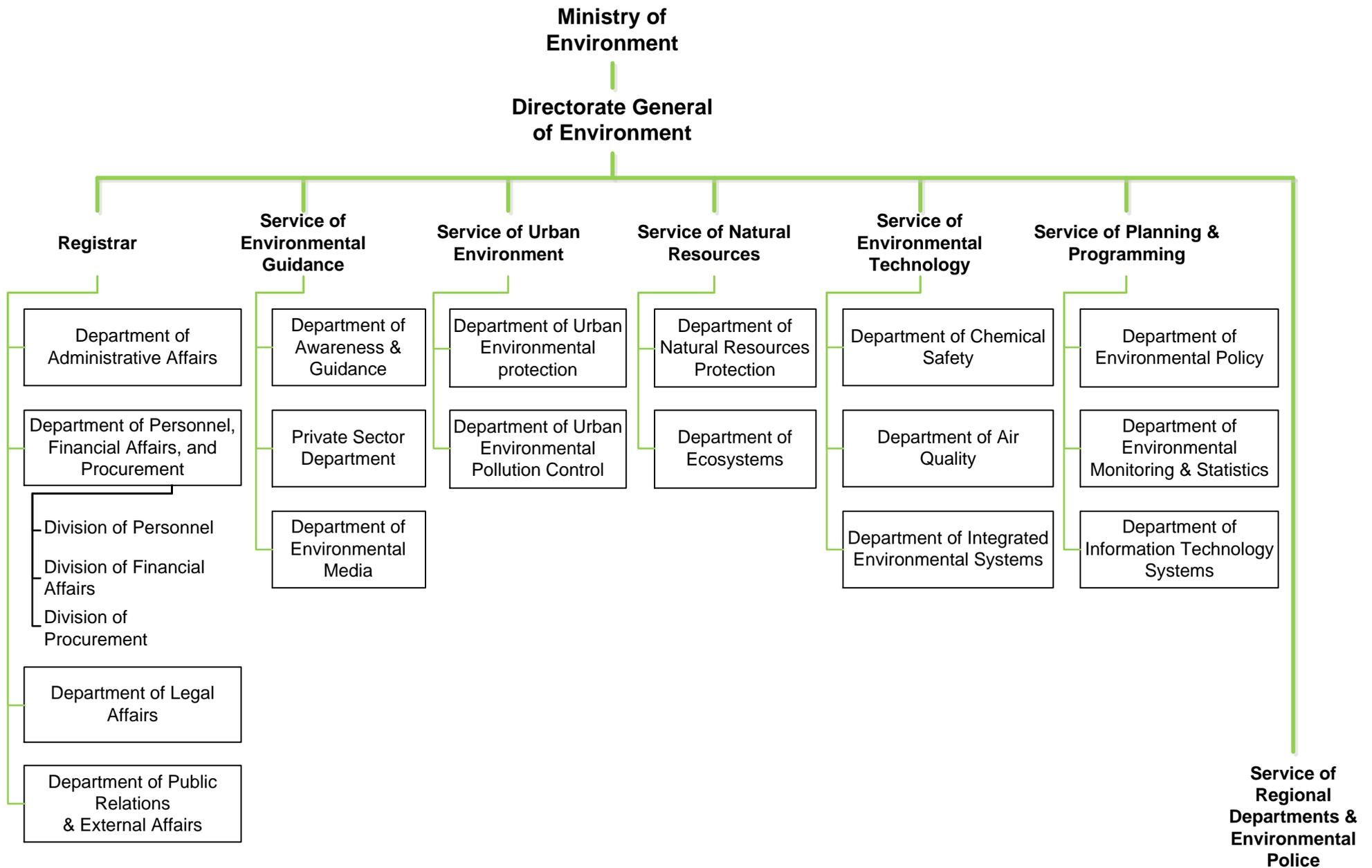


Figure 1 - Organizational chart of the MoE as per Law 690/2005 and Decree 2275/2009

## **I.1.2 INTER-INSTITUTIONAL COOPERATION: STATE OF PLAY**

Despite the presence of active and technically able institutions, streamlining environmental priorities and actions towards an improved understanding of environmental quality and its impacts remains a complex and somehow difficult process. Institutional cooperation is often-when it exists- based on ad-hoc requests only and upheld during projects. Environmental information is reported to be poorly consolidated as research institutions and/or government agencies appear to collect data for their own use, if at all. Data, when available, is often discontinued in place and in time, leaving major information gaps with respect to other aspects, and the fact remains that the information available is seldom consolidated for the purpose of establishing national databases.

On some priority issues such as in the case of water monitoring, inter-institutional cooperation appears to be more active than on other priorities, probably due to their importance and the shared responsibilities among institutions.

The MoE struggles to obtain data and information from other institutions. Much of the information is not public per se. The MoE and/or users can submit a formal request to public institutions to obtain the desired information but procedures to grant access may take several weeks or months, sometimes due to the lack of human resources to reply to such requests or due to the unavailability of the data in some cases.

In the case of the MoE and in its efforts to increase its internal capabilities, the ministry has recruited new members and is attempting to open regional offices in the different mouhafazat (regional districts). Yet, the number of human resources at the ministry is still much smaller than what is specified in the organizational decree of the ministry. This is particularly problematic when following up on filed environmental complaints where a primitive paper-based system of record-keeping does not allow for efficient follow-up.

Therefore, unless a reliable and automated information system is put in place and shared among the different institutions, the collection and sharing of environmental data will remain a limited and cumbersome process,

The section below will present an overview of the interactions among institutions on the priority areas identified for the ENPI South countries, in addition to presenting the case of air quality given its high priority at national level.

### **I.1.1 WATER (FRESH AND MARINE)**

The monitoring of water (fresh and marine) is under the joint jurisdiction of the MoEW and the MoE.

Whereas the MoE is responsible for putting in place strategies for the protection and sustainable use of water resources and implementing measures preventing the pollution from human activity, the MoEW, through the regional water authorities, is in charge of its distribution, regulating consumption, and management of fresh water resources.

Nevertheless, a number of international agencies are currently working on the sector of fresh water under bilateral and multi-lateral projects to support the different public institutions in

improving their operations. Nevertheless, to this day efforts are concentrating on the production of quantitative data which remains decentralized, despite the regular coordination among stakeholders. One should mention that the Economic and Social Commission for Western Asia (ESCWA) is currently implementing the System of Environmental-Economic Accounting for Water (SEEAW) in 14 countries with pilot projects in each of Bahrain, Jordan, Egypt, and Lebanon on supply and use tables.

The coordination among stakeholders in the water sector, as in the case of other priority environmental issues, is very limited. Following up on water quality issues is done on an as-needed basis and information accessed only upon official requests to concerned data holders.

### **I.1.2 SOLID WASTE MANAGEMENT**

The management of solid waste in Lebanon testifies perhaps to the best case of institutional cooperation that exists in matters related to data collection and perhaps data reporting. Indeed, solid waste management has been recognized as an environmental priority and a number of institutions are involved in the planning and management of waste.

Key players are the MoE, CDR, MoIM, MoF, OMSAR, and MoPH.

The MoE coordinates, with the different ministries and public institutions, the planning and management of solid waste management (SWM). Furthermore, and under international assistance programmes such as the EU funded programme implemented by OMSAR, the MoE also supervises solid waste services in rural areas of the country.

With respect to matters related to hazardous waste, the Stockholm convention was ratified by the Lebanese government in 2003, which resulted, one year later, in the adoption of Decree 13389 making healthcare waste classification and disposal based on four categories, namely non-hazardous municipal-like, hazardous infectious, hazardous non-infectious and special wastes, mandatory. Two related circulars were elaborated subsequently and communicated with concerned stakeholders, namely MoPH, MoIM, healthcare facilities and concerned syndicates, to ensure compliance with the latter Decree. Recently, a meeting was held between the MoE and MoPH to discuss possible areas of coordination to improve compliance with Decree 13389. A major outcome of this meeting was represented by filing around 80 law suits, by the MoE, against hospitals found incompliant with Decree 13389, and work is in process to bring to court incompliant public hospitals. With the same objective, and under the scope of a GEF funded project, the MoE is working in partnership with two hospitals to demonstrate best practices in the field of healthcare waste management and developing training material for capacity building in this respect. These activities are carried out and closely followed up by a national steering committee consisting of representatives from different governmental agencies, syndicates, WHO, healthcare facilities, NGOs etc.

Further work is being done, at the national level, under the umbrella of the Stockholm convention, on the phasing out PCBs from the energy sector. With this objective, the "Électricité Du Liban" has compiled an inventory, at the national level, of all PCBs containing transformers and capacitors whether in use or in storage as obsolete equipment. Negotiations are in progress between the latter agency and the MoE to replace remaining PCB containing equipment in use, namely located in the Jiyeh power plant, and eventually exporting these PCBs as well as stored ones for disposal abroad under the Basel Convention's requirements.

### **I.1.3 INDUSTRIAL EMISSIONS**

Industrial activity is regulated by the MoI. Nevertheless, control and monitoring of environmental impacts of industries is under the jurisdiction of the MoE. Consequently, industrial permitting is subject to the approval of a committee holding experts from the MoI, MoE and other relevant institutions (depending on the type of project) who will be deciding on the compliance of the industry with a number of environmental and non-environmental conditions.

The MoI also undertakes industrial censuses and studies on the different sectors of activity. The MoE has recently engaged in discussions with the MoI in order to include in the periodic industrial surveys environmental indicators in order to optimize the resources and gather data judged relevant for the assessment of environmental impacts of the industrial sector (wastewater effluents, solid waste, air emissions, etc.), on a qualitative and quantitative level. Such coordination would allow the MoE to update and validate its GHG emission inventory and bridge the gaps & reduce the uncertainties encountered in the previous inventory.

Nevertheless, in the absence of an official endorsement of such coordination, the efficiency of data collection and data sharing is yet to be ensured.

## II CONTENT

National reporting obligations: There are no national reporting obligations in Lebanon but the national law and legislation gives the institutions the mandate to monitor and protect the environment.

### II.1 NATIONAL LAWS AND LEGISLATIONS

While government agencies including the Lebanese Parliament and the CoM prepare and release a battery of laws and regulations, some draft texts may require many years before their enactment (e.g. EIA decree) while others are enacted in record time (e.g. health care waste decree). Upstream policy formulation is often complicated given the needed coordination with the different concerned public bodies. Frequent cabinet reshuffling further delays and jeopardizes policy making as new governments and ministers tend to overlook previous policies, or policies still in the making, and engage with new studies.

This stop-and-go approach has indisputably also affected the state of environmental affairs in the country.

As highlighted during the meetings that were held, a major challenge for the MoE is the lack of human and financial resources at the disposal of the ministry. High employee turnover has been reported, given the low remuneration and limited opportunities in the Ministry. Moreover, the MoE budget is estimated to be 0.05% only of the general governmental budget.

The main challenge with respect to environmental legislation is mainly the fact that the legislative texts are partly outdated (e.g. in some cases dating back to 1932). Additionally, weak monitoring and inspection mechanisms, lack of financial and human resources as well as a limited awareness among policy makers and the public of the importance of environmental issues have been identified as problems aggravating the weak legislative framework in Lebanon.

The sections below present an overview of environmental legislation in relation to environmental priorities:

#### II.1.1 ENVIRONMENT LAW 444/2002

Approved by parliament in 2002, the law is an overarching legal instrument for environmental protection and management. It defines 11 environmental principles. The environmental principles according to Article 4 of Law 444/2002 are as follows:

1. Precaution (cleaner production techniques),
2. Prevention (best available technologies),
3. Polluter-Pays Principle (polluters pay for pollution prevention and control),
4. Biodiversity conservation (in all economic activities),
5. Prevention of natural resources degradation,
- 6. Public participation (free access to information and disclosure),**

- 7.Cooperation between central government, local authorities, and citizens,**
- 8.Recognition of local behavior and customs in rural areas,
- 9.Environmental monitoring (pollution sources and pollution abatement systems),
- 10.Economic incentives to encourage compliance and pollution control,
- 11.EIA process to control and mitigate environmental degradation,

Like most laws, Environment Law 444/2002 requires application decrees, some of which are complex and have stirred a protracted political debate. In total, Law 444/2002 needs at least 36 application decrees to achieve full implementation.

The SEDLAS project, whose goal was the Strengthening the Environmental Legislation, Development & Application System in Lebanon (SELDAS), identified gaps and overlaps in environmental legislation; assessed the implementation status of existing legislation and built capacities of institutions involved in legislation. It helped raise awareness about environmental legislation development, application and liability, and promoted environmental law education at several universities.

### **II.1.2 WATER: LAW 221 AND 241/2000**

This Law reorganized Lebanon's 21 water authorities and over 200 local water committees into four new Water Establishments plus the Litani River Authority (LRA). In 2005, the CoM enacted four decrees (14596, 14602, 14600 and 14598), defining the mandate and by-laws of each water establishment, including personnel size and structure. Although little has been achieved to date insofar as incorporating the local water committees into the new water establishments is concerned, this development marks an important paradigm shift in Lebanon's handling of the water sector and will eventually improve service delivery and the protection of water resources.

### **II.1.3 AIR QUALITY: DECISION 8/1 DATED 30 JANUARY 2001**

Decision 8/1 defines environmental limit values for stack emissions and effluent discharges from classified establishments, wastewater treatment plants, and hospitals. The decision disaggregates stack emission limit values by industrial sector (e.g. power plants and generators, cement, glass, aluminum, batteries, agro-foods, and incineration) and sets out rules for new and existing burnt forests to prevent future acts of arson. In the last decade, Lebanon has witnessed a spate of forest fires that reached devastating proportions in 2007. Concomitantly with the preparation of needed forest fire fighting strategies and action plans, Parliament approved the law in the hope that it would deter some arsonists from burning forests to harvest fuel wood or alter land uses. This decision does not tackle reporting requirements relating to compliance to air quality standards.

The Air Quality Law (Clean Air act) was approved by the CoM early in 2012 and is currently part of a batch of legal texts being reviewed by the parliamentary committees.

#### II.1.4 LAND RESOURCES: DECREE 2366/2009

The decree approved the National Land Use Master Plan that was prepared during 2002-2004. This master plan is Lebanon's first attempt to unify and organize land use holistically, while respecting basic premises including decentralization, economic growth, and environmental protection. Land use planning is very complex, and impacted by century-old legislation and mores. Realigning Lebanon's regional master plans, even partially, will require many years of hard work and, more importantly, goodwill and appreciation of the public good.

#### II.1.5 SOLID WASTE: DECREE 8006/2002

This decree was amended by Decree 13389/2004 which categorized hospital waste and set guidelines for health care waste management. The decrees have unequivocally improved Healthcare Waste Management (HCWM) services and increased awareness of the topic.

The Solid Waste Management Law was approved by the CoM early in 2012 and is currently part of a batch of legal texts being reviewed by the parliamentary committees.

At present Lebanon lacks an obligatory legally binding system for environmental information flow management. No procedures for environmental data sharing and information exchange among state agencies exist in the country.

### II.2 INTERNATIONAL CONVENTIONS

Lebanon has acceded to and ratified more than a dozen conventions and treaties related to the environment (e.g. including UNFCCC). Ratification of these conventions has also secured Lebanon millions of dollars in funding from international donors, including multilateral funding instruments (Global Environment Facility, Multilateral Fund under the Montreal Protocol, MAP) and bilateral donors (AFD, FFEM, USAID, Italian Cooperation, Spanish AECID, Canadian Trust fund (CTF), Hellenic Aid of the Government of Greece, etc.). However, not all reporting obligations related to international conventions and treaties have been fulfilled by Lebanon so far.

The table below indicates to which international conventions and agreements Lebanon is a party:

Convention	Date ratification/ Adhesion	Reporting obligation	Next report due on
The Ramsar Convention on the preservation of wetlands	Adhesion Law no: 23 1/3/1999		
Amendments to Barcelona Convention	Adhesion Law No.34 16/10/2008		
The Convention on Biological Diversity	Ratification/ Law No.360 11/8/1994		
The Cartagena Protocol on	Adhesion Law	Each 2 years	2012

Biosafety	No.31 16/10/2008			
The Vienna Convention and Montreal Protocol to protect the ozone layer.	Adhesion/ No.253 31/3/1993	Law	Each year before 30 Sept	
The United Nations Framework Convention on Climate Change	Ratification/Law No.359 11/8/1994		Each 2 years	2016
The Kyoto Protocol on climate change	Adhesion No.738 15/5/2006	/Law -		
The Basel Convention on the Control of Hazardous Wastes and their transfer across the border	Ratification No.387 21/12/1994	/Law		
The United Nations Convention to Combat Desertification	Ratification/Law No.469			
The Rotterdam Convention on the prior approval of the transfer of hazardous chemicals	Adhesion No.728 15/5/2006	Law		
The Stockholm Convention on Persistent Organic Pollutants	Signature and adhesion Law 432 08/08/2002			

Although ratification of Basel and Stockholm conventions is expected to be a sign of commitment to the latter conventions, Lebanon is far behind with respect to the relevant reporting requirements.

## DATA AND INDICATORS

### 1.AVAILABILITY AND ACCESS TO DATA AND INFORMATION

The availability of environmental data is key when attempting to make sure that sound policies and programmes are put in place. Data collection and research are often guided by institutions' agendas and the type of information needed internally. Today, and despite these isolated initiatives, public and academic/research institutions generate a substantial amount of data. Unfortunately, data collected is often unpublished, which results in duplications of efforts at the collection and generation levels in the absence of appropriate sharing processes and dissemination activities.

In the SOER 2010, the MoE highlighted the main gaps in order to guide the concerned researchers and scientific institutes towards projects such as the development of a database on environmental monitoring, namely on air quality (in particular emissions) and water (surface, groundwater and marine) in order to bridge these gaps.

Most of the environmental data produced in Lebanon is designed to support planning and investment projects. A lot of this data are being generated by donor-funded projects, such as environmental labs, observatories and research projects. Private sector firms under contract with government agencies have also produced several data groups (ECODIT has cooperated with a LEDO project hosted at MoE in 2002 to develop the **State of Environment Report SOER** in 2002 and **State and Trends of the Lebanese Environment Report** in 2010).

The **Lebanese Environment and Development Observatory** (LEDO) project was a project funded by the EC Life Third Countries Programme and hosted at the MoE who envisioned that within two years (project duration), the observatory would become part of the Ministry's new organizational structure. LEDO funding ended in 2002 and the staff working on the project was dismissed, jeopardizing its sustainability. Among project deliverables was the set-up of a permanent observatory through forming a multi-disciplinary steering committee, and identifying about 90 environmental and development indicators grouped into four categories and 14 themes. The project also initiated the compilation of baseline information in support of these indicators. The sustainability of LEDO and its usefulness depend on improving data sharing and dissemination mechanisms among the different stakeholders, improving data quality and its reliability. The mobilization of human and financial resources is also key when attempting to make the LEDO a centralized source of environmental information and indicators.

On the other hand, the **Tripoli Environment and Development Observatory** (TEDO) was established in 1999 with grant funding from the Mediterranean Environmental Technical Assistance Programme (METAP). The observatory is hosted at and operated by the Federation of Municipalities of Al Fayhaa, located in North Lebanon. The federation consists of three municipalities (Tripoli, El Mina and Beddawi) covering an urban community of about 300,000 inhabitants. The observatory was initially a project, under contract with the

federation. In December 2004, the CoM formally approved a proposal to incorporate the observatory (i.e. office and staff) into the organizational structure of the federation. This milestone approval will institutionalize the observatory by making it part of the federation, per se rather than an ad-hoc unit. The observatory is currently generating all types of environmental data such as on wastewater, solid waste and air pollution.

## **2 ENVIRONMENTAL INDICATORS**

The MoE has a list of indicators which are periodically updated and reviewed by the department of environmental monitoring and statistics, in order to be published on its newly designed website.

A total of 90 indicators have been devised for Lebanon; these indicators are divided into 4 categories:

- Population: 30 indicators
- Economic Activity: 17 indicators
- Environment: 30 indicators
- Sustainable Development Activities: 13 indicators

Lebanon also participated in the data working group meetings organized within the initiative of the Arab league and UNEP Asia Division of Early Warning and Assessment– (DEWA). The countries participating in this working group agreed on 86 environmental and sustainable development indicators and on reporting on the progress in implementing these indicators.

Lebanon also participated in the data working group meetings organized within the initiative of Blue Plan/ MAP which agreed upon 34 indicators.

## **3 MARINE AND FRESH WATER DATA**

### **3.1 MARINE WATER QUALITY AND RESOURCES**

Regular reporting under the Barcelona Convention exists. 10% of the Lebanese coast has to be declared as marine protected area by 2020. The combination of the fish data with other data sets (e.g. water quality) was considered to be important by several participants.

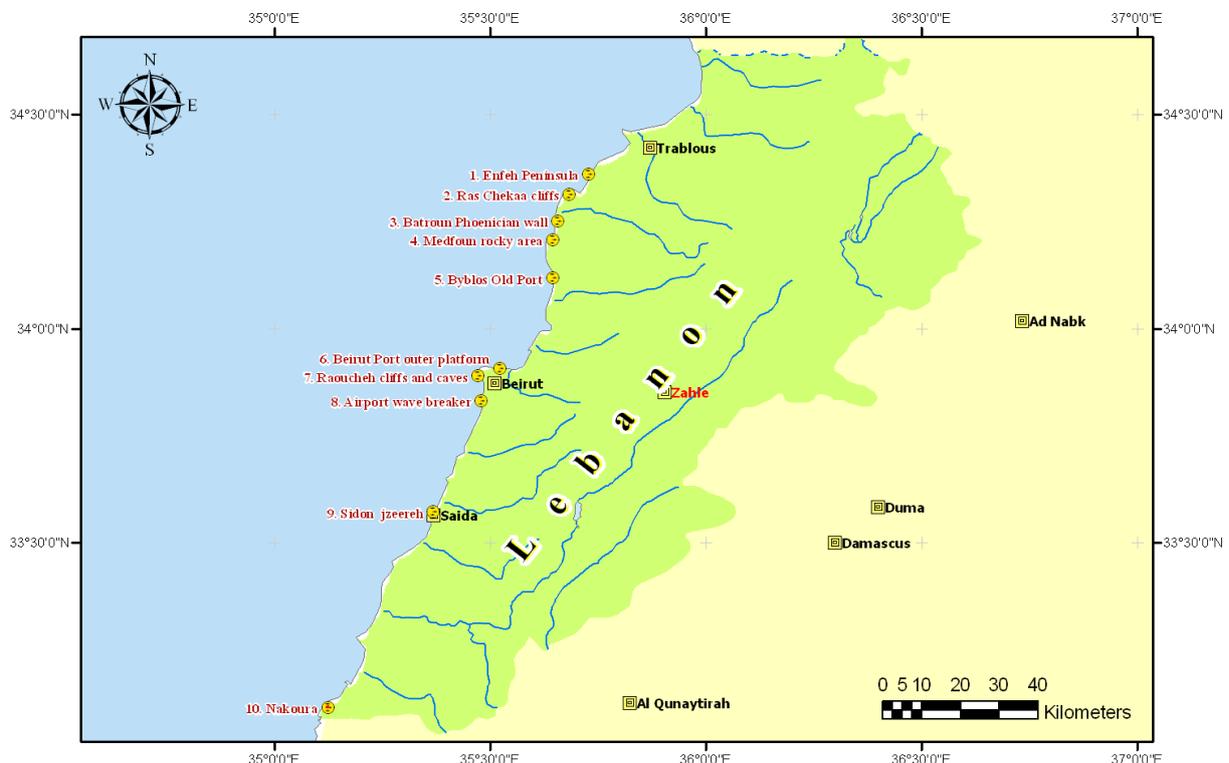
The Lebanese coast is heavily populated and lots of industries are discharging their effluents into the sea. Thus, protection of marine habitats is very important to keep the last spots free from buildings and economic activities. Under the “Supporting the Management of Important Marine Habitats and Species in Lebanon”, a project implemented by the Ministry of Environment, a number of activities support the development of a network of Marine Protected Areas (MPAs) in Lebanon and an associated monitoring programme to evaluate management effectiveness.

A number of indicators were developed in order to track the health of marine ecosystems, namely:

- Fisheries indicators:
  - Percentage of overfished stocks of commercial importance.
  - Fish catches by major species and area.
- Biodiversity indicators:
  - Species & Habitats: Trends in abundance & distribution of selected species (UNCED/CBD – proposed).
  - Community Structure: Seabird population trends as an index of seabird community health.

The monitoring of sea water along the coast is also undertaken by the National Center for Marine Sciences (NCMS) of Lebanon that maintains a research vessel and conducts regular monitoring activities on water quality and marine biodiversity at multiple locations along the Lebanese coast (up to 25 locations representing the different geomorphological states found at the coast). The water is tested for standard bacteriological and physical-chemical parameters monthly, such as fecal coliforms content, phosphates and nitrates. Also, with a bi-annual frequency, fish and sediments are tested.

There is no mechanism for data sharing among public institutions nor is the data accessible. Such data is communicated to interested parties upon specific requests.



**Future marine protected areas in Lebanon**

Cities
  Future\_MPA

## **3.2 FRESH WATER DATA**

Under Law No. 221/2000, several institutions are in charge of water-related issues. The MoEW implements water policy and extends and monitors the implementation of hydraulic projects. It applies laws regarding the protection of public water and its use and oversees operation of water and wastewater establishments.

The water establishments are financially and administratively autonomous. In the absence of metering, data relating to their operations (distribution, losses, etc.) are based on estimations. Information on connection rates is available.

Surface water quality data are available from sporadic sampling activities conducted by various institutions. Such data highlight spatial variations but do not account for temporal variations. Temporal variations in river quality would require continuous sampling and monitoring events, something Lebanon does not have.

The LRA is the only water authority to retain special responsibilities and functions that extend beyond its administrative region (the natural boundaries of the Litani Basin). It is responsible for developing and managing irrigation water and associated works in southern Bekaa and South Lebanon. It is also in charge of measuring surface water along the Lebanese territory.

Water quantity data has been available since 1938 on up to 20 locations on the upper river basin and 6 locations on the lower river basin. As for water quality data, monthly water samples have been taken and analyzed since 2007 for standard bacteriological and physical-chemical parameters, namely: TDS, pH, nitrates, phosphate, cadmium and fecal coliforms.

Data on groundwater quality is fragmented and only produced through EIA and singled-out studies. Nevertheless, the MoPH monitors and controls regularly potable water quality.

Weather-related data including precipitation data can be obtained from the Meteorological Service of Civil Aviation of the MoPWT, but the release of the data is subject to fees, even when requested by public institutions or ministries.

## **2.WASTE MANAGEMENT**

Waste incineration for municipal waste is considered as worth pursuing, however, a waste incineration plant does not exist so far.

There is no legal reporting system concerning the waste generation or waste collection facilities in place. Some of the private sector companies provide periodic reports, next to data available from some regional projects with H2020 or SWEEP NET initiatives.

As mentioned above, a number of players are involved in the management of solid waste in Lebanon. In the case of municipal solid waste, available information is restricted to quantities of waste and recovered recyclables along the waste chain, i.e. quantities of waste collected, sorted, composted, and landfilled.

Such information is communicated to the municipalities and the union of municipalities or the CDR on a regular basis to issue payments to contractors. One should mention:

- Monthly and yearly reports are submitted to CDR & MoE from the Averda Group
- Periodic reports are submitted to CDR by BATCO-LAVAJET

- Periodic reports are submitted to the municipality of Zahle by SANITEC
- Quarterly reports are submitted to OMSAR by the different municipalities and the union of municipalities

Information on the distribution of dumpsites exists (about 700) and is organized in a GIS system maintained by the MoE. Only 2 of those dump sites are legal & environmentally controlled as sanitary landfills, and regular reporting by their respective operators is done because of financial considerations.

## **2.1.FINANCING OF MUNICIPAL INVESTMENT PROJECTS IN SOLID WASTE MANAGEMENT**

The OMSAR plays an important role for the implementation of EU funded projects such as the funding of waste treatment, composting, sterilization and sorting facilities.

One particular project started in 2004 and will be completed by 2013. It is supervised by the MoE, MoIM, as well as the CDR.

Until now, 5 sorting and composting facilities, 1 sorting facility and a medical waste sterilization center have been operational. Six (6) additional sorting and composting facilities are also planned or under construction. The facilities are operated by OMSAR but are handed over to the municipalities after 3 years of operation.

There is a reporting mechanism in place covering the following data on a quarterly basis:

- Daily quantity of waste received- baseline for payment:
  - Data includes date, time of arrival, truck number, coming from, weight, nature of load, remarks.
- Outgoing quantities of rejects and recyclable materials:
  - Data includes date, time of departure, truck number, going to, weight, and nature of load (rejects or recyclables and types - plastic, metals, cardboard, etc...), remarks.
- Detailed summary of all maintenance activities undertaken during the reporting period.
- Number of workers operating in the facility (on a daily basis).
- Test results of the compost produced.
- Summary of the quantity of waste received during each month along with a request for payment.

According to OMSAR representative, collected information can be shared with the ministry upon request or through a pre-defined sharing mechanism as soon as the plants are operational.

## **2.2.HAZARDOUS WASTE - DATA REPORTING AND INDICATORS**

A circular was issued by the MoE on the reporting requirements relating to infectious waste treatment. However, the sharing of information has not been enforced: Reporting under the

Basel convention has stopped and that for the Stockholm Convention has not been developed.

On the other hand, according to the Ministerial Decision 71/1 of 1997, the Lebanese customs are required to cooperate with the MoE on imports of hazardous waste. Information related to quantities and the economic value is available online on [www.customs.gov.lb](http://www.customs.gov.lb) under HS classification for both exports and imports. However, other information on each transaction such as the importing party, the country of origin, the type and quantity of waste imported are available. For exports, annual export quantities are reported along with annual generation rates.

Additionally, trimestral reports are generated in the case of radioactive waste treatment. These reports hold the following information:

- Quantities treated per source
- Monthly testing results on wastewater discharges
- Annual testing results on wastewater and air emissions
- Bacteriological and chemical indicators for treatment efficiency

As of March 2011 (as a result of circular 11/1), waste treatment facilities are expected to report on a trimestral basis to the MoE on the above mentioned information. Prior to that date, (from 2009), this information had to be submitted to the MoE in non-standardised reports, using different indicators, which did not allow for comparison or long-term monitoring.

The information is to be submitted to the MoE on a trimestral basis using a specific template.

### **2.3.COMMON PRACTICES IN THE CONTROL AND MONITORING OF RADIOACTIVE WASTE IN LEBANON**

Lebanon is a non-nuclear country. Radioactive waste is generated mainly because of medical uses. The radioactive waste in Lebanon consists of:

- Medical use (cancer therapy unit, blood irradiator, cyclotron, radioisotope production, nuclear medicine, X-ray based diagnostic equipment, accelerators, etc.)
- Gauging systems (thickness, density and level).
- NDT (X and gamma radiographers)
- Elemental analyzers (radioisotopes and X-ray tubes).
- Agriculture Research.
- Nuclear materials (shielding, neutron sources)
- Miscellaneous uses (smoke detectors, lightning prevention...)

For imports of nuclear sources a “prior to import authorization” is needed.

The first law dealing with radioactive substances is from 1983: Regulating the use and protection against ionizing radiation. Since 2005, a number of additional decrees and ministerial decisions have been in force to regulate the transport, control, import and export of radioactive material.

It is proposed to have one single nuclear law regulating those issues in a comprehensive manner.

### **3. WASTEWATER**

While data on industrial wastewater networks and flows is scarce and fragmented, the CAS produced in 1996-1997 data on household wastewater connections and updated these data in 2004.

Available information is restricted to the number of connections and the number of operational wastewater treatment facilities per mouhafazat.

Information on the location, size of wastewater treatment plants (WWTP) in population equivalents, status, design flow, wastewater treatment processes and components, methods of sludge treatment, effluent standards (BOD5, SS, Total N) can be obtained or estimated based on the design of the facilities. Nevertheless, a study currently being developed for the assessment of the bioenergy generation potential testifies to the difficulty in accessing such information.

Furthermore, due the important financial investments required for the upgrade and rehabilitation of the infrastructure (treatment facilities and connection network), a date for the start of operation of the WWTP and consequently, for the generation of quantity and quality data, cannot be specified for the plants, even for those finalized.

### **4. INDUSTRIAL EMISSIONS**

Data on industrial wastewater effluents and air emissions is almost inexistent, and where available, access to it is very difficult.

A bottom-up approach is needed in order to generate accurate data. Unfortunately, a great deal of data recycling has been observed as state agencies often rely on private sector work studies and analysis, which is also used by other players. Major limitations exist when accessing available data. These include:

- Reluctance to cooperate among stakeholders
- Slowness in replies
- "Secrecy" of the data according to data holders
- Unavailability of data in the respective organization

Data quality is also a major impediment: when available, it is often very difficult to obtain representative data due to it being discontinuous in time and/or in space. Also, some information may show major discrepancies among data holders.

Basic information such as on the exact location of licensed industrial facilities is not available. Nevertheless, and according to the MoI, the planned update for the 2007 industrial survey (published in 2010) should take into account additional information about the industries' operations and allow better monitoring of their impacts on the environment.

Nevertheless, with regard to air emissions, Decision 191/1 (08/10/1997), the Cement Industry Directive, requires cement industries to monitor and register continuously their daily emissions of air pollutants like dust, NOx, SO2, CO, and HC and send an annual report to

the MoE on the particular issue of dust. The information is provided on paper-based reports where the data is often difficult to read and compare.

The industries can provide different formats such as a single graph per day, without clear average values, or may even choose to report on weekly averages compiled in a table format.

The MoE is consequently obliged to check each graph manually and compare it with national standards and enter the data manually onto MS Excel sheets.

MOE is currently working on the definition of a new reporting format for the cement industry and the chemicals industry to include the following information, amongst others:

- Information regarding the industry, the technical person in charge of data reporting
- Continuous data readings in table formats.
- The daily average values for pollutant emissions.
- The annual average values for pollutant emissions.
- Unified format of graphs should also be provided electronically.
- The methodology used for emission measuring and corrections is to be addressed in an Annex.
- Any breaches reported should be clearly and scientifically explained along with the measures taken by the company to address the sources of the problem that caused the breach and solutions undertaken.

The developed templates can be adapted to other types of industries, as required. Nevertheless, such preparatory work has not been expanded onto other sectors.

### **III INFRASTRUCTURE**

#### **III.1 WATER DATA INFRASTRUCTURE**

##### **III.1.1 FRESH WATER MONITORING INFRASTRUCTURE**

In the absence of meters, the calculation of the water demand in Lebanon is based on a certain number of assumptions. Some regional water authorities in Lebanon are introducing metering in their respective coverage areas, such as Tripoli, Baalbeck, Beirut and Saida but demand/ use data, when available, is not reported - unless specifically requested by the MoEW.

In the case of the LRA, and as mentioned above, the authority is responsible for data collections on everything related to the Litani river (flow, storage, water quality etc.). In addition, the LRA is responsible for flow measurement on all the rivers in Lebanon.

Digitalization of the quantity readings is currently underway. Analysis results are entered onto MS Excel sheets but this information is not distributed or shared unless officially requested.

Furthermore, five (5) automated stations exist at 5 locations at the upper basin level measuring the DO and pH levels and the temperature of the water.

The construction of a hydrometric network is essential so that data can be collected appropriately by the different ministries, regional water authorities and other agencies in order to compile and centralize quantity and quality data on groundwater, rivers, springs, etc.

##### **III.1.2 MARINE WATER MONITORING INFRASTRUCTURE**

Marine water quality is monitored mainly by the National Centre for Marine Sciences of the CNRS which conducts regular monitoring not only on marine water but also on biodiversity and sediments at 25 locations along the Lebanese coast covering different geomorphic states.

Water quality is assessed through manual sampling and testing for physical, chemical and microbiological parameters. The data is compiled electronically on a monthly basis by the National Centre for Marine Sciences which shares it with the MoE upon request. There is no established mechanism for data sharing.

In addition to the regular monitoring activities performed by the National Centre for Marine Sciences, some universities undertake punctual studies in the framework of specific research projects. Obtained results are, however, not compiled nor cross-checked for validation.

##### **III.1.3 WASTEWATER INFRASTRUCTURE**

The improvement of wastewater management is among the greatest challenges Lebanon is facing. Most towns and villages have no wastewater infrastructure except for the traditional

household sanitary pits, or inhabitants drain wastewater into boreholes in bedrock, which easily pollutes the groundwater. Particularly rural systems in Lebanon are mainly limited to cesspools and septic tanks. Some rural communities do not use any treatment and simply release raw sewage into the environment.

With efforts to restore the infrastructure in Lebanon, the construction of sanitation systems has focused on sewerage networks for collecting and transporting wastewaters out of towns and villages. The treatment of collected wastewaters has now become more relevant. At the moment, and according to the MoEW, four (4) wastewater treatment plants are in operation, seven (7) are completed but not operational, six (6) are under construction and seventeen (17) being designed. Another 20 treatment plants require funding.

Some municipalities and local communities have started to invest in wastewater collection and treatment. In recent years, projects promoting small-scale, decentralized wastewater treatment in rural areas have been implemented and several of these small-scale wastewater treatment plants provide secondary treatment resulting in water that is suitable for irrigation. However, most municipalities still lack the human and financial resources, environmental awareness, management capabilities, and/or political commitment necessary to implement wastewater management in an environmentally sound manner.

### **III.1.4 SOLID WASTE MANAGEMENT**

The current data collection infrastructure does not allow for automated centralization and/or sharing such information on a waste management database.

The case is somehow different for hazardous waste monitoring despite the fact that there is no official hazardous waste monitoring network in Lebanon per se. Although different public agencies might be involved in monitoring hazardous waste management and disposal within the country, coordination mechanisms are still in their primitive stages. In fact, customs have developed a register of all imported hazardous wastes over the years, and the MoE has prepared a database tracking quantities of imported waste aggregated by sector and country of origin; however, such information is not shared with the concerned stakeholders.

However, Decree 13389 and its associated circulars require the submission of trimestral reports, by hazardous infectious waste treatment centers, to the MoE, indicating the sources and the quantities of treated wastes, the results of specific treatment efficiency and environmental parameters, namely air emissions and wastewater discharges. Unfortunately, although data entry is performed in a timely fashion by the MoE, the development of related environmental indicators has still not been completed, which is delaying data analysis and the dissemination of results.

Furthermore, the MoE lacks the capacity, of both human and financial resources, to inspect or monitor compliance with the laws and regulations governing hazardous waste management.

### **III.1.5 AIR QUALITY**

Measurements of criteria pollutants in Lebanon have been relying on individual initiatives led mostly by research and academic bodies. The American University of Beirut (AUB) and the Université Saint Joseph (USJ) are associated with the CNRS in the Air Quality Research

Unit (AQRU) to monitor air quality with 1 and 3 fixed stations in Beirut, respectively. Data is also collected using sampling methods for NO<sub>2</sub>, SO<sub>2</sub> and PM.

Furthermore, considering that air quality has been identified as an environmental priority by the MoE in line with the recommendations of UNEP's Post Conflict Environmental Assessment report for Lebanon in 2007, the MoE has been implementing, since September 2011, the project "Environmental Resources Monitoring in Lebanon". An air quality monitoring programme is expected to be finalized by June 2012 and needed infrastructure (equipment and software) will be put in place in the framework of this project by June 2013 to ensure data collection and acquisition/centralization at the MoE.

The monitoring programme being still under development, the locations and the amount of the equipment are thus yet to be determined. However, the different parameters to be continuously monitored are PM<sub>10</sub>, PM<sub>2.5</sub>, CO, NO<sub>2</sub>, SO<sub>2</sub>, and O<sub>3</sub>. It is worth noting that the monitoring stations will also be equipped with a meteorological station (wind speed and wind direction sensors, relative humidity/ temperature sensor, barometric pressure sensor, solar radiation sensor, rain gauge). These stations will be added to the currently available wider network in the different Lebanese areas.

The project will also ensure that MoE staff and relevant persons are suitably trained to maintain the equipment and attend to its operations. It is worth noting that the project does not foresee a budget for running costs and the maintenance of the Air Quality Monitoring System (AQMS), which can be a potential threat to producing continuous and reliable data. The MoE would have to allocate the necessary budget to ensure the sustainability of the AQMS.

## **IV NEXT STEPS**

### **IV.1 PROPOSED ACTIONS**

Following the country visit in October 2011 and based on the information collected for the present report, i.e. available data, infrastructure in place and inter-institutional cooperation on the identified priorities, environmental indicators appear to be quite dispersed and unorganized.

Discussions and recommendations proposed by the SEIS project team and representatives from the different ministries and institutions showed that there is a need to anchor the importance of coordination in data collection and clear data sharing processes. For such a vision to be shared, the involvement of key executives is essential for the design of effective and efficient data collection tools and mechanisms to coordinate and integrate them within national environmental databases, within the specific thematic areas.

The absence of such coordination has proved to be negative on a number of levels, not only the reduced accessibility to data. In fact, time and financial resources are allocated to activities that appear to be partially or fully redundant for different ministries and research institutions. This has been the case for the water accounts, which has been highlighted as a priority. The consolidation of data is needed in order to produce complete water accounts.

The development of a PRTR has also been identified as an important activity. Unfortunately, and despite fragmented initiatives to map industrial pollutants in specific industries by the MoI and MoE, planning for a PRTR is still very precarious at this stage. The enforcement of reporting for the various sectors remains very weak, where it exists at all. This also applies to discharge and emission permits and related decrees under the provisions of Decree 2275/2009 which are not applied.

With the above in mind, the following recommendations have been retained as priorities for the design of specific interventions and these should be implemented in the short term:

#### **1. Inform and engage executives on/in the SEIS process**

Engaging and mobilizing key persons at the executive level in ministries and other public administrations has proved to be difficult so far, impacting the process of data sharing from the onset: Mapping the available information and its holders appears to be an invasive activity and high level approval for such work is required. It is therefore important that key persons be aware of the project, its objectives, and most importantly its benefits at the national level. Given previous activities, it is most likely that organizing yet another executives meeting will not bring higher participation levels, nor will it guarantee the presence of executives, but it will ensure representation of nominated public officials as in previous events.

Accordingly, it is recommended that individual visits be organized by the National Focal Points (NFP), i.e. MoE NFP and/or CAS NFP to the different key executives, as judged relevant for the development of a SEIS.

However, for such meetings to be efficient and result in concrete follow-up actions, it is important that the SEIS benefits be well developed and reflected in real case examples. It would therefore be beneficial for the team to be accompanied by an expert who would be (i) presenting SEIS and its benefits, (ii) suggesting a mechanism for data collection and an action plan, and (iii) following up on the meeting's outcome.

## 2. Mapping of information

As reflected in the present report, environmental data is generally reported on an as-needed basis and upon official requests from the different users. The mapping of such information is unorganized, often relying on trial and error searches for the right data and right data holder.

Mapping the water-related data alone, for example, is a tedious chore considering the dispersed responsibilities among stakeholders.

Mapping the available information and data holders has been initiated by the MoE, focusing on the priority areas. Due to the lack of human resources at the MoE and as discussed above – without the support and approval of executives, follow-up on information available and access to key persons, the mapping process is slow and in some cases incomplete.

## 3. Development of complete Water Accounts

Available data on water currently does not allow for the preparation of complete water accounts. As reflected above, most of the data collected is based on estimations provided by the water authorities and the MoEW to the CAS for the production of water statistics.

Moving from water statistics to water accounts is a multi-phased process requiring a defined strategy to secure the involvement of key actors and the mapping of available information and data holders. Even if such information is made available, it is clear that the production of water accounts cannot be secured without the set-up of inter-institutional cooperation concretized by a committee holding the major stakeholders of the sector and engaging them in the process of data collection and production of information.

It is only then that the available data can be interpreted and used for water management decisions and practices.

The concrete implementation steps were identified during the water accounting workshop in Beirut (20-22 March 2012) and are as follows:

### Short term (6-12 months): Strategy formulation:

- Define the leadership for water accounts work: MoE
- Check the available data coming in from all official sources at CAS, MoE, CDR, etc.
- Contact MEW in order to get more water data even if it is not updated
- Data gaps can be identified through:
  - Reading international UN manuals (IRWS, etc.) in order to have the methodology and background for what constitutes Lebanon metadata
  - Try to make estimates in order to encounter missing data based on available data from all official sources
- Start filling some SEAAW tables through the available information
- See what information is missing

### Mid term (12-18 months): Strategy implementation / Institutional work:

- Form an inter-ministerial and administrative (CNRS, LARI, LEDO, TEDO, etc.) and syndicates committee in order to strengthen cooperation and to get the missing data or to be able to compute some agreed estimates
- Set a time table and provide a job description for the committee members
- Write a memorandum of understanding for the members of this committee to achieve the commitment of the head of the institutional pyramid
- Provide capacity building regarding SEEAW tables for the committee members and for the people who will compile and handle data
- Try to increase institutional awareness about the importance of establishing SEEAW tables and to move from data to information in the field of water
- Try, through this committee, to deal with the lack of data by asking other ministries that conduct statistical surveys to introduce in their questionnaires some data related to water to answer the needs of SEEAW tables

Long term (18 months +): Strategy evaluation to ensure data sustainability:

- Get all the water data that the committee will provide and try to complete SEEAW tables
- See what is missing again in order to evaluate the strategy and rectify the field work
- SEEAW tables will increase the knowledge of water management and will allow to guide water decision makers so as to mitigate and alleviate problems regarding, for example, unaccounted for water
- Publish and disseminate a 2-year publication on water accounts on all committee institution members' websites. This publication could include:
  - Metadata and methodology
  - Sources of information
  - Move from data to information: a compendium (summary) part, synthesis tables, and exhaustive tables
  - Calculating some water indicators
  - Forecasting water trends for the future water strategy

## IV 2 IMPLEMENTATION PLAN

	2012			2013			2014		
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
<b>Mapping of environmental indicators and key informants in Lebanon</b>	[Gantt bar spanning Q2 2012 to Q2 2013]								
Establish a list of key environmental indicators based on literature review	[Task bar]								
Identify key informants in various Lebanese institutions	[Task bar]	[Task bar]							
Establish an Environmental Indicators Committee nominated from the different ministries/institutions		[Task bar]	[Task bar]						
Describe available data: status (in progress, periodic, irregular, extent of time series, type of data available, analysis output)		[Task bar]	[Task bar]						
Negotiate with executives the need for the data & sharing modalities			[Task bar]	[Task bar]	[Task bar]				
Develop templates for data collection/sharing				[Task bar]	[Task bar]				
Put in place a software applications for data collection					[Task bar]				
<b>Executives meeting</b>	[Gantt bar spanning Q3 2012 to Q1 2013]								
Assign expert for mission to Lebanon		[Task bar]							
Coordinate with the expert the visits with the different ministries and public institutions		[Task bar]	[Task bar]						
<b>Organizing and uniformizing water accounts</b>	[Gantt bar spanning Q2 2012 to Q4 2013]								
Define the leadership for water accounts work: MOE	[Task bar]								
Map available data incoming of all official sources at CAS, MOE, CDR, etc.	[Task bar]								
Contact MoEW in order for additional information even if it is not updated		[Task bar]							
Fill in data gaps through approved methodologies to constitute metadata and try to make estimates on missing data		[Task bar]	[Task bar]						
Fill in SEEAW tables and map the gaps		[Task bar]	[Task bar]						
Form an inter-ministerial and administrative (CNRS, LARI, LEDO, TEDO, etc.) and syndicates committee to strengthen the cooperation and to get the missing data or to be able to compute some agreed estimates			[Task bar]	[Task bar]					
Set a time table and the job description of the committee members			[Task bar]	[Task bar]					
Write a MoU among members to achieve the commitment of the head of institutional pyramid				[Task bar]	[Task bar]				
Make a capacity building regarding SEEAW tables for the committee members and for the people who will compile and handle data				[Task bar]	[Task bar]				
Increase institutional awareness on the importance of establishing SEAAW tables to move from data to information in the field of water				[Task bar]	[Task bar]				
Try through this committee to improve data collection through ministries to answer the needs of SEEAW tables					[Task bar]	[Task bar]	[Task bar]		
Complete the SEEAW tables						[Task bar]	[Task bar]	[Task bar]	[Task bar]
Reconsider the strategy in case of missing data							[Task bar]	[Task bar]	[Task bar]
Publish and disseminate a 2 years publication on water accounts on all committee institutions members								[Task bar]	[Task bar]

 Subject to availability of funds

## CONCLUSIONS

It is clear that the lack of reliable environmental data and the presence of information gaps is a major limitation to the implementation of appropriate management programmes.

Environmental monitoring in Lebanon is still weak and where available, reporting appears to be dispersed. In the framework of the ENPI-SEIS project and in the light of the findings of the report, the major limitations to the implementation of a shared data system are as follows:

- Lack of legislative framework organizing data sharing among the different concerned institutions.
- Lack of consensus among executives on the need to share and coordinate efforts at the national scale
- Lack of information flow management

The implementation of the ENPI-SEIS project implies the fulfillment of the following baseline activities, for which support is needed:

1. Securing collaboration among executives on the need to share environmental data
2. Conducting detailed mapping of involved stakeholders and available data series
3. Designing a data and information sharing mechanism

With the limited human resources for environmental monitoring at the MoE, the involvement of the SEIS team would be essential, namely in mobilizing executives to achieve the objectives of the projects and its benefits. The participation of external experts is recommended. Meetings would help the NFP and SEIS experts to have an idea of the willingness of the different individual institutions to cooperate and validate information on the type of data generated. It might be worthwhile to consider the possibility of putting in place a Twinning project with a European agency whereby support for the mapping and organization of data collection could be provided.

This first step would be a corner stone for the preparation of data sharing mechanisms and perhaps for recommending a methodology to initiate the development of a PRTR.

On that level, a good starting point would be to develop reporting on air quality emissions as the MoE has just had a successful experience in the design of reporting mechanisms for emissions for the cement manufacturing sector. It is an opportunity to validate the template and adapt it so as to include more types of industry across the table.

In the medium term, and with the solid waste management sector evolving with the potential introduction of new technical solutions and new players, the development of a national waste database can be interesting. Such an activity, however, would be more realistic and relevant once the picture of SWM has become clearer and is nearer completion.