



Environmental Governance in Lebanon: Challenges and Opportunities Policy Paper

**Issued by the Observatory of Public Service and Good Governance at Saint Joseph University¹
(May 2022)**

The report “Lebanon State of the Environment and Future Outlook: Turning the Crises into Opportunities” (2020) indicates a significant deterioration represented by the additional depletion and pollution of natural resources, and the high cost of this deterioration, as it revealed an annual cost of environmental degradation at 2.3 billion US dollars. The degradation covers many areas of which solid waste, quarries, biodiversity, beaches, air, water, and other natural resources. In terms of solid waste, for instance, there are around 1,000 uncontrolled dumps, at an average rate of one per town. At the level of mountain tops, the damage is estimated at no less than 0.6 billion US dollars annually. As for damage caused by air pollution, the cost of the health bill is estimated at about \$0.9 billion US dollars annually.

After the outbreak of the Syrian war, the Syrian exodus to Lebanon contributed to increasing this downward path. It also generated negative environmental impacts due to the significant pressures on the water, sewage, electricity and solid waste management systems, which were already facing such pressures before. The explosion of Beirut Port on August 4, 2020 caused direct and indirect environmental and health damages. The major economic crisis that started in the fall of 2019 added a new element that contributed to the decline in the required treatments, as a result of the deterioration of the exchange rate of the Lebanese pound against foreign currencies, and the decline of projects that enhance environmental governance.

Good governance has become a key driver in the policies and strategies adopted to achieve sustainable development. The decision stems from this governance in formulating the projects of today and tomorrow. As for the bodies and elements concerned with governance, they are distributed among the relevant departments and institutions, laws and policies, monitoring, control, implementation, financing, incentives and participation. Today, it is no longer possible to think in part about a comprehensive and complex scene in terms of natural, economic, social, legal, administrative and political affairs, etc. Rather, cooperation between different administrations, institutions and bodies in both, the public and private sectors, and joining efforts, are necessary to succeed. In this context, the economic recovery plan that the government is discussing with the International Monetary Fund constitutes a golden opportunity that should be exploited in order to consolidate environmental governance by including the plan and building on it in the project to promote a way out of the crisis. It also encourages international agencies to provide the required funding.

This paper was prepared based on a series of debates² organized by the Observatory of Public Service and Good Governance at Saint Joseph University, in partnership with the Ministry of Environment and the United Nations Development Program during the period of February-April 2022, with the aim of strengthening environmental governance, starting with a public debate entitled “Introduction to Environmental Governance: Challenges and Opportunities”³ and followed by debates that dealt with specific sectors as follows:

¹ Dr. Charbel Maroun, University Teacher and Journalist, drafted and edited the roadmap.

² The sessions were inaugurated by Professor Pascal Monin, Director of the Observatory of Public Service and Good Governance, and moderated by Dr. Charbel Maroun, university teacher and journalist.

³ On 10/02/2022 Professor Salim Daccache, Director of Saint Joseph University of Beirut, Ms. Celine Moyroud, Resident Representative, of UNDP Lebanon Lebanon and Dr. Nasser Yassine, Minister of Environment, inaugurated the session; and a discussion was held between Dr. Demianos Kattar, former Minister of Environment, Mr. Charles Arbid, Head of the Economic and Social Council; Ms. Lama Bashour, Director of Ecocentra; Mr. Malek Ghandour, Lebanese Environment Forum; Mr. Fadallah Hassounah, Lebanon Eco Movement; and Ms. Samar Khalil, Waste Management Coalition.

- 1- Environmental Governance in the Water and Wastewater Sector⁴
- 2- Environmental Governance in the Air Quality and Climate Change Sectors⁵
- 3- Environmental Governance in the Terrestrial and Marine Ecosystems Sector⁶
- 4- Environmental Governance in the Land Management and Urban Planning Sectors⁷
- 5- Environmental Governance in the Solid Waste and Chemical Management Sector⁸

Accordingly, this paper proceeds from studying the reality of environmental governance (first section) to presenting the required suggestions and recommendations (second section), and suggesting specific steps within the recovery plan (third section). The five annexes of this paper detail the prevailing reality and solution proposals in the above sectors.

First – The Reality of Environmental Governance:

The existing reality of environmental governance in Lebanon is summarized in the following main headings:

⁴ On 24/02/2022, the roundtable included the following speakers: Prof. Wajdi Najem, Professor at the Faculty of Engineering and former Vice Rector of Saint Joseph University, Dr. Khaled Nakhleh, Professor at the Lebanese University and Advisor at the Ministry of Energy and Water, represented by Ms. Suzy Howayek, engineer and Advisor at the Ministry; Dr. Yousef Karam, Head of Water, Wastewater and Infrastructure Department, Council for Development and Reconstruction; Dr. Rania Maroun, Senior Environmental and Water Resources Expert; Ms. Nour Moucharafieh, Senior Project Manager at ECODIT Liban and Mr. Rabih Nahhas, Mechanical Engineer and Representative of Lebanon Eco Movement.

⁵ On 14/03/2022, the roundtable included the following speakers: Professor Jocelyne Adjizian Gérard, Head of the Geography Department at USJ; Ms. Samar Malek, Head of the Service of Environmental Technology, Ministry of Environment; Mr. Elie Helou, Senior Specialist and Transportation Engineer, Council for Development and Reconstruction; Mr. Pierre Khoury, Engineer and President and General Director of the Lebanese Center for Energy Conservation; Mr. Vahakn Kabakian, Climate Change Adviser, UNDP; Dr. Charbel Afif, Chairperson of the Chemistry Department at USJ, Expert in Air Pollution; Dr. Layale Abi-Esber, Senior Environmental Consultant at SES; and Mr. Rayan Kassem, West Asia Regional Director at Youth4Nature.

⁶ On 28/03/2022, the roundtable included the following speakers: Dr. Miled Fakhry, Director of the National Center for Marine Sciences; Mr. Nizar Hani, Shouf Biosphere Reserve Manager; Ms. Petra Obeid, Head of Youth and Local Bodies Department, Ministry of Tourism; Dr. Myrna Semaan, University Teacher and Researcher in Natural Heritage, Terrestrial Biodiversity Expert; Ms. Rhéa Kahalé, Instructor and Researcher in the Conservation and Management, USJ, Jouzour Loubnan Association; Mr. Pascal Abdalla, Responsible Tourism Development Expert; and Mr. Omar Sakr, President of Lebanon Mountain Trail Association (LMTA).

⁷ On 08/04/2022, the roundtable included the following speakers: Mr. Elias Al-Taweel, Engineer and General Director of Urban Planning, Ministry of Public Works and Transport; Dr. Ibrahim Chahrour, Planning and Programming Director, Council for Development and Reconstruction; Mr. Aref Yassine, Engineer, President of the Federation of Lebanese Engineers and President of the Order of Engineers and Architects - Beirut; Mr. Maroun El Helou, Engineer and President of the Lebanese Contractors Syndicate; Prof. Elie Karam, Acting Dean of Issam Fares Faculty of Technology, University of Balamand; Dr. Serge Yazigi, Consultant and Professor at the American University of Beirut and the Lebanese American University; Mr. Habib Maalouf, Advisor to the Minister of Environment, Writer and Environmental Journalist; Mr. Mohamed Fakih, Engineer and Head of the Mount Rihan Environmental Protection Committee, representative of the Lebanese Environment Forum; and Mr. George Einati, Coordinator of the Kfarhazir Environmental Committee, Popular Coalition Against Quarries.

⁸ On 29/04/2022, the roundtable debate included the following speakers: Mr. Bassam Sabbagh, Engineer and Chief of Urban Environmental Service, Ministry of Environment; Dr. Dominique Salameh, Solid Waste Management Expert and Industrial Strategist, Teacher and Researcher at the Faculty of Sciences, USJ; Mr. Samy Assaf, Engineer, Association of Lebanese Industrialists; Mr. Rami Nassif, Engineer, Solid Waste Expert, UNDP; Dr. Sophia Ghanimeh, Associate Professor, Environmental and Water Resources Engineering, Notre Dame University; Dr. Gaby Kassab, President of ECOSERV for Environmental Sustainability; Dr. Andre Sleiman, DRI Representative in Lebanon, Expert in Governance and Public Policy, Waste Management Coalition; Ms. Lama Mghames, Senior Environmental Consultant; and Mr. Ricardo Khoury, Engineer and Environmental Practice Lead at ELARD.

- 1- **Absence of the rule of law:** The most difficult thing that the environment in Lebanon has suffered from is the failure to give it the necessary importance and considering it among the secondary matters that can wait. In most cases, legislation was passed under international or local pressure without a real will to do so, or because the environmental reality imposed such legislation without any firm conviction. Most of the time, laws and regulations are not applied in the environmental sector. One of the reasons is that when it comes to application, the environmental issue is distributed among many departments and institutions. The Ministry of Environment is in charge of regulating environmental affairs and setting policies and strategies, but the responsibility for implementation lies within other departments and institutions.
- 2- **Absence of environmental concern among the political forces:** Environmental concern is non-existent among most influential political forces, and is absent from their programs and projects, knowing that through their presence in the government and the parliament, they are the force of legislation. These forces have the power to make environmental decisions in all their forms. However, they often put their own factional interests ahead of the public interest. As a result, what we can call the legitimacy of the illegitimate prevails, despite the fact that this decision is issued from within the various official institutions. The negative impact of the political forces is reflected in the time period consumed by the legislation, which is approximately between 10 and 15 years, which constitutes the period between preparing the law in its initial form and its approval in parliament.
- 3- **Absence of real accountability:** When environmental damage occurs, accountability is quasi non-existent or limited despite the presence of many deterrent laws, as a result of the influence of political forces and the provision of protections to perpetrators and violators, which constitutes an obstacle to efforts to protect the environment. The adoption of modern legislation was not accompanied by an improvement in environmental performance, as there is a National Council for the Environment, and environmental prosecutors, but real accountability does not exist due to political interference. Moreover, political interference is applied in other ways. For instance, the Council of Ministers was unable to determine the locations of the waste to energy plants required in the road map for the solid waste sector, leaving the decision to the influential political parties and movements. The contract signed with “Sukleen” for waste collection lasted for over 15 years after it was extended more than 3 times, without resorting to any new tender (until 2015) that could achieve a price reduction.
- 4- **Weakness of the central implementation mechanism, readiness and monitoring:** The Ministry of Environment complains of the high number of administrative vacancies, and it is currently working with a third of the employees, which greatly affects its productivity, in addition to the negative impact of the economic crisis on the attendance of employees to their workplace. The environmental issue suffers from poor planning and preparedness for emergencies. A physical example of this is the lack of initiative after the explosion of the Beirut Port on August 4, 2020. There is a lack of oversight over adherence to the strategic environmental assessment and environmental impact assessment, especially at the stage of adopting and implementing strategies and projects, after being strict at times at the stage of studying projects, which makes the topic lose its intended importance.
- 5- **Weak participation:** The environmental issue still suffers from weak participation between the public sector, the private sector, NGOs and municipalities (compared to the desired level), which constitutes an obstacle to the required proper treatments. Also, partnership, at the level of vision, strategic planning, coordination, implementation and monitoring, is required among the ministries concerned with environmental affairs, and they are numerous.
- 6- **The limited environment culture:** despite the impact of environmental deterioration on the economy, where it is impossible to think of a healthy and sound economy without a sound environment, since the environment constitutes a platform for investment that provides an economic return (For example, a recovering environment is a condition for the economy of the food industries that form the backbone of Lebanon's exported industries. Moreover, one cannot think about tourism amid environmental degradation).

Despite the Lebanese awareness of environmental problems and the damage it causes in many fields and sectors, the environmental culture, which prompts the Lebanese to respect it, is missing. As a result, there is no popular pressure and influence to defend the environment. The solution lies in the “we” culture replacing the “I” culture when it comes to environmental matters, where treatments and solutions express the convictions of society, or the majority of its groups, which facilitates the application of laws and the implementation of policies and strategies.

- 7- **Double standards in the implementation of international environmental law** should not be overlooked: for example, the compensation owed to Lebanon as a result of the oil spill after the Israeli aggression in 2006, set at \$856.4 million in 2014, which has not been paid to date despite the issuance of 16 resolutions by the General Assembly of the United Nations to date; and the Syrian displacement crisis and the blatant disparity in the distribution of the displaced in relation to the environmental infrastructure.

Second: Suggestions and Recommendations for the Development of Environmental Governance:

In order to achieve environmental governance, and based on the data shown in the five annexes of this paper, a set of integrated steps should be adopted, the most prominent of which are:

1- **Enforcing the rule of law:** The rule of law should be reinforced through a political decision that abolishes protections and puts everyone under the rule of law. The fraud in the application of laws and regulations must also be stopped. For example, contractors and other stakeholders seek to avoid implementing environmental impact obligations in projects after they have been identified, in order to achieve personal interests. Concerned ministries are reluctant to play their role in this field, which leads the situation to a fait accompli with all violations and abuses. Under the pressure of emerging crises, as is often the case with wastes, the environmental impact study is bypassed and projects are started before the necessary studies are completed, in order to avoid the accumulation of waste on the roads. Therefore, it is necessary to reach a clear mechanism that imposes legal punishment on the concerned departments when they do not abide by the legal texts and principles, bearing in mind that the laws in force specify penalties for those who fail to study the environmental impact. In order to activate liability, accountability and punishment, environmental prosecutors must be dedicated in accordance with the provisions of the law.

2- **Adopting integrated management in the various environmental sectors:** It is impossible to develop effective solutions without integrated management of the various environmental sectors. This would ensure the necessary coordination, prevent conflicts of authority, and provide all the required information and data to those concerned, in a way that helps in drawing up strategies and implementing projects.

3- **Decentralizing solutions after a necessary transitional period:** The sharp centralization that has proven incapable of providing solutions and treatments should be put to an end, and a perfect example to portray this is the solid waste crisis. Decentralization should start at the local level (municipalities and municipal unions) provided that there is, where necessary, a transitional period of rehabilitation and preparation before moving to decentralization.

4- **Establishing a unified center for information related to the environment sectors:** It is impossible to expect sound environmental treatments without a unified information center that benefits from various efforts and experiences and provides unified reliable information and data to stakeholders that helps in setting strategies and conducting research and studies.

5- **Promoting participation:** There is no solution to environmental problems without the participation of the quintet: the public sector, municipalities, the private sector, environmental associations, and the citizen. The Ministry of Environment plays a pivotal role in this by fostering dialogue between specialists, stakeholders, the Economic and Social Council and other bodies, to reach useful comprehensive ideas. Direct discussions and coordination between these forces would provide the required participation in creating solutions. In this context, the celebration of the “National Environment Day” this year comes at an expected invitation by environmental associations, after a series of conferences held at the governorate and district levels.

One should think about the necessity of declaring an environmental emergency, with which a working group would be formed, at the Lebanese level, to work alongside people in order to ensure their participation in the environmental solution. In parallel, a law must be passed to modernize the Economic and Social Council to become the Economic, Social and Environmental Council⁹, so that it becomes a forum for dialogue in environmental matters, in addition to economic affairs. The council has no executive authority, and its decisions are non-binding; however, its opinions matter, as they are issued by concerned productive segments who are familiar with environmental matters. This is known as citizen participation.

6- Enhancing the role of environmental associations: The role of associations should be activated by activating their involvement in proposing environmental policies and strategies and following up on their proper implementation. These associations can pursue the policy of forming specialized coalitions (solid waste coalition, quarry coalition, nature reserves coalition, water resources coalition, etc.) in a way that would enhance work to protect the environment.

7- Developing environmental monitoring: It is necessary to work on strengthening environmental monitoring at the level of Lebanon, by reactivating the existing monitoring networks and building new networks where necessary, and the participation of people who are in contact with the Ministry of Environment, environmental associations and other frameworks such as environmental prosecutors and the environmental police. Through all these steps, an effective pressure force is achieved at the level of all of Lebanon, supporting the Ministry of Environment in its work.

8- Enhancing university research and studies: It is necessary to invest in university research and studies, including those related to public health and its relationship to the environment, and to use universities as a partner in the preparation of strategies, projects and monitoring in order to enhance the required environmental governance.

9- Establishing an environmental culture: It is necessary for people to “own” the environment for them to become directly concerned with environmental matters in order to preserve environmental resources. This is done through environmental education in educational institutions, educational, orientation and guidance media campaigns in traditional and modern media, and direct discussions with people in conferences, workshops and the media.

10- Establishing a new social contract: All of this would establish a new social contract that would provide trust between the responsible authorities and the people.

Third: Suggestions for an Economic Recovery Plan for Comprehensive Environmental Governance: The environment must be viewed as a return and as an economic investment, not as a set of crises seeking solutions. In parallel, it is important to establish a broad dialogue on achieving sustainability in recovery, or what is known as green recovery, especially since sustainability is required in many sectors that at first glance may seem far from the environmental issue, including public deals, where what is known as green procurement was noted in the public procurement law that was passed in 2021. It is necessary that the government’s economic recovery plan notes the following:

1- Strengthening coordination between the concerned sectors in order to reach a national strategy for sustainable development: A comprehensive view of development matters is necessary so that the approaches are the fruit of the efforts of all concerned, especially the concerned public administrations and local authorities - which are many -, the private sector, environmental associations and citizens. Today, it is impossible to establish policies and strategies without studying the environmental aspect and getting the approval of the concerned, and without looking into the realistic possibilities available and the difficulties and obstacles that exist. Therefore, coordination and integration of the steps is required. It is also impossible to invest the existing resources without a comprehensive economic view. In this context, the concept of productivity in water, for example, must be essential in the plan. By studying the impact of water on social and economic growth, water investments are determined in various sectors, and consumption becomes “smart” and a product that achieves economic returns.

⁹ In this context, reconsidering the National Council for the Environment issued by Decree 8157/2012

Through the content of the developed recovery plan, the water share of each sector is set in a fair and appropriate manner. For instance, focusing on tourism in the recovery plan represents an appropriate water share. The same applies to all other sectors.

2- Imposing a strategic environmental assessment study for draft strategies and action plans: Ensuring that the draft strategies and action plans are subject to the provisions of Decree 8213/2012 in terms of the need to prepare a strategic environmental assessment study, defining its scope and involving stakeholders prior to its approval.

3- Imposing the study of the environmental impact on projects: The study of the environmental impact is a key condition for the conduct of all kinds of projects, given that the costs of environmental damage are large and complex, and can sometimes exceed the desired return from the project itself. Therefore, today, with the economic transformation that has taken place as a result of the emerging crisis since October 2019, Lebanon has a golden opportunity to help it reach economic renaissance. The environment must be a priority and at the heart of transformation. At this point, the environment can be attractive to investments and external financing.

4- Preparing legislation, legal texts and strategies necessary to establish environmental governance: The various environmental sectors should be regulated in accordance with the policy of good governance. This requires the adoption of all the necessary legislation to establish a new environmental era based on new approaches, consisting of green policies in all fields.

5- Investing in the environment and stopping the deterioration that is taking place: It is impossible to think of effective and useful steps in economic recovery without environmental governance being a basis in all strategies and projects in the various tourism, industrial, agricultural, urban, and other economic sectors in a way that secures the revenues the precarious economy needs and provides a lot of economic and health costs in particular. Therefore, this approach would put a stop to the environmental deterioration that is taking place, and provide an economic return that increases growth and helps emerge from the crisis.

6- Completing renewable energy projects: Lebanon should work on launching renewable energy projects in a way that contributes to saving spending in this sector and easing the burden on public finances. In 2019, the Ministry of Energy and Water, with the assistance of the International Renewable Energy Agency, developed a scientific study aiming for the production of renewable energy in Lebanon to make up, by 2030, 30% of the total energy produced. This requires the approval of the draft renewable energy law that has been prepared, in addition to the implementation of the plan set by the ministry, and amending it as necessary, which would also achieve financial savings estimated at up to one billion dollars annually.

7- Reconsidering the structure of the Ministry of Environment: In order to improve environmental management, the powers of the Ministry of Environment should be modified and an environmental regulatory body should be established, in a way that contributes to establishing an advanced management for this sector, in line with the economic recovery plan. It is necessary to study the annexation of the Directorate General of Local Administrations and Councils in the Ministry of Interior and Municipalities to the Ministry of Environment, based on the fact that the central environmental issue should be limited to a single administration that plans, organizes and monitors. Thus, planning, developing strategies, and managing systems becomes in the hands of the ministry, at a time when the municipalities become in charge of the operational mechanisms on the ground. By doing so, the ability for direct action is transferred to the municipalities, which makes the execution capacity on the ground faster. At the level of the ministry, there are two administrative parts related to its tasks: the first has to do with the regulatory frameworks, strategies and public policies, and the second with licenses and the relevant environmental impact assessment system. In any of the ministry's new structures, the independence of each part in its work should be established, with cooperation and coordination between them. It is necessary that the administrative units of the ministry include monitoring and follow-up tasks that have an impact on the environment. It is impossible to think of sound environmental governance without addressing the administrative reality, whereby the central authority plans and monitors everything related to the general outlook and direction.

Annex 1: Environmental Governance in the Water and Wastewater Sector:

1- **The prevailing reality:** governance in the water and wastewater sector suffers from many problems, some of which hinder the required treatments and negatively affect the implementation of strategies after their development. The most dangerous thing is that the problems do not receive the necessary attention, and more emphasis is placed on the crises of other sectors such as electricity, despite the fact that water constitutes a real wealth for Lebanon that can be invested in and relied upon for economic recovery. The main challenges can be summarized as follows:

a - Completing the legal framework through Water Law 77/2018 amended by Law No. 192/2020 and the implementing regulations: This law, which was passed in 2020, provides the framework that regulates the water and wastewater sector. The work in progress focuses on the issuance of decrees implementing the law, successively. This law is the second after Law No. 221 of May 29, 2000 regulating the water sector, which approved the organization of the sector and established 4 investment institutions for water and wastewater in the following regions: Beirut for Beirut and Mount Lebanon, Tripoli for North Lebanon, Zahle for the Bekaa, and Sidon for South Lebanon. The law defines the tasks of the institutions to operate and maintain drinking water, wastewater and irrigation water, which the institutions currently are unable to perform. Law 192/2020 deals with many principles of environmental governance, of which integrated water management, the establishment of associations for water users such as farmers, with preparations for the establishment of a water regulator ... and establishes the National Water Sector Commission, composed of the Prime Minister and ministers directly concerned with water affairs, with the aim of discussing strategic matters of interest to the sector, such as means to distribute water according to the needs of the different sectors (agriculture, industry, tourism, etc.) and studying common water affairs with neighboring countries. It also deals with the foundations of partnerships with the private sector, including the latter in the water sector, and partnerships between public sector parties (water companies, municipalities, Council for Development and Reconstruction, etc.). The law defines the rights and duties of the citizen towards the water company, and the sector as a whole, and makes him a standing sentry responsible for any pollution that takes place in the water sector under his watch. It also defines the responsibilities of the Ministry of Energy and Water and other ministries, water companies and the Litani River Authority in dealing with pollution and setting the necessary backup plans to avoid it. With the modern law, trespassing on water sources has become a felony. It sets administrative and penal penalties for various violations. The French Development Agency has offered the Ministry of Energy and Water the necessary funding to hire a legal advisor in the water sector to study the law in order to prepare the necessary implementation decrees and set the priority in this field.

b- Reviewing the water strategy set by the Ministry of Energy and Water: The ministry's efforts are focused on achieving the new draft strategy set in 2020, an amendment to the previous strategy that was adopted in 2012 but was not implemented as a result of urgent developments and realities, of which political and economic problems and the pressure of Syrian displacement. This proposed strategy includes a clear road map for the water and wastewater sector, with a list of specific projects. An environmental consulting company is handling the preparation of a strategic environmental assessment study for the draft of this strategy in accordance with the content of Decree No. 8213 of 2012. This assessment provides the required coherence between the plan on the one hand, and the social and environmental requirements on the other. A team of experts consisting of 10 members specialized in the fields of the environment, biodiversity and social matters is evaluating the plan by keeping in mind 3 goals:

- 1- Studying the negative and positive effects of the draft strategy set, on the environment and the society.
- 2- Making recommendations to help implement the strategy in an effective manner.
- 3- Encouraging dialogue (POLICY DIALOGUE) among all concerned stakeholders to know how suitable the draft water strategy is and how compatible it is with other strategies developed in Lebanon. This stems from the extent to which the different sectors of agriculture, industry, drinking water and ecosystems need water, and what should be done to preserve water resources and the ecosystem in a sustainable manner.

It is considered natural to conduct a review of the established strategy after a certain period of time, to study the extent to which data and circumstances have changed, and whether it should be continued or whether modifications made in line with the objectives should be set. Abroad, the set master plan is reviewed almost every 5 years with the aim of updating it and making it commensurate with emergency data, should it be available. The review that the Ministry of Energy and Water is conducting today aims to develop a clear action plan that addresses 3 issues:

- 1- Reforms required in the water sector at the level of the Ministry of Energy and Water and water establishments.
- 2- Collecting information related to ground and surface water and other water resources, unifying it through one center in the Ministry of Energy and Water, and working to periodically update it.
- 3- Drinking water, irrigation and wastewater projects by specifying them in detail and priorities in implementation, with water resources that must be developed to secure the increasing demand for water.

The review does not include taking down the set strategy, but rather renewing it through the recommendations and suggestions submitted by the environmental consultancy company, and the lesson is in the implementation and the transition from plans laid out on paper to projects that exist on the ground.

c- Lack of a periodically updated information database available to stakeholders from both, the public and private sectors, and civil society: The sector suffers from inaccurate, lacking, and inconsistent information, due to conflicts between ministries, institutions and bodies concerned with the water sector. In some cases, authorities refuse to put information at the disposal of its seekers, despite its availability. The absence of data is a real problem. What is available is inaccurate, erroneous or contradictory data and numbers. This was reflected in the content of the report "Lebanon State of the Environment and Future Outlook" (2020), which was based on information issued by the Ministry of Energy and Water. For example, the report indicates that the snow cover in Lebanon decreased by 40 to 50 percent in recent years, while studies of other scientific references confirm that this cover covered 6,000 square kilometers of Lebanon's area in 2002, the equivalent of about 60 percent of the area, and that this cover is stable, or rather increasing.

The same applies to the level of water resources represented by rivers and springs, as the report indicates a decrease of 52% in the water level in rivers between 1965 and 2005, and of 23% in springs during the same time period. Meanwhile, several university studies confirmed that there was no change in the water resources that feed rivers, and notably springs. The average amount of water measured in Nahr al-Jawz between 1965 and 1985 is of 57 million cubic meters per year, and of 56.5 million cubic meters per year between 1990 and 2006. The water quantities in the Afqa spring increased by two degrees over a period of 30 years. It was not clear that there was a decrease in the quantity of water in Afqa between the sixties of the last century and the year 2000. Also, there are no accurate data on the quantities of ground and surface water. Ever since the sixties of the last century, dozens of statements have been made, and all of them lack scientific value. Rather, it is safe to say that the majority of the data are slightly revised versions, and the numbers contained in them cannot be relied upon as a reliable scientific reference. The real problem is that the state's water policies and strategies are based on these numbers, which means that billions can be wasted, at a time when what is required is collective work involving experts and specialists to develop accurate scientific data and numbers.

An example of the impact of the lack of information is the Beirut River Project, whose flow canal cost hundreds of millions of dollars back in the 1960s. Because of the lack of reliable and accurate information, the canal was built with a height of about 7 meters, while the water level did not exceed 70 centimeters a day during the flood of rainwater. The course of the river allows the flow of 1,000 cubic meters per second, which is much more than the actual capacity, because the average of this flow did not exceed 200 cubic meters per second. This means, that financial waste due to the lack of correct information could have been avoided.

Another example in the field of information is what happened in the Bisri Dam project, about which 5 studies were conducted without providing a single approach to the subject. The opponents to the project insisted on replacing it with the dynamic stock of groundwater, despite the fact that the stock is limited and does not renew itself and could stock-out if the use exceeds a certain level. The World Bank experts also denied the information that indicated that the dam could cause a devastating earthquake, based on scientific data and their experiences in building dams in a number of countries. However, the opponents maintained their position. The problem may not be in the information as much as it is in communicating with the local population and the objectors and carrying out awareness campaigns that focus on the benefits of the dam project, especially since a plan to keep pace with the environmental compensation in Bisri has been prepared. Nevertheless, the general picture in the mind of public opinion remained the project's disadvantages due to the absence of these campaigns. Today, according to a number of experts, there is no feasible alternative to the project that provides drinking water to the city of Beirut. The proposal to the Ministry of Energy and Water is to search again for financing for the project after the World Bank retreated or to renegotiate with the Bank.

It is necessary to work on finding coordination between the various parties involved in the water and wastewater sector, at a time when there is no coordination in work between them in most cases. Water related information, from measurement to data, is distributed among more than 17 stakeholders. For example, the Directorate of Civil Aviation prepares reports on the amounts of precipitation from rainwater, and the Litani River Authority has information related to rainwater in riverbeds. There is no coordination between the two institutions in this regard.

d- Financing and cost recovery: Work should be done to secure cost recovery in water and wastewater sector projects. Spending on the wastewater sector is modest and very limited compared to a large number of countries. Between 1992 and 2017, the Council for Development and Reconstruction spent 5 USD per person per year, while the average expenditure on equipment maintenance, without building infrastructure, in developed countries is between 40 and 50 USD per person per year. In the Sultanate of Oman, for example, 80 USD per person were spent in order to increase the treatment of wastewater.

e- Objections to the sites and the state's inability to impose its decisions: In implementing wastewater projects for ministries and public institutions, the Council for Development and Reconstruction relies on a master plan dating back to 1994 after the plan was updated in 1982. It also depends on the wastewater sector strategy set by the Ministry of Energy and Water. The Council has implemented a number of wastewater treatment plant projects, of which, today, there are 12 on the coastline, 7 of which operate normally, while the rest still haven't been executed or are not in service. The reason is most often the objection to the site. One of the serious problems in this sector is the treatment of medical wastewater in hospitals, despite the presence of laws and regulations that require these institutions to establish their own treatment plants. Also, stale water in hospitals is of two types: biological and chemical. Water that is not treated is transferred to the public network and pollutes the places it reaches. In most cases, stale water that is untreated at the source leads to a malfunction in the main treatment plants. The solution lies in sustaining the sewage network, not throwing the waste of slaughterhouses, factories and hospitals into it, and limiting the use of the network to wastewater. The Order of Engineers and Architects attaches great importance to the issue, including the requirement for self-treatment of wastewater in every home (in areas where sewage networks have not been completed), no matter how small the area is, and the insulating protection of diesel tanks and not connecting them to the sewage network.

f- Limited coordination between the concerned departments: This translates into complications in planning and implementation, and a waste of time and public money.

g- Weak participation in planning and implementation between departments, associations, academic institutions and the youth: The reality suffers from the weak participation of youth in water environmental matters. Environmental associations adopt a policy of involving the youth in planning and implementation. Some of them suggested holding an annual competition in which students from 58 Lebanese universities would participate, dealing with the preparation of projects on the Lebanese future and achieving environmental development. Associations in another field suffer from the marginalization of their activities. They often present projects, solutions and future plans to the concerned authorities, but they do not find the required response. Nevertheless, they work hard within their modest capabilities, and organize environmental activities in the field of water sector management, such as beach and river bank cleaning campaigns, awareness campaigns, and sit-ins in the event of violations and abuses. Associations' actions often come post disaster and damage.

2- **The suggestion of solutions:** Work should be done to approve some measures and procedures that ensure environmental governance in the water and wastewater sector, the most prominent of which are:

a- Availability of political will: The weakness of the state constitutes a major obstacle to the proper management of this sector. In most cases, political disputes and the race to obtain benefits and the achievement of special interests play a major obstructive role. It is impossible to implement the water strategy, accompanying plans and projects, and establish the necessary coordination without the required political decision.

b- Adopting the principle of integrated management of water and wastewater in planning and implementation: This means the equitable and coordinated distribution of water to sectors according to their respective needs, with the aim of promoting economic and social development without compromising water ecosystems, and in a manner that ensures its sustainable use. This management is now adopted in the majority of developed countries that operate according to advanced scientific strategies. As for Lebanon, it is still far from this policy, despite the fact that the new water strategy refers to this principle. However, the application collides with the lack of accurate information on natural water resources, which are of two types: conventional (ground and surface water) and non-conventional (rainwater and water generated from treated wastewater). To adopt this management, a full report on these resources, in addition to the need of each economic and social sector of water is required, for it to be used in an effective and appropriate manner. In order to achieve this, the established laws must be applied, the most important of which is the Water Law, which indicates the importance of developing plans for water basins. It is also important to think about comprehensive and integrated solutions in the sewage field. In promoting this principle, non-conventional sources of water must be sought. Irrigation water constitutes 70% of the water demand. The agricultural sector is part of what causes river pollution. The Ministries of Energy and Water, and Agriculture must find a solution to this problem. Wastewater can be an important non-traditional source after being treated and used in agricultural irrigation. The policy of collecting rainwater in ponds, which are present in many regions, should also be strengthened.

c- Adopting the principle of environmental assessment in preparing drafts of strategies and construction projects: For an effective and applicable strategy, the strategy should be prepared in parallel with conducting a strategic environmental assessment study for it. In this way, gaps can be avoided by adopting the suggestions presented in the study, which will reduce the waste of money and time, and increase the chances of success of the strategy. Today, this is being done by ECODIT for the Ministry of Energy and Water, in terms of conducting a strategic environmental assessment study for the draft water strategy, so that it can be amended in light of the recommendations of the strategic environmental assessment study so that it is commensurate with the current situation in Lebanon, especially after the economic crisis.

d- Supporting and strengthening water investment institutions and cost recovery: Water investment institutions constitute the backbone of the required solution. The legal texts give it broad tasks and powers that are summarized in the implementation, maintenance and operation of water and sewage facilities, while the Ministry of Energy and Water assumes the guardianship authority over its administrative and financial activities and decisions. The necessary funding should be provided to these institutions by increasing the allocations allocated to them in the budgets to help them perform their required role, and employing qualified employees. A recovery plan for the water and wastewater sector should be developed based on strengthening the status of institutions in order to continue operating the sector and recover the cost. Self-financing and achieving financial balance for institutions is a focal point of the plan. In order to boost the imports of enterprises, the annual water fee allowance was raised to one million liras. The required balance is achieved if the fee reaches 6 million liras. The annual deficit in institutions is currently 80 million USD, of which donors cover only 20 million USD.

e- Partial decentralization of the wastewater sector: There is no solution to the problem of wastewater treatment beyond resorting to this option in a thoughtful manner. Practical experiences have proven that it is inevitable to adopt centralization in the construction of sewage plants in cities and large congregations. However, resorting to decentralization and establishing plants in villages and small towns, especially those located on cliffs, is a practical solution, as it is possible to rely on gravity, sun and air to generate the energy needed for the plants, which reduces operating costs, with a maintenance cost almost equal to zero. Owning a sewage treatment plant for people raises the level of interest they have and makes them directly concerned with operating and maintaining it in the best way. The Council for Development and Reconstruction started to successfully implement such plants in a number of villages in the Bcharre district about 6 years ago. Other villages in the district, Koura, Al-Diniyeh and the South are planning to follow this path.

f- Establishing a unified information center: It is necessary to unify and collect information related to the water sector in one center, which may be the Ministry of Energy and Water, that includes water specialists. With the development of technological means, the center can put at the disposal of those concerned and interested all the data related to the water sector, with the possibility of requesting the amendment and correction of any information proven to be incorrect. A protocol should be drawn up between the institutions concerned with the water sector for cooperation and coordination.

g- Coordinating between the concerned authorities: The adoption of integrated water management presupposes coordination between the concerned ministries and institutions to reach a single vision that takes into account the needs and the different points of view and approaches and be applicable.

h- Partnering with citizens in water decision-making and strengthening the role of associations: This partnership should be achieved at the level of decisions related to managing water demand and the need for it. The use of the expertise of environmental associations that mainly lack the necessary funding for their projects must be strengthened.

Annex 2: Environmental Governance in the Air Quality and Climate Change Sectors

1- **The prevailing reality:** Environmental governance in the air quality and climate change sectors is not limited to the application of laws, with many challenges that can be summarized into four:

1. Air pollution problems, unlike other environmental problems (such as solid waste), are intangible, which makes people not realize their actual size. Everyone mentions the widespread popular movements in 2015 in Downtown Beirut as a result of people directly feeling the impact of the waste crisis at the time. Since 2003, academic researchers and environmental associations have been warning of the dangers of air pollution in Beirut without any popular reaction to it. Determining air pollution levels does not mean anything to people because of the invisible nature of the problem. The same applies to climate change. An increase in temperature of 3 or 4 degrees in the coming years does not provoke any reaction in people who do not feel the impact of the problem.
2. The risks from air sector problems and climate change occur over a long timeframe. For instance, strategies are put in place today to confront and avoid the effects that will occur in 50 or 60 years. In addition, the well-established Lebanese culture is based on the present and does not give importance to every long-term vision.
3. There is some uncertainty in the approach to climate change, which makes people not accept the results reached by science. Matters are not definitively settled beyond any doubt, and research is based on a specific model that is subject to constant alteration and change. What was acceptable decades or years ago is no longer so today, and vice versa.
4. The frequency of working time, which varies between scholars and decision-makers. Scientific experiments and expertise require time, while the responsible decision-maker must take immediate decisions. Sometimes scholars cannot give an immediate definitive answer regarding climate change, because that requires long-term work and research. On the other hand, treatments, drawing up strategies, and the adoption of legislation require immediate decisions from the official.

As for the prevailing reality today in the air quality and climate change sectors, it is based on the following elements:

a- Establishing the legal framework:

What is forbidden and what is permitted has become precisely defined in Lebanon through a set of laws and texts, all of which are based on international treaties and protocols. The Environmental Protection Law promulgated in 2002 (Law 444) included a chapter related to air quality and defined the powers and responsibilities of the Ministry of Environment in this regard.

1. Air Quality Protection Law: The Ministry has been preparing a draft law on air protection since 2003, but its approval was not achieved until 2018 (Law 78), meaning that it took 15 years to establish the framework law for air protection, which is a very long time. The law lays down the general framework for protection, and identifies a number of points that would secure this protection. It enshrines the right of people and all Lebanese regions to breathe clean air. This translates into the fact that pollutant emissions in the air should not exceed the level of emissions set by the World Health Organization. In September 2021, the WHO issued new guidelines for concentrations. The Lebanese reality today is bad in terms of exceeding the level of concentrations by 5-6 times. The Air Protection Law included a regulation of this impact by emphasizing the need to update the limit values to control industrial and non-industrial emissions. It dealt with inspections and permits related to emissions and specified the method and manner of measuring air. The law also dealt with fuel standards and how to regulate them. To this day, not all implementing decrees and legal texts related to the law have been issued, but work is underway to achieve them.

2. Resolution 1/16 - 2022 issued by the Ministry of Environment: In 2022, Resolution 1/16 was issued. It included an amendment to Resolution 1/8 - 2001, pursuant to the Air Quality Protection Law and the relevant national strategy and set the limit values for emissions from the industry sector. The decision is very important in terms of its expected positive effects, noting that Article 20 of Law 444/2002 and Executive Decree 167/2017 on economic and customs incentives would encourage the concerned parties to implement and respect Resolution 16/1 - 2022. The goal is not to harm the industrialists and other stakeholders, but rather to ensure compliance with the legal text that sets standards and foundations that achieve the public interest and the interests of the industrialists themselves. Past and current experiences indicate the commitment of industrialists to the specified limit values, because it achieves a direct interest for them, by requiring the outside to commit so that their industries are allowed to enter foreign markets.

b- Participatory work in decision-making and implementation, and youth participation:

The work sponsored by the Ministry of Environment in the field of preparing projects, strategies and legislation is characterized by the participation of all concerned parties: the relevant ministries, local authorities, industrialists, experts, academics, environmental associations, international organizations and donors. The most prominent example of partnership is Resolution 1/16 - 2022, to which all the concerned parties contributed its preparation. The discussion about it included many universities, most notably: the American University of Beirut, Saint Joseph University, the University of Balamand, and the Beirut Arab University. The matter was referred to a ministerial committee during the government of Prime Minister Hassan Diab, which discussed the matter with the owners of cement factories directly concerned with limit values. The comments made were studied, and the required modifications were made. The owners of the factories signed the draft that was reached as a result of the research and discussion.

Young people participate in local and external activities that discuss the reality of the air and climate change sector, which led to their direct contributions to achieving governance. They often offer unconventional proposals and solutions that are characterized by boldness and creativity away from the prevailing bureaucracy in the work of governments. In recent years, youth participation has been observed in the preparation of many legislations and projects, based on invitations from the Ministry of Environment and a number of other relevant ministries. According to a vote conducted during the 26th Conference of the Parties on Climate Change, young people in particular are looking forward to two things:

1. The serious accountability of governments and decision makers; participation in the negotiations that result in decisions is not enough, what is required is that young people be present when it's time for accountability.
2. Supporting individual and collective initiatives and promoting decentralized activity.

Lebanon is ahead of the various Arab countries in the field of youth participation as a result of the political conditions and the prevailing systems in these countries. The Minister of Environment is working to promote youth participation, and pledges the future participation of young people in conferences related to climate change at the level of negotiations. The ministry is currently preparing Lebanon's vision for dealing with climate change for 2050, or what is known as the long-term strategy. Young people and NGOs will have a say in its development. The problem is the lack of a unified youth coalition that includes advocates for solutions related to climate change. Serious work is being done to address this gap.

c- Politicians' lack of awareness of the importance of the environment:

The budget of the Ministry of Environment constitutes 0.03% of the general budget, which indicates that environmental problems are not a priority for decision-makers. The weakness of political awareness is also translated into another field, which is the weakness of human and technical capabilities in the Ministry of Environment. To compensate for the shortfall, a number of supporters, experts and academics are sought. They have accomplished many tasks and put scientific studies at the disposal of the Ministry, including auditing data issued by monitoring and preparing Resolution 16/1 - 2022. The results of these studies were based on many procedures.

d- The air monitoring network has stopped working since 2019:

The network was made possible by two grants from the Greek government and the European Union. The failure of the Lebanese state to fund maintenance and operation led to its cessation 3 years after it was put into service. All data related to air pollution are currently provided by research conducted by universities, and they are irregular due to the effects of the Corona pandemic and the economic crisis. The role of the network is pivotal and essential in measuring pollution and identifying those who are responsible for it. It allows, through the data it provides, to accurately identify the problem, with the possibility of solving and helping people with good intentions to address the conditions of their factories. Prior to the financial crisis, Saint Joseph University offered the Ministry of Environment assistance and cooperation to secure the necessary maintenance, but the cooperation project did not receive the approval of the Council of Ministers at the time - bearing in mind that many people are affected by the measurement and identification of pollution, and they have no interest in getting the network to work again, which reduces opportunities of securing the necessary funding from local parties (even before the outbreak of the current financial crisis). In addition, the network, over time, may become invalid, as rapid technological developments can overtake it and render it outdated.

e- Working to reduce air pollution by improving transportation:

The Ministry of Public Works and Transport, in cooperation with the Council for Development and Reconstruction and other parties, is preparing a comprehensive study of the public transport project in all of Lebanon, which aims to determine supply and demand in the current circumstances in light of the economic crisis and the high cost of fuel. The project is directly related to the air sector and the pollution caused by the transport sector. The issue of pollution abatement occupies an important part of the study and would achieve part of the required environmental governance. The study is based on an old project that was developed years ago (financed by the World Bank), which stalled as a result of the economic crisis and the Corona pandemic, and work is underway to update it. The research focuses on maintaining funding while expanding the project's framework to include the construction of infrastructure, such as building stations, garages, warehouses, etc. The project includes bringing express busses and others for supply, and the involvement of the private sector in the operation – knowing that the previous version of the project was based on 3 phases: from Beirut to Tripoli in the north; from Beirut to Tyre in the south; And connecting Beirut to the inland through Zahle.

Work is currently underway to modify the project after changing needs and demand, but the coverage will remain at the level of Lebanon as a whole, provided that the first phase includes the previously marked areas from Beirut towards Tripoli, Tyre and the inlands, and to add coverage to it at the foot of the West Lebanon Mountains, which are densely populated areas. The study, which is still in its early stages today, would give a clear idea of the status of the traffic network in Lebanon, and the volume of movement and transportation after the increase in petrol price, which would help in developing an appropriate transportation plan. It was noted that the decline in traffic on the roads during the period of the Corona pandemic, and then as a result of the economic crisis and the high cost of fuel, led to a reduction in emissions and pollution (but the heavy reliance on private electric generators had a very negative impact. A Saint Joseph University study conducted in February 2022 showed that air pollution as a result of the increase in the number of private generators has dramatically increased).

In public transport projects, the Council for Development and Reconstruction relies on the principle of environmental impact assessment during design and implementation, while adhering to international and local standards. Qualified consultants conduct environmental impact studies for the projects implemented by the Council for Development and Reconstruction. The studies are referred to the Ministry of Environment for comments on them, and then a discussion takes place with the consultant to take the comments into consideration. The studies are then published on the Council's websites. Based on the study, a program for monitoring and mitigating treatment is being prepared for the projects. The Council for Development monitors during the implementation of the projects in terms of respecting the established rules and standards (air pollution, dust, noise levels, etc.) and in the operational phase, monitoring becomes the responsibility of the parent ministry. The citizen has the right to object, complain and report any environmental damage that occurs, through the electronic addresses placed at his disposal.

In order to help reduce air pollution resulting from the transport sector, incentive steps were adopted, most notably the draft general budget law for 2022, where the percentage of customs exemptions on non-polluting cars was raised to 100%, knowing that the economic crisis that Lebanon has been experiencing since 2019 could negatively affect the expected return, as the number of new cars purchased by the Lebanese in 2020 and 2021 amounted to about 4,000 cars, which is a modest number, bearing in mind that the undeclared goal for Lebanon according to the Paris Agreement is to reach 20% of low-carbon cars, namely electric and hybrid cars, from the total cars in 2030. The quality of the fuel used in cars, which is Euro 3, causes a high level of pollutants, and many countries no longer use it.

f- Working on the reduction of pollution through energy conservation and renewable energy:

Renewable energy, energy conservation, effectiveness and efficiency constitute a viable alternative to traditional polluting energy, and thus a factor mitigating the negative impact on air quality. The Ministry of Energy and Water has set a practical goal for it to produce 30% of renewable energy from the total electrical energy production in Lebanon. This goal is feasible, provided that the required reforms from the International Monetary Fund are adhered to in a number of areas. It should be noted that there are two main pathways to follow:

1. The technical pathway for the development of the electricity sector: professionals, engineers, administrators and lawyers who develop the necessary legislation, strategies and projects work in it. They can suggest what is required to achieve governance. During the past three years, the Lebanese Center for Energy Conservation completed two draft laws, through joint work with the Dutch Ministry of Foreign Affairs and the European Bank for Reconstruction and Investment, and today they are ready for discussion before the Council of Ministers:

- The Distributed Renewable Energy Draft Law: It has a direct impact on improving air quality. Its application allows the private sector to produce, transmit, distribute and deliver renewable energy to another group through the use of the electricity network of Electricité du Liban, which will be transformed into a "basin" that gives the ability to all people to use the network for renewable energy purposes. The law allows for the production of about 800 megawatts of solar energy projects, which has a direct positive impact on air quality (also, improving the quality of fuel used in electricity production plants currently leads to a reduction in emissions).
- Energy Conservation Project: It includes incentives to conserve energy in existing buildings and those to be constructed in the future. The Ministry of Environment plays a key role in raising awareness in terms of encouraging the use of materials that do not consume energy.

2. The general political track: It relates to the reality of governance, disruption, conduct of business, disagreements and political understandings, and has a significant impact on the approval of legislation, strategies and plans.

2- The suggestion of solutions: A set of measures and steps must be taken to establish environmental governance in the air quality and climate change sectors, most notably:

a- Providing security and stability and the absence of corruption:

These elements form the basis for the success of reforms and the achievement of the required governance. As for its absence, environmental concern is at a low level on the list of priorities. The best example of this is Lebanon, which is experiencing a difficult economic crisis with which people's attention is focused on securing a livelihood and the requirements of a decent life, without focusing on pressing environmental issues. The elements of sustainable development consist of the economy, society and the environment, and any imbalance that affects the first two elements negatively affects the environment.

b- Establishing a culture of law enforcement:

There is no sound environment or environmental governance without the application of the laws and texts in force, and the achievement of accountability and punishment. The most prominent problem is how to ensure implementation, and the challenges in this area are three:

1. The individuality of the Lebanese and their quasi constant quest to get around the law and evade its application: In a study conducted by Saint Joseph University, it was found that about 70% of those surveyed are not willing to do anything to address air pollution. 30% of them stated that they are ready to use public transportation, but it was found that these people do not own a car, and if they ever owned one, they would not use these means. Another study showed that 51% of the Lebanese do not like to use public transportation, which raises a question about the extent to which the Lebanese have environmental values.
2. Weak trust in decision-makers: There is a sort of divorce between people and officials who make decisions. The first team doubts the work of these officials and what is issued by them. The lack of confidence sometimes reaches scholars and academics, and the result is that people do not abide by the laws.
3. Lack of equality: Care should be taken to achieve equality in the punitive aspect, so that no group is held accountable while another group is overlooked, especially when the second group operates without obtaining the necessary licenses and violates the laws. In the same context, the law must be applied in terms of the full-time environmental prosecutors, and the establishment of an environmental control by employing the required human resources. This step would allow the application of punishment when environmental violations occur. In another field, valid monitoring mechanisms must be put in place, after laws are passed and industrial licenses are given, to ensure compliance with them.

c- Drafting the legislation, legal texts and strategies necessary to establish governance:

The time lost now, in light of the economic crisis, constitutes an opportunity to work on drafting the legislative, legal and technical requirements for establishing governance in the air and climate change sectors. This should be used to review existing texts and draft new legislation. It is urgent that the work addresses two things:

1. The adoption of the necessary legislation to give incentives to import and purchase non-polluting cars. It is imperative that the Banque du Liban and the banking sector engage in the project of strengthening environmental governance by encouraging the initiatives and steps associated with it. For example, new car loans can be limited to non-polluting cars. The economic crisis may have been a catalyst in mitigating pollutant emissions as a result of the decline in the use of cars and transportation. However, facing the challenges of tomorrow requires the adoption of the required legislation to reduce air pollution.
2. The establishment of renewable energy projects: The laws relating to distributed renewable energy and energy conservation must be passed quickly, and the relevant projects should be implemented.

d- Community participation in decision-making and implementation: It is necessary to establish a culture where the environment is a public property and it involves everyone, i.e. "our environment", and to move away from the idea of "his environment", which was translated on the ground, by ignoring the environment problems from the individual and considering them as a matter that does not concern him. The reality must be changed because environmental strategies cannot succeed without the participation of society in the decision and accountability. It is also necessary to work on changing the behavior of a large group of Lebanese who do not want to implement laws and seek to get around them or evade implementation. In this regard, it is possible to organize seminars, colloquiums and media campaigns with the aim of explaining legislation, strategies and projects to raise the level of people's responsiveness to them. It is also necessary to publish and provide the necessary information that allows people to know everything related to environmental laws and legislations and the powers and responsibilities of each ministry. Some academics suggest the use of the humanities (sociology, psychology, anthropology, etc.) in order to find a solution to the existing problems, because the implementation of governance in the true sense of the word is very complex, and requires the use of different sciences and capabilities to understand the components of the human environment and take them into account to be able to develop the right laws.

e- Organizing awareness campaigns:

Modern and traditional media play a key role in motivating and stimulating the public opinion to adopt environmental governance in the air quality and climate change sectors.

f- Getting the air monitoring network to work again:

It is necessary to quickly work on securing the necessary funding to get the network that has been suspended since the summer of 2019 to work again. The biggest challenge in this field is that the price of the required maintenance parts is paid in foreign currencies. It is also necessary to conduct an evaluation inspection of the condition of the machines and whether they are still technically operable or should be replaced, knowing that the technological programs used are renewed every 10 years. Securing electricity on a regular basis is another challenge if the financing and technical problems are addressed.

g- Expediting the development and implementation of a public transport plan:

The new study, which is being prepared to be placed before the Council for Development and Reconstruction, aims to stimulate the private sector to participate in public transport by bringing in new buses, with new conditions and a new system. The discussion and research dealt with the possibility of bringing in buses that use the battery or operate according to a hybrid system, and whether they are suitable to function in Lebanon with the irregularity of the electricity situation and the difficulty to constantly provide it, and it is likely to become a major burden with high chances of it to increase as a result of the stifling economic crisis and the lack of the Lebanese resort to renewing their cars. In parallel, the situation of the private car fleet in Lebanon, which numbers between 1.6 and 1.7 million, without counting motorcycles, should be addressed.

h- Accelerating the completion of renewable energy projects:

In 2019, the Ministry of Energy and Water, with the assistance of the International Renewable Energy Agency, developed a scientific study that aspires that by 2030, 30% of the energy produced in Lebanon be renewable. The electricity plan set by the ministry in 2022 was consistent with this study and its objectives. If the plan is respected, in 2030, Lebanon will produce more than 4,000 megawatts of electricity production systems on renewable energy, which will achieve savings estimated at one billion dollars annually.

Annex 3: Environmental Governance in the Terrestrial and Marine Ecosystems Sector:

1- The prevailing reality: Lebanon is facing major challenges in preserving terrestrial and marine ecosystems as a result of the various human activities. Despite the damage done, the situation is still acceptable and amenable to repair and development. The vegetative cover in Lebanon, despite the extensive urbanization movement, still covers, according to the latest estimates, around 13% of the total area of Lebanon. Healthy sea beaches that are protected from pollution constitute 70% of beaches. Law 130/2019 (the Protected Areas Law) regulates the environmental reality in these areas, categorizing these areas into 4 types: natural reserves (including those on private properties¹⁰), natural parks, natural sites, and the Hima. Add to that any other category “to be established by a decree taken in the Council of Ministers based on the proposal of the Minister of Environment in order to preserve natural resources by implementing international treaties in a manner consistent with the natural peculiarity of Lebanon.”

Here, we can include the category of small reserves that are concerned with the protection of a specific type of plants that are at risk of extinction, such as the IRIS BISMARCKIANA plant in the Sarda region, where the initiative to protect it succeeded thanks to the cooperation of the Melkite Greek Archdiocese in the area that ceded 90 hectares and thus allowed the preservation of the plant in its natural habitat. The experience can be repeated with a large number of plants bearing the name of Lebanon or Lebanese regions, and that only grow in Lebanon. Research teams from universities and environmental associations are working on introducing specific species of plants that are threatened with extinction into archaeological sites, ensuring their protection and continuity. They are also working to enhance the role of animals in permanent sustainability projects by preserving their presence, and reviving semi-extinct species, as is the case with the mountain caribou, which the Chouf Cedar Reserve returned to its natural environment in the reserve, with round-the-clock monitoring. University studies are conducted on the DNA found in animal feces, with the aim of identifying the diet of the animal in question, which helps to plant plants suitable for its nutrition, thus preserving it and preventing its extinction, and bringing in other animals.

Among the issues that negatively affect the environmental subject is the granting of building permits for 150 square meters according to circulars issued by the Minister of Interior from 2014 to 2018, which led to severe environmental damage. In March 2022, the Parliament passed a law in this regard that would perpetuate damages and affect food security at the same time. The most prominent features of the current environmental reality can be summarized as follows:

a- Lack of a culture of law enforcement in general:

In general, and with the exception of some cases (such as some natural reserves), the lack of respect for and enforcement of laws prevails in the terrestrial and marine ecosystems sector.

1. Terrestrial Ecosystems Sector: The environment is no longer a priority for people due to the weight and pressure of the economic crisis. The most telling example lies in the unorganized forests sector. The problem increased as a result of the cold climate that Lebanon experienced in the winter of 2022 and the people's need, especially the rural population, for heating. The main problem is that the environmental loss is irreparable, and the damage is irreparable. The Lebanese Mountain Trail is also exposed to direct encroachments, especially when the trail passes through private lands. The Lebanese Mountain Trail Association is making great efforts to curb these encroachments and rehabilitate the trail and modify its path into public property, thus reducing the risk of future encroachments. It has obtained funding from the International Labor Organization for this project. Work is currently focused on giving the redrawing of the trail a legal dimension and putting the trail on its new route on the official maps, with the help of the civil organization. After the completion of the project, the path will be declared a national trail protected by the local community represented by the municipalities and reserves administrations. Successive crises play a role in obstructing the issuance or application of laws, as is the case with the mountain tops protection bill.

¹⁰ As is the case of the Amiq swamp (Beqaa), where the property owners understood the important environmental dimension, and the site is supposed to be declared a natural reserve soon, after the obstacles in front of it were removed.

2. **Marine Ecosystems Sector:** Although Lebanon signed the Barcelona Convention, which stipulated the protection of the sea from all sources of pollution that harm both, humans and the marine environment, the reality is different. The percentage of polluted beaches in Lebanon is about 30% of the total area. As for the sources of marine pollution, they are riverbeds that transmit biological and chemical pollution through sewage and industrial wastewater, and the waste that people throw into the sewers. It hasn't adopted the sorting between biological and chemical pollution. Treating polluted industrial water is limited to a very limited number of factories, with varying efficiency. Solid waste dumped on beaches is an additional source of marine pollution, and it has a very negative impact, as pollution is transmitted to marine ecosystems and from there to fisheries and humans. Another danger to marine ecosystems is overfishing, which uses various methods that contribute to the destruction of marine wealth. These methods include fishing with dynamite, the use of nets with small openings, and the use of diving machines that harm fish eggs and small fish. The harm is not limited to fisheries, but it also affects freshwater springs (in Al Qasimia in particular), sulfur hot springs, and others. The use of dynamite also leads to cracks in the marine environment. The noise accompanying the activities on the beaches plays a negative role and leads to the fleeing of many types of fish from their main environment into the depths of the sea. A study conducted in 2009 showed the presence of dolphins in the sea of Lebanon, affected by sound pollution caused by activities on the beach and at sea. In the face of all these violations, deterrent laws are not applied. Moreover, the work of environmental prosecutors still suffers from a lack of respect for Law 251/2014 in terms of employing them on a full-time basis for environmental work, and the environmental police are non-existent. Various types of pollution negatively affect the marine tourism movement. However, fisheries are still safe. A study by the National Council for Scientific Research conducted on fish samples in Sidon, Dora and Tripoli showed that this fish is safe and fit for human consumption.
 3. **Natural reserves, or at least some of them, are a special case:** Natural reserves are a valid model for complying with the laws in Lebanon, as a result of the efforts and vigilance of those managing them and the response of local communities and tourists. There are 18 reserves in Lebanon and they constitute 3% of the country's total area. If natural sites, numbering to about 20, Himas and biosphere reserves are added to them, the environmentally protected area becomes relatively large. The biggest challenge is how to protect unprotected areas. Those concerned with environmental affairs pose a challenge to them to reach a tangible goal of protecting 50% of the existing natural resources. It should rely on the experience of successful reserves and adopt them as a model for the protection of the existing natural heritage.
- b- Weakness of the central administration and the decline in its role: The central authority, which is a basic line of defense for the environment and its resources, has become in a weak position as a result of the effects of the economic crisis. This is reflected in the decline in the necessary financial resources, and the lack of maintenance of the human system on a daily basis as a result of the high costs of life, of which gas.
- c- The spread of tourism and sports activities and their negative effects: After the Corona pandemic, the Lebanese people's tendency to adopt the activities of natural tourism and ecotourism emerged, which put pressure on the environment and hurt the ecosystems. The problem has doubled after 2019 as a result of this pressure, especially since the culture of achieving environmental sustainability does not exist for the majority of people. The "Lebanese Mountain Trail Association" is facing a real problem every year in the encroachments on the trails it built based on the trails adopted by our ancestors. 50 km are being fixed and encroachments removed annually. The problem is that the environment is no longer a priority for people in light of the stifling economic crisis. The biggest concern has become to quickly achieve financial benefits, even at the expense of the environment and its resources. In terms of sports too, a tendency to resort to physical activities in nature has emerged among the Lebanese. A study conducted by the Lebanese University in the summer of 2020 showed that the number one favorite sport among the Lebanese is walking. On the ground, this resulted in many people seeking to randomly build mountain trails. The strange thing is that these initiatives receive external funding from donors, thinking that they will thus contribute to supporting rural tourism and motivating the economic wheel. This has led to the development of unsustainable trails.

d- Adopting partnerships: participatory reserves are adopted as a means in managing their affairs. This explains the success it is meeting on several levels. A number of reserves, including the Chouf Cedar Reserve, depend on direct work on the ground, and constant communication with the people of the area and local communities. However, the constant challenge is to find a common language for all those who are concerned with the environmental and tourism sectors, starting with decision-makers and public policy-makers in the central authority and donors, to tourism companies and environmental associations, and local authorities and tourists. The concept of ecotourism is not the same for them. Some of them consider visiting natural places as ecotourism, while it is limited to reserves only. Others consider that sustainable tourism is that which includes the four seasons, while sustainability means communication and continuity in a way that preserves the rights of future generations. It includes environmental, economic and social sustainability. The Lebanese Mountain Trail Association, in turn, adopts a participatory work system. In 2022, cooperation with the civic organization and municipalities began in order to organize the trail that stretches over 470 km from the northern town of Andaq to the southern city of Marjayoun. The work aims to make the trail legally protected so that it becomes a national trail with a heritage dimension, adopting internationally approved standards and criteria. Partnership is also adopted through cooperation with LIBNOR Standards Institution to set the standards required for mountain trails and reserves.

2- The suggestion of solutions: In order to preserve terrestrial and marine ecosystems, the following should be done:

a- Implementing, updating and creating the necessary laws: It is necessary to work seriously on implementing the existing laws, and on adopting those required, given that the environment constitutes a dynamic system that requires the continuous development of laws. Among the most important laws that must be adopted or enforced:

1. Laws that guarantee biodiversity, such as the protection of endangered plants. The main problem in this field is when the plant is present on a private land, knowing that about $\frac{3}{4}$ of the land in Lebanon is private property. Land owners often refuse to give them up to the state due to the lack of confidence in it. In developed countries, incentives are provided to those who pledge to protect the plant in its natural environment, such as exemption from some taxes. Here, it is possible to build on the paragraph related to private lands of Law 130/2019, the Urban Planning Law, and others.
2. Laws regulating modern non-traditional tourism, which are not limited to organizing the trip, but also include all activities done.
3. Laws regulating the work of tour guides working in reserves and nature.

As for the laws that must be updated to keep pace with developments and changes in the environmental and tourism reality, the most prominent of them is the Wild Hunting Law that was approved in 2004.

b- Focusing on science in the development and application of strategic environmental planning: Science has become a basis in strategic environmental planning. It is adopted in the management of reserves in particular. It is no longer possible to establish a project related to rural tourism, eco-tourism or urbanization without a scientific study. The strategic environmental planning that is being worked on aims mainly at limiting urban sprawl. Planning leads to two practical outcomes:

1. The general plan that obliges the state and its administrations to adopt what is stipulated in large projects such as dams, roads, landfills, etc.
2. Architectural plans in detail: Defining all the details contained in the plans. Through strategic environmental planning, priority is given to the environment in any activity that includes urban expansion. The availability of water, underground wells, and whether there are animal or wild species that may be threatened with extinction as a result of this activity is studied. This is essential to protect this system. In the reserves, the scientific bases are adopted in the investment plans, in order to ensure the preservation of the ecosystem. Also, publishing studies and information and putting them at the disposal of the public opinion would help in strengthening environmental governance, especially when the goal of these studies was to raise awareness in terms of the concepts of governance.

This includes what the National Council for Scientific Research is doing in terms of issuing an annual report that specifies the status of Lebanese beaches, unpolluted areas, and areas where swimming should be avoided. The Council conducts studies and research in the sea through a scientific vessel that provides valuable data on the marine ecosystem. Environmental and tourism associations and a number of universities are also conducting studies dealing with the tourism reality and its components that would help develop new tourism trends, especially after the recent developments represented by the Corona pandemic and the economic crisis. Despite the progress that has been recorded during the last ten years in the field of research, the need is still great. Research work should be organized according to specific tracks that take into account needs and priorities, in order to be a starting point for strengthening governance related to reality. The main obstacle facing research and studies is providing the necessary funding in light of the stifling economic crisis. Sometimes, some official institutions face difficulties in obtaining available credits from external financing, due to the monetary and banking crisis.

c- Encouraging the policy of environmental sustainability: It is necessary to promote work on several plans and projects in this framework.

1. Increasing the number of reserves in various regions, which leads to the preservation of the existing natural heritage.
2. The strategic plan for sustainable mountain tourism: The project is being prepared between the Ministries of Environment and Tourism in cooperation with the United Nations Development Program, based on the three foundations adopted in sustainable development: the economy, the society, and the environment. It aims to conserve natural, economic and social resources. The strategic plan includes many clauses, including those directly related to the environmental issue. The strategy recommends the adoption of reserves and protected areas as destinations for sustainable mountain tourism. It emphasizes on the Hima model in terms of community participation in decision-making. It stipulates the need to include awareness on sustainability in school curricula. It should keep pace with the prevailing global trend in terms of establishing a local management of tourism, which depends on a partnership away from a centralized approach based on bureaucracy. The partnership in this case is based on the efforts of the public and private sectors and the local community, through representatives of the various parties. Thus, it becomes easier to take the tourism decision, develop plans and promote tourist destinations. All of this contributes to enhancing sustainability. The Ministry of Tourism, in cooperation with the Ministry of Environment and with the support of the United Nations Development Program, is working on developing guidelines for the development of tourism services in accordance with the principles of sustainability. A project will be implemented with the World Tourism Organization with the aim of developing the necessary legal framework for this local administration and how to organize it.
3. Adopting sustainable harvesting by picking plants in a way that ensures their continuity. Unsustainable harvesting puts plant species at risk of extinction. In this regard, it is necessary to develop a complete list of the names of medicinal plants in Lebanon, and the method of harvesting them in a sustainable manner. Recently, Lebanon witnessed an unjust harvesting of two plants, the sage and the common sage. Huge quantities of the first plant were exported to Jordan, until the Ministry of Agriculture intervened, fearing that other plants would suffer the same fate.
4. Creating mountain trails that adopt international standards, then creating a management marketing for each trail. The administration, which could be a municipality or an association, is responsible for ensuring the required sustainability of the trail. The management of the natural landscape in the reserves as an integrated unit is considered as part of the framework of environmental sustainability, which is the model adopted in the Mediterranean basin. This view provides for the preservation of the ecosystem through the preservation of all components of the landscape (forest fire barriers, roadside cleaning, etc.). It also provides many job opportunities for the local population through various activities in and around the reserves. It is impossible to promote sustainability without rehabilitating workers in the environmental and tourism sectors and regularly training them to keep pace with developments in this field.

d- Enhancing environmental investment that achieves economic returns: Investment in the environment is considered to be a success in terms of its high economic returns. A recent scientific study showed that the return for each dollar invested in the Chouf Cedar Reserve is 19 dollars, in addition to contributing to the preservation of ecosystems such as water, plants and carbon depletion. There is no possible way to separate the environment and tourism from the economic process, and to show the economic feasibility of each environmental and tourism activity, for those concerned. All efforts should focus on the importance of achieving sustainability as a vital component of the process. The economic crisis should not be an obstacle to the development of eco-tourism. Rather, it can constitute a motivating factor by securing returns for projects and investments. The best evidence of the existing economic movement is the result of the presence of reserves in a large number of areas that adopt an administrative plan for them, where local communities have become dependent on this activity to secure a decent life. The work of local communities is translated through volunteers and their involvement in various environmental projects, which greatly enhances the participatory process. It is important to consider providing incentives to people who take into account environmental sustainability criteria in their projects, such as securing the necessary funding and helping them communicate with investors or donors. With regard to the preservation of marine ecosystems, a culture of sustainable fishing should be established, fishermen should be encouraged to avoid illegal and crooked methods of fishing, and industries based on marine products should be encouraged.

e- Enhancing participation: It is impossible to maintain terrestrial and marine ecosystems without strengthening and developing existing participatory systems. It is supposed to start at the level of the local authorities and reach the central authorities. Partnership has evolved over time. The first administrative plan established for the reserves on a participatory basis included 3 reserves: Ehden, the Palm Islands, and the Chouf Cedar. The reserves' partners were identified by local parties (the Ministry of Environment, municipalities, the Civil Defense, the Red Cross, local schools, etc.). Nevertheless, today the reserves' partners are all people. The management of the natural landscape assumes the contribution and partnership of the land owner, the land investor, the fisherman, the tourist, in addition to the local parties involved in the management. Participation ensures the preservation and protection of natural and heritage resources. A recent scientific study on the rehabilitation of neglected lands in the vicinity of the Chouf Cedar Reserve through participatory efforts revealed the presence of 330 species of plants, including about 12 species of importance in terms of biodiversity.

f- Spreading awareness: It is necessary to spread environmental awareness in the terrestrial and marine ecosystems sector, through the central authority, local authorities, associations and the media to motivate people to conserve and protect terrestrial and marine ecosystems. There is often a lack of understanding of the meaning of protecting biodiversity, and people believe that protection always requires not harming natural resources, while the goal is to achieve environmental sustainability. For example, some forests can be fully protected, and it is allowed to cut trees from other forests, in order to achieve the required sustainability. Awareness must also be spread to implant a culture of environmental sustainability in people's minds, so they resort to choosing their representatives at various levels, from among those who give priority to the environment in their thinking and politics.

g- Marketing: The marketing of eco-tourism and regular tourism has become a necessity in the modern era. Work should be concentrated in the direction of two types of markets:

1. The national local market to encourage people to discover the existing natural resources.
2. The global market, which is divided into many markets, including the Lebanese expat market, the Gulf market, and the market for non-national residents in the Gulf. One can think of organizing long weekends for these people, extending from Thursday to Monday morning. In all cases, marketing should target specific customers.

Annex 4: Environmental Governance in the Land Management and Urban Planning Sectors:

1- The prevailing reality: Despite the issuance of many reports, studies and suggestions related to the reality of land resources and urban planning, this reality is currently worse than it was decades ago. Despite the numerous suggestions and recommendations, they did not affect the existing reality. The environment is attacked on a catastrophic daily basis, which has led to significant deterioration and losses of hundreds of billions of dollars. The environmental problem is multifaceted, in which responsibilities are distributed to the Ministries of Public Works and Transport - urban planning, Interior and Municipalities, Environment, Agriculture, Industry, etc., the Higher Council for Urban Planning, the National Council for Quarries and Crushers, municipalities, and a number of unions and associations. Municipalities play a pivotal role as the authority that grants building permits and approves permit applications for quarries and crushers. The main problem is that a number of officials in these departments are ignorant of the laws and regulations or ignore them, and do not know or abide by their duties and responsibilities. In most cases, the administrations in general, including the local authorities, have become composed of members who represent the active political forces or are influenced by them, which negatively affects their activities.

a- Delays in enacting laws and/or not implementing them: The legal reality that governs the urban planning sectors, and quarries and crushers, varies.

1. Urban planning: The general master plan or what is known as the comprehensive plan for arranging the lands was approved in 2009 after it was drawn up in 2004. The delay in developing the draft, and the relatively time distance between drafting and reaching the plan, indicates the lack of firm and solid support for it from by the political class. Some experts believe that the delay in approving the scheme was intentional, with the aim of allowing investors after the war to benefit from the absence of regulation. It was accomplished in a national unity government, as a result of direct European pressure, to which the government gave in in order to obtain the required economic and financial aid. It is safe to say that the scheme has received no objection from the government as it was approved. The master plan established general directions for uses in Lebanon, and divided them into several uses related to cities, rural areas, forests, etc. according to the validity of their use and investment. It also identified areas in which to build. It included plans for land and sea transport, noted extensive transport networks, and established major highways such as Zahle - Baalbek, and determined how to build on both sides of these highways. It also noted the so-called "balance areas" in Tripoli, Nabatiyeh, Zahle, and inland cities, and the establishment of industrial and agricultural zones to achieve development with the aim of keeping people in their land. It also addressed mountain tops and forests and the need to preserve them. Since its approval in 2009, the Higher Council for Urban Planning has based its decisions and actions on the content of the plan and seeks to implement it in individual transactions and directive designs for cities and villages. If the plan had been fully implemented without obstructing political interference, it would have helped develop the economy and preserve the environment. Thus, it can be said that the plan did not contribute much to improving the environmental situation and controlling urban sprawl.

Practice has shown that there are loopholes in the implementation of the plan, which is why it has become necessary to amend it. In this regard, it is necessary to re-examine the ways of using lands and how to benefit from them environmentally, in addition to preserving the rare remaining green spaces, and maintaining and protecting heritage buildings. While the plan was criticized for being based on an intellectual background based on investment and consumption of resources without taking into account the extent of their sustainability, and the ecosystem was mostly bypassed, and two principles of protection and sustainability were not taken into account, and that a comprehensive and detailed plan for development that addresses different sectors, especially transportation and energy, industry, agriculture and housing was absent, experts agree that the root of the problem is in the application. In its periodic meetings which are held at an average of 4 times a year, the permanent committee charged with keeping pace with the implementation of the master plan suggested some amendments that would develop it. However, these suggestions do not seem to have seen the light. With regard to the problem of the investment factor, there are areas organized according to decrees or minutes issued by the Higher Council for Urban Planning, and completely unorganized areas that constitute more than 50% of the

Lebanese territory. In 2019, the urban planning council took a decision addressing unorganized areas in terms of use and investment, according to a specific comprehensive plan. However, the political authority and a large number of municipalities expressed their objection to the decision, which led to the delay in its implementation. There is a section related to the sustainable building plan in place. It was issued in a joint booklet prepared by the urban planning council and the Order of Engineers and Architects in Beirut, and aims to mitigate the negative effects of construction, which affect the surroundings, especially infrastructure, water resources, energy resources, and wastewater. Conditions were set on buildings to mitigate the abovementioned negative effects. For instance, high residential buildings and industrial and commercial establishments are obligated to generate energy for them, secure sewage treatment plants, collect rainwater and recycle it for reuse. Work is focused on including in these directions the new building law, which is constantly updated and developed, so that sustainable buildings are at the heart of this law.

2. Quarries and crushers: Decree 8803/2002 and its amendments regulate the quarries and crushers sector. However, the majority of the activity in this sector is located in areas outside the plan noted in the abovementioned decree, and some of them are in residential areas, and that, either through decisions issued by the Council of Ministers, or through licenses for other businesses that conceal quarrying work, or through administrative deadlines described by the Legislative and Consultation Commission as an equivalent to administrative decisions that are non-existent. The same applies to many areas in the north, south, in Mount Lebanon and the Bekaa, where chaos reigns and random construction spreads in the forests without any legal deterrent. By violating and circumventing laws, mountains and hills were completely or partially destroyed in a number of Lebanese regions. Often, a permit is obtained from the municipality, based on a permit from the Urban Planning Department, without any control over the existing works. In the town of Kfarhazir in Koura, where the investment factor is relatively low, lands are expropriated and destroyed by quarries established in residential areas after their owners obtain licenses to dig from the municipality or rely on administrative deadlines. In Jabal al-Rayhan in the south, 12 sand quarries are working. They pollute the waters of the nearby springs, in addition to the winter torrents that flow into the riverbed of the Litani River. As a result, it committed an ecological massacre in every sense of the word, with which mountains ceased to exist. Despite the issuance of Decree 8803 of 2002 to regulate the work of sand quarries and put an end to the ongoing environmental massacre, the concerned administrative authorities did not respond to its implementation. Environmental associations and the people of the area organized demonstrations in the area and media campaigns that succeeded in putting a temporary end to the violations.

b- Weak state authority and political interference: The Lebanese live in a semi-state in which politicians interfere in environmental affairs related to land resources and civil regulation to legislate or cover violations, in order to achieve personal interests:

1. Weak state authority: Environmental affairs related to land resources and environmental regulation are not considered a priority for officials in a state that complains of a significant weakness in its authority, and private and factional interests are often given priority over the public interest. Therefore, the main problem is political, not functional or technical. Added to this is the weakness of the sense of national belonging. Therefore, a political leader in Mount Lebanon would consider that he is not concerned with environmental affairs in the south or the north, and vice versa. This negatively affects the solution of environmental problems and the formulation of the required national policies.
2. Political interference: For decades, the ruling political authorities have been directly responsible for environmental degradation in the land resources and urban planning sectors. The most prominent manifestation is the law issued by the Parliament in March 2022, which increased the investment factor, which poses a direct danger to buildings that do not meet the required technical specifications. The law was considered an irresponsible electoral bribery, with dire consequences.

The Order of Engineers and Architects in Beirut objected to the new law and indicated its dangers. The so-called architectural identity of each building was not taken into account, or the required urban organization was preserved, in order to maintain general harmony, knowing that the municipalities and municipal unions had previously been given the authority to issue building permits for an area of 150 square meters without providing the required oversight from the Urban Planning Department. This is often accompanied by direct political interventions in organizational and administrative issues, which helped create the chaos of urban sprawl. The sand quarry and quarry sector is also a model for direct political interventions. It is clear that this sector is distributed among most of the political forces and parties to manage it and make huge profits from it.

c- Heavy environmental, health and economic losses: Violations and attacks on the environment inflicted severe damage on the sectors of land resources and urban planning, and caused great economic losses, especially in the first sector.

1. Environmental losses: Quarries, crushers, and cement production plants have completely or partially destroyed natural resources, and mountains and hills, constituting irreplaceable wealth, have disappeared. The gases emitted by the cement companies in Koura also wiped out the natural resources of figs, almonds and grapes. Acid rain saturated with corporate gases wiped out millions of historical trees. The removal of the mountains of the Koura sea front led to dangerous climatic changes, and the excavation of red dirt quarries in the heart of the Koura olive forest, and turning these quarries into lakes and swamps, caused the spread of the fungal Peacock Eye disease, and caused extensive environmental destruction. In order to avoid damage, it is prohibited in most of the developed countries to use high-sulfur petroleum and coal, which are used by cement factories in Lebanon, and factories are set up in areas far from inhabited areas. The production of each ton of cement in cement factories leads to direct health problems, the bill of which is estimated at one million dollars. High cases of cancer are recorded in the Koura region, which is close to the cement factories, where the percentage of infected patients in the town of Fih, for example, reached 52% of the population a few years ago. Now, with the use of filters, it has decreased to 35%. On the other hand, the owners of companies make huge profits. While a ton of cement is sold in Lebanon at 70\$, its price in Egypt is 32\$, in Iran 32\$, and in Saudi Arabia 35\$.

2. Economic losses: The size of the losses should not be underestimated as they are devastating and cannot be compensated in some cases. Some experts believe that their value is not less than the value of the deposits that the Lebanese lost in banks. The state's rights from the crushing and quarrying sector alone, according to some estimates, amount to more than 5 billion US dollars.

d- Weak environmental awareness and lack of respect for laws: Despite the fact that the Lebanese people instinctively adopted the rules of urban planning before the current regulations were put in place, the last fifty years have clearly revealed the absence of environmental awareness, and Beirut and other large cities and its surroundings have turned into blocks of concrete as a result of urban chaos. The capital witnessed an instinctive proliferation of towers without paying attention to the ability of the infrastructure to withstand this, especially roads, electricity, water and the Internet. Environmental experts believe that the real problem lies in the increase in the investment factor in the capital, which led to the disappearance of green spaces and the prevailing urban expansion. Add to that the lack of application of laws and the spread of violations and construction settlements for which legislation has been issued for many decades. The relevant agencies in the Ministry of Public Works and Transport - the General Directorate for Urban Planning, and the municipalities were unable to carry out the necessary oversight to curb the chaos. The wars and the instability that accompanied them also contributed to the urban chaos that occurred.

2- The suggestion of solutions: Getting out of the prevailing reality requires a large workshop based on necessary reforms and required legislation. While some see the need to revive the Ministry of Design, which Lebanon knew in the last century for a short period, or to establish a Ministry of Planning whose tasks are linked to all relevant ministries and public institutions and oversees all development and planning matters, starting with the review of all existing plans and then developing a general planning study for all Lebanese territories that is valid to regulate the situation in the next 20 or 30 years. For example, others see the necessity of establishing an environmental emergency body that includes representatives of the relevant departments, activists in public opinion, associations and universities. It studies environmental concerns and proposes an emergency plan based on existing laws, legislation and projects. Some experts also believe that the problem does not lie in the absence of these institutions, but rather in the application of laws and regulations:

a- Implementing and creating laws: It is necessary to implement existing laws and stop the political interference that hinders this, and which aims to circumvent these laws and impede the public interest. Compliance with the law must be the basic rule, as is the case in most developed countries. As for the laws settling building violations, for example, which are issued on a regular basis, they give a bad signal to the ordinary citizen that the violation will be followed by a settlement. The provisions of the law that define the conditions and standards for land reclamation must be adhered to, and in cases of industrial activities, rehabilitation processes are distributed over phases, so that moving from one phase to another is not permissible before the required rehabilitation is completed. Decree 8803/2002 - Article 12 also stipulated the rehabilitation process. In the sector of crushers and quarries, the required balance must be found between the application of established laws and the production or import of soil/aggregates, which is a vital material in construction works that is indispensable.

b- Adopting sustainability and urban planning in its broadest sense and setting the necessary strategy: It is necessary to get out of the urban chaos and environmental destruction that has occurred and to set the necessary regulatory rules so that urban, industrial and other activities are not synonymous with devastation and damage, as a balance can be provided between urban and economic needs and the preservation of the environment. For this, a number of measures and steps must be taken:

1. Developing a national strategy for sustainable development that includes identifying the real needs of Lebanon in the sectors of urban planning, quarries, crushers and all sectors, as well as the capabilities and objectives of each ministry, followed by approving the necessary laws that translate the strategy into projects and operational steps. The existence of laws would reassure investors of the existence of a legal framework that takes care of their rights and duties. The strategy should note how to manage the natural resources in Lebanon that are above and below the ground and develop a new economic model that allows for benefiting from them and employing them in the economic recovery plan. The strategy can be based on the data provided by the surveys of the Lebanese Army on the sites of quarries, crushers and sand quarries, in order to file lawsuits against investors in the sector to collect the lost state rights and impose fines.
2. Applying the rules of sustainability in construction in order to reduce the negative effects of construction on the surroundings and infrastructure. However, this contradicts the weakness of the basic services that must be provided before adopting this option. How can we imagine the existence of a "green building" that adopts the highest environmental standards and at the same time uses private generators to provide electricity, with all the toxins and emissions that they emit.
3. Facilitating the import of cement, transferring cement factories to the uninhabited East Lebanon mountain range, and banning the use of coal and petroleum in all cement factories on Lebanese territory.

c- State investment in the quarries and crushers sector and the adoption of a law for it: The state can monopolize investment in the so-called “white gold” sector, designate specific areas for investment, and provide protection to other areas by prohibiting the establishment of quarries, crushers and sand quarries in them. The state can invest directly in its own properties and that of the Banque du Liban on the eastern border in the Tfail area, where the area suitable for investment is estimated at millions of square meters. The regulatory decrees must also be replaced by the adoption of a law regulating the sector and putting an end to the forces, parties, and political figures benefiting from quotas and the existing chaos.

d- Participation and cooperation: Governance requires the adoption of partnership and cooperation between the central authority and other concerned parties, including public administrations, institutions, local bodies, the private sector and civil society. Cooperation would secure the required integration in preparing and implementing laws and regulations, emphasizing that universities, associations and unions cannot replace the state and its institutions, and they often play a significant moral role without any executive effect.

e- The adoption of science and studies: The organization of the sectors of land resources and urban planning should be based on scientific studies. Universities, in their capacity as educational institutions independent of the authority of parties and political forces, can make valuable contributions through research, participation in submitting proposals, preparing projects and drawing strategies. Unions and civil bodies can also offer their contributions as advisory bodies, putting their expertise at the disposal of the state.

f- Organizing an awareness campaign or a pressure force: carried out by the concerned departments and the vital forces in society in order to put pressure on ending the urban chaos, and to stop the environmental massacres caused by quarries, crushers and cement companies.

Annex 5: Environmental Governance in the Solid Waste and Chemical Management Sectors:

1- The prevailing reality: Lebanon suffers from many problems in this sector. Two sanitary landfills at the northern and southern entrances to Beirut receive waste from the capital and the Mount Lebanon Governorate. There are about 1,000 uncontrolled dumps in various areas, and those responsible for a large part of them burn waste to get rid of it, causing health and environmental disasters. The management of solid waste and chemicals lacks the required governance, as a result of the weak authority of the public sector and political interventions, which prevented the development of a sound treatment strategy.

In the 1990s, with the end of the war, research began to develop a national strategy for solid waste. However, matters settled on arriving at an emergency and temporary plan to be renewed on an ongoing basis. A strategy was supposed to be developed within 10 years, as is the case in various countries when dealing with the issue of solid waste. This situation was maintained because it secured huge profits for the politicians who benefited from it, until the disaster occurred with the explosion of the waste crisis in 2015. In most cases, the logic of profit and benefit controls the approved policies instead of governance. There is a wide network of direct beneficiaries of the sector who are sponsored by powerful politicians. The situation today has become worse than it was in 2015 had the Council of Ministers approved the tenders that were conducted at that time, as a result of the solution that was adopted in 2016 and based on a political settlement between the various parties, while in 2015 an objective scientific solution had been put in place. It was aborted after civil society objected to it.

Hazardous waste, which includes chemical waste, some industrial waste, mercury, electronic waste, electrical transformer waste, batteries, and some household waste, should not be neglected.

a- The general legal framework: The framework regulating the sector is divided between law and strategy.

1. Law No. 80 of 2018 (the Integrated Solid Waste Management Law). The sector organizes and focuses on decentralizing waste management, especially in the matter of collection, sorting and treatment, while maintaining the centralization of landfills. It defined the responsibilities in this sector, and allowed the use of various techniques, after mitigating and sorting at the source. It also defined the powers and roles of the various ministries, especially of Ministries of Environment, and Interior and Municipalities. The main problem of the law is the failure to adopt a cost recovery system, which makes waste a continuous financial burden on the treasury.
2. Solid Waste Sector Management Strategy: The draft was prepared in 2019 and is currently undergoing a strategic environmental assessment study after providing the required funding from the World Bank. ELARD, in cooperation with a Greek company, is conducting the study. Evaluation is one of the planning mechanisms noted in Decree No. 8213 of 2012. It is supposed to keep pace with all projects, as it constitutes one of the mechanisms that help when making a decision. The strategy will provide for clearly defining objectives such as the percentage of landfill, how to invest in the sector, and the treatment of hazardous and electronic waste, etc.

b- Failure to apply laws: Lebanon suffers from the absence of the rule of law. Impunity prevails, the law is circumvented, and the powers conflict, which prevents the application of accountability and proper oversight. Political and personal interests have dominated the sector, and the waste has become linked to specific regions, sects, and interests from which the powerful benefit. Lebanon also suffers a lot as a result of the absence of the required legislation. The adoption of Law 80/2018 took 13 years between preparing its first version and its issuance. In many cases, the legislation is subject to political moods. A good example of this is Law No. 80, which a specialized technical team in the Ministry of Environment worked on preparing, but it was subjected to amendments in the Parliament, some of which distorted it, especially in terms of canceling the article dealing with cost recovery, which is a pivotal and essential article for the continuity of the sector, as the financial deficit in waste, in the event that it is not addressed through the adoption of cost recovery, it would impose burdens on the treasury similar to what it bears from the electricity sector in the long term. In addition, waste treatment is a service that should be subject to a fee in exchange for obtaining it.

Despite the issuance of a number of important laws regulating the solid waste and chemicals sector, many implementing decrees have not yet seen the light of day. Moreover, legislation related to e-waste is not being implemented, and it is very dangerous because 60% of it is found in homes, emitting its bad emissions there. Even the major companies working in the field of solid waste do not give electronic waste the required special care because of its extreme danger, and it is treated as is the case with solid waste. Law 80/2018 is classified as the law that embraces and collects all types of solid waste, of which hazardous waste constitutes a part. The lack of application of laws is manifested in the following matters:

1. **Political interference:** Governance assumes complete impartiality on the part of responsible bodies, which is not available in Lebanon, as politicians' interference prevents the implementation of legislation and laws in force at the expense of the public interest. Politicians' interventions negatively affect the performance of the various stakeholders in the sector, or those that provide contributions and assistance in proposing treatments, such as the Association of Lebanese Industrialists, in which influential politicians play influential roles.
2. **Absence of the institutional and organizational system:** The absence of effective policies and the organizational institutional system has led to the spread of corruption and the failure to meet the needs of citizens in this field.
3. **The authorities have not been defined until recently:** This was clearly demonstrated in 2015. Without defining the powers, it is not possible to determine the responsibilities and carry out the required accountability. The Ministry of Environment sometimes implements solid waste projects, at a time when its role is supposed to be limited to preparing draft laws, public policies and strategies.
4. **The management of the waste sector has also been extended by political interests to unrelated departments such as the Office of the Minister of State for Administrative Development, for example, which undertakes the implementation of solid waste projects. The chaos is also represented in the municipalities or the municipality unions implementing similar projects without any coordination or planning of the need and capabilities in many cases with the concerned authorities. The confusion increased with the failure to distribute the funds of the Independent Municipal Fund to the municipalities on a continuous basis, which led to the deprivation of the municipalities from an important financial source, and consequently their inability to implement required projects.**

c- Not sorting solid waste from hazardous waste: In many cases, solid waste is not sorted, and hazardous waste is not separated from it, and transferred to sanitary and open dumps as they are. There is no doubt that sorting and treating hazardous waste separately solves an important part of the solid waste problem. Information indicates that electronic waste constitutes 3% of the contents of random landfills, and 70% of the toxins resulting from this landfill waste.

d- Absence of required information: In the absence of reliable information, studies and treatments in this sector are based on estimates.

e- Weakness of the role of the Ministry of Environment: Environmental concerns have never been a priority for officials. The Ministry of Environment is the main focus of any plan based on governance. It was often viewed negatively by other ministries, as it is the authority that sets rules, restrictions and limits, and thus "obstructs" the work and plans of these ministries. The Ministry of Environment also suffers from the weakness of its budget, which amounts to 0.03% of the general budget, and after the exacerbation of the economic crisis, it has become insufficient to provide the simple operational matters of fuel and office supplies. This is accompanied by the failure of employees to carry out the required tasks on a daily basis as a result of the impact of the economic crisis on salaries.

2- The suggestion of solutions: Solutions depend on good political will and putting the public interest above all else. It is divided into the legal, administrative, practical and technical fields.

a- Amending Law 80/2018 and approving the required legislation: A number of amendments to the law should be approved, most notably regarding the adoption of a cost recovery system, as it is impossible to think of a final, sound solution to the issue of waste without imposing a parallel fee. This system constitutes an application of a basic principle found in Lebanese laws, which is “the polluter pays.” Therefore, amending Article 28 of the law, which deals with sources of waste financing, is an imperative. The cost recovery must be started from the decentralized local level, such as municipalities or municipal unions, based on needs and capabilities. It is not possible to rely on the sidewalk construction and maintenance fee, which is part of the municipal fee currently approved as a funding basis in the cost recovery system. In fact, if the system is adopted, it can constitute a financial incentive to reduce the volume of waste, because the imposed financial fee would encourage people to reduce their waste, in order to avoid an increase in the value of the fee with each increase in consumption, as is the case with electricity and telephone. It is also necessary to put a fee on chemical and hazardous waste, which is higher than the fee for household waste, and to apply the system of fines that exist in case of violation, including throwing hazardous waste in containers on the roads. The implementation decrees of Law 80/2018 should also be approved, the most important of which is the decree establishing the National Waste Management Authority, and the strategy required for the sector. Among the required legislations is what is related to the development of standardized model books that include sorting from the source, reducing the volume of waste, and reusing. The role of municipalities and municipal unions should be strengthened so that they are responsible for sweeping, collecting, transporting, sorting and some types of processing.

b- Integrated management of the sector, amendment of the powers of the Ministry of Environment and the establishment of a national body: The integrated management of the sector has become a duty, with the redistribution of responsibilities and powers. There should be a new approach to the role of the Ministry of Environment, and an independent national body should be established. The role of the ministry is limited to laying the foundations and general frameworks, while the authority is in charge of implementation, licensing and oversight. This experiment has been adopted in a number of countries, including Saudi Arabia, which has established an independent center for waste management. The regulatory body can undertake the establishment of an economic market for waste that displays and sells the products produced from valid materials from operations at the source. As for the implementation of decentralized projects, it is the prerogative of the local authorities. On the other hand, it is necessary to enhance the human, technical and financial resources of the Ministry of the Environment, which suffers from vacancies that represent more than two-thirds of its staff, which is noticeable in the administrative structure.

c- Adopting decentralization and municipal cooperation: Decentralization is the best solution to the sector's problems. Rather, a transitional phase must be passed that includes, in addition to approving the necessary legislation, training and rehabilitation, assisting municipalities that do not currently have the required financial and technical capabilities. As for the laws that should be approved, they must give the municipalities the required independence and the necessary means, in a way that provides capacity building for them. This is accompanied by the establishment of so-called "service areas" that include municipalities that cooperate with each other in specific waste treatment projects. With the unification of efforts, the search begins for ways to reduce the quantities of landfills. A program for communication and information to the public opinion should be developed with the aim to explain all the steps required for the transition to decentralization.

d- Adopting the sorting technique and identifying sites for landfills and waste treatment: the solution is supposed to be an integrated one that covers all aspects of the problems. It requires work on two axes:

1. A screening stage: It is necessary to adopt screening as a basic stage in treatment:

- **Sorting solid waste at the source:** Law 80/2018 stipulates the adoption of sorting at the source. Lebanon is still lagging behind in this regard. Municipalities, local authorities and the media can play a role in promoting the adoption of this technique. The problem does not lie in the waste itself, but rather in its abundance, which is why it must be treated. It is necessary to look at the issue when dealing with it as a continuous series, which requires an integrated plan. Improving the sorting technology would allow for better waste treatment at a lower cost and would help in a better application of the cost recovery system. It should be noted that sorting can lead to accumulations of various types of waste (organic, electronic, chemical, etc.), which requires thinking, in parallel, of solutions to this urgent problem.
- **Sorting household waste from hazardous waste:** This technique contributes to treating the bulk of the toxins found in hazardous waste. In parallel, the necessary legislation is passed to identify hazardous waste, prevent its entry into Lebanon, and impose a penalty on anyone who produces, imports or uses it. A guide that includes a list of these wastes, which helps to identify responsibilities and penalties, is also being developed.

2. Determining the locations of waste treatment centers and landfills: This issue is the responsibility of the central authority, and it constitutes a basic entry point for a comprehensive solution. The Naameh landfill experience is an example that should be used in terms of providing an alternative before crises occur.

e- Economic investment in waste: A portion of the waste is actually leftovers, i.e. materials suitable for different investments, that can provide a great financial return if it is properly used. In this field, industrialists in particular can recover a lot of materials such as cardboard, plastic and metal, and reuse them as industrial raw materials.

f- Adopting a transitional phase in the application of laws and treatments: It is not possible to approach solutions and application of laws in the solid waste and chemicals sector with great legal leaps from an existing reality to another desired. In many cases, those subject to the law should be given a specific time limit to settle their situation and adapt to the new situation after the issuance of legislation. For example, it is not possible to treat the sanitary landfills adopted today in two landfills at the northern and southern entrances to the capital by closing the landfills immediately without going through a necessary transitional phase that includes integrated steps that provide a viable solution. Developing an integrated plan for the solution does not mean waiting and not taking the initiative. Helpful practical steps can be taken, such as mitigating hazardous waste, packaging and transporting it. This is what happened in the electricity sector, as more than 330 tons of this waste, represented by transformers polluted with persistent organic pollutants, were removed. Another 1,000 tons of the same waste will be removed. Other quantities were also packed in specific places, and a large field survey was conducted, which showed the presence of 23,000 electrical transformers of the same type in Lebanon. Among the contributing factors to the adoption of scientific treatments is Lebanon's signing of environmental agreements such as the Stockholm Agreement, which obliges it to fulfill its obligations in terms of managing persistent organic pollutants, one of the most harmful chemicals to the environment and health. In implementation of Lebanon's commitment given after signing the "Minamata Convention" on mercury, classified as hazardous waste, a comprehensive survey of this substance is being conducted in hospitals and health centers within the framework of an integrated plan to dispose of it. One of the practical steps to help is a project funded by the World Bank that aims to close 4 waste landfills and rehabilitate their places. However, that requires finding an alternative.

g- Adopting planning and participation and enhancing the contribution of the private sector: This is done through the development of a major national strategy with parallel executive plans, in which the public and private sectors, associations, civil society bodies, universities, engineering companies and industrialists, etc. participate in reaching it. It is necessary to take advantage of the large capabilities of the private sector and employ them in the treatments. In this context, it is possible to establish entirely private projects, or partnership projects between the public and private sectors under the supervision of the Ministry of Environment. The outlook on the issue should be comprehensive, due to the reflection of environmental problems on various economic, social, health and tourism aspects.

Planning must start from setting policies, then strategy, to reach specific goals, so that the vision is clear from the beginning all the way to implementation. As for the adopted techniques, they are not rated between good and bad, and the real evaluation is based on how they are applied and in which projects.

h- Trust through reaching a social contract: It is necessary to restore the lost trust between citizens and officials in the management of the solid waste and chemicals sector through a social contract based on transparency, publishing plans before implementation, integrity, a scientific approach to problems and achieving the public interest.

i- Establishing a comprehensive and unified information center: This step provides reliable information for stakeholders that allows decisions, policies and strategies to be adopted according to scientific bases based on figures and facts. It also places accurate and scientific numbers and data in the hands of followers and researchers. The unified information base, with the cooperation of the various stakeholders, allows access to the available information, its exchange and coordination among them for the public interest.

j- Spreading awareness: Spreading awareness contributes to forming a public opinion aware of the importance of the problem in the solid waste and chemicals sector. By recognizing the scale of the problem, people engage in collaboration and partnership to develop and implement solutions. In the Bekaa, for example, the Union of Buheira Municipalities cooperated with efforts and initiatives to treat e-waste after realizing the danger facing their agricultural lands if a solution was not found.