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# **The Role of Development in Promoting Environmental Awareness: Evidence from Lebanon**

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## **Abstract**

The paper reviews the evolution of the environmental movement in both the public and the private sector in Lebanon. The public sector involvement in the environmental movement is studied by reviewing the commitments made by the government to the local, regional and international communities. The paper presents a summary of all the decisions, decrees, and laws pertaining to environmental protection that the Lebanese government instituted over time, as well as all the conventions and agreements that the country ratified and/or signed. The level of awareness and involvement of the government and the community seems to be increasing over time, as evidenced by the total number of laws and regulations instituted to manage the environmental affairs, as well as the level of reported activities aimed at spreading awareness and educating people. The paper tests the relationship between environmental movement and economic development as measured by GDP and the results indicate that environmental awareness and activism is decreasing at low GDP levels and increasing at high GDP levels thus yielding a U-shaped curve.

**Keywords:** environmental movement, laws, awareness, development, developing country, Middle East and North Africa, Arab world

## **I. Introduction**

The global environmental movement dates back to the late sixties and early seventies. It has now, with varying degrees of success, reached the developing and the less developed world. While the concerns differ across the countries, there is global acknowledgement that environmental issues deserve attention and commitment. Lebanon caught in a crossroad between the developing and the developed world represents a good example of a country that has begun considering healthy environment as part of a healthy economy. In fact, there is an acknowledgement by the government that “environmental protection requires a collaborative and concerted effort from all” (SOER, 2001, p. 181). Although a late entrant into the environmental movement, there are several success stories that Lebanon can tell on the issue of environmental activism and its effect on the outcomes in the marketplace. Legislations banning quarries, designating various areas preserved, banning diesel-operated vans from circulation may have all been introduced as responses to environmental movement. The number of environmental non governmental organizations (ENGOS) at the local, regional and country level has increased significantly. Lebanon has more than one hundred registered ENGOS (Ministry of Environment, 2001). The level of awareness and involvement of the community seems to be increasing over time, as evidenced by the level of reported activities aimed at spreading awareness and educating people. In addition to the ENGOS, the media have been instrumental in creating and/or raising public awareness and promoting grassroots activities.

The paper reviews the evolution of the environmental movement in both the public sector and the private civic society in Lebanon. The public sector involvement in

the environmental movement is studied by reviewing the commitments made by the government to the local, regional and international communities. We review and summarize all the conventions and agreements that Lebanon ratified and or signed. At the local level, we review and summarize all the decisions, decrees, and laws pertaining to environmental protection that the Lebanese government instituted. We hypothesize that there is a relationship between environmental movement and alternative measures of development and make an attempt to test the relationship. We propose the relation to be theoretically a mirror image of the environmental Kuznets curve (EKC) which basically assumes that the level of development and environmental degradation are initially positively related with the relationship changing into a negative one with increased level of development, hence, yielding an inverted-U shaped curve.

The paper is organized as follows: Section II presents a brief history of environmental movement in Lebanon. In this section we summarize both governmental and non-governmental involvement in the promotion of environmental quality and awareness. In Section III we attempt to explain the evolution of environmental movement by arguing that it is related to the level of economic development. Here we posit a simple structural model of the relationship and empirically test it in Section IV. Section V concludes the paper by highlighting its contribution and the shortcomings.

## **II. Environmental Movement in Lebanon**

### **1. Governmental**

#### *A. International and regional commitments*

As a member of the world community Lebanon has been a partner in signing international agreements pertaining to the protection of the environment for over fifty years. The first international agreement the country signed was in 1949 in Rome; Lebanon was the only Arab country participating and signing this international agreement which required international cooperation in development and utilization of the resources of the Mediterranean Sea. In fact, there are many conventions where Lebanon was the only Arab signatory: 1958 Geneva Convention on the Continental Shelf, 1958 Geneva Convention on the High Seas, 1963 Vienna Convention on Civil Liability for Nuclear Damage, to name a few. The significance of these international partnerships is in their moral implications. In some instances, Lebanon is not even a threat because of its economic and industrial make-up.

Table 1 presents the list of all the international conventions, treaties and protocols signed or ratified by Lebanon. Over 40% of these conventions were signed before the start of the war (pre 1975); slightly less than that were signed during the war period (1975-1991), and the balance were signed in post war period (post 1991). A careful reading of the titles of the international conventions signed indicates that most of them deal with water pollution, specifically in the area of prevention of pollution of the Mediterranean Sea by oil. Thirteen out of the total 28 International agreements relate to the protection of the Mediterranean Sea. Some attempts in the area of biological diversity, climate change, desertification and protection of the ozone layer have been observed since 1985.

To put these numbers in perspective and be able to assess the international involvement, we compare the performance of Lebanon to that of the other countries in

the Arab world. Table 2 presents the total number of international and regional conventions signed by Arab Countries in the Middle East and North Africa (MENA). The numbers indicate that Lebanon has signed more international agreements than any other country in the MENA region. This may be due to the fact that the bulk of the agreements concern the Mediterranean Sea as we saw above. However, note that there are eight other Arab countries that have borders on the Mediterranean Sea including Egypt, Libya, Tunisia, Algeria and Morocco in North Africa and Palestine and Syria in Middle East. In fact, even within the region, Lebanon ranks second highest country signatory to regional conventions. A careful look at the numbers indicates that North African Arab countries are less integrated in the world community in environmental matters than the Middle Eastern countries. Lebanon, Jordan and Syria top the list with 28, 24 and 20 signatures, respectively; whereas, Libya, Algeria and Morocco are listed at the bottom with 1, 3, and 5 signatures, respectively.

### *B. Local*

A full fledged Ministry of Environment in Lebanon was established only in 1993, marking a significant step forward in the management of environmental affairs. Prior to that, a state ministry of environment was created in 1981, in the midst of the war, aiming at controlling all forms of pollution: the use of pesticides, deforestation and forest fires, solid waste disposal, protection of fauna and flora, and urbanization. However, there was no global environmental law. Specific issues were addressed in sector laws and regulations. These laws included the protection of natural sites, forestry, archaeological and touristic sites, drinking water, sewage, marine pollution, air pollution, industry,

hunting, fishing, urban development, mining, food control, housing and toxic waste disposal.

The first executive order that deals with the local environment was issued in 1925 (Executive Order 144) and declared the sea including the deep sea, the sea side, and the shore a public property. The second initiative followed in 1970 almost 45 years later with an executive order to specify the general rules to establish and invest in touristic enterprises (Executive Order 15598). A total of 85 ministerial decrees, executive orders and laws are in effect currently, with only two dating prior to the establishment of the Ministry of Environment. Law 216/93 established the Ministry of Environment and defined its mandate and functions. This law was amended twice according to Decree 5591/94 and 667/97. The amended law would strengthen the ministry and reorganize its mission and mandate along four general policy principles: regionally balanced development; protection of the environment through preventative measures; adoption of the polluter pays principle and the integration of environmental policies into other sectoral development policies.(SOER, 2001) A comprehensive environmental protection law, Law No. 444, reflecting the policy principles highlighted above, was introduced in July 2002. Law 444 sets the fundamental principles that would govern the use and the management of the environment. A total of 68 articles cover all aspects of the environmental protection and fill out the gaps introduced by previous decrees.

Table 3 lists all the decrees issued by the Ministry of Environment since its establishment in 1993. Note that many of the laws (not listed in Table 3) governing the use of the environment are issued by Executive Orders from the President and the

Council of Ministers, in addition to Decrees issued by other ministries such as Agriculture, Public Works and Transportation, Tourism, and the Ministry of Interior.

The Ministry of Environment has been instrumental in creating awareness and mobilizing resources for the promotion of environmental quality. One of the major accomplishments of the Ministry in the past decade include assigning “protected” status to eight natural reserves, seven of them by Law and only one by a ministerial decision and 16 different protected natural sites, including forests and rivers, by ministerial decisions. Data presented in Table 3 indicate that this Ministry expended disproportionately more effort in establishing protected areas and reserves than any other activity. It also collaborated with the Ministry of Agriculture and declared by decision of its minister 17 forests as protected areas and with the Ministry of Tourism and declared by decision of its minister 14 villages as historical monuments and natural landscapes.

Another major accomplishment of the Ministry of Environment has been the establishment of licensing standards for 12 classified manufacturing facilities including gas stations, tanneries, plastics, dairy products, farms and slaughter houses.

Given its limited resources, it has, in the last ten years participated in at least 30 projects. Between 1996 and 2000, the Ministry has leveraged its own budget resources by attracting grants from donors at the rate of US \$ 1.5 for every dollar spent from its own budget.

## **2. Non Governmental**

### *Environmental Non-Governmental Organizations (ENGOS)*



One of the responses to civil war was the establishment of NGOs or civic groups in different parts of the country. These groups focused on social issues such as provision of first aid training, help communities cope with water and food shortages, move the injured to the hospitals. All in all they attempted to maintain a minimum level of social order in a country characterized by chaos.

The post war period is characterized by a significant increase in the number of NGOs, especially the ENGOS. ENGOS have been influential in creating awareness and demanding regulation to enhance the well being of the Lebanese people. While a minimum of 24 ENGOS were established during the war period, a minimum of eighty five new ENGOS were registered in post war period. Table 4 presents the evolution of ENGO establishment over time. Currently there are 138 registered ENGOS in Lebanon, most of them operating at the local grassroots level. Some of the ENGOS have been able to raise funds and implement environmental projects at the local and national level. The ministry offers funds for small projects and for use by ENGOS to promote environmental education and funds awareness campaigns.

The activities of ENGOS, in post war Lebanon, are directed mainly towards creating awareness of the environmental problems that the Lebanese overlooked for over a decade and a half. While these activities are not well documented, the outlook for the future seems promising as interest and awareness in environmental issues are growing. Today, there are a number of newspapers that allocate daily coverage on local and regional environmental issues. A daily calendar of events is posted in these specialized local presses. Daily talk shows on television are being used more frequently to disseminate information on ENGO activities.

A review of post war press revealed that the most frequently listed public activity dealing with environmental issues is reforestation, a phenomenon referred to as the greening of towns and villages throughout Lebanon, followed by seminars and workshops on environmental degradation and ways of combating the problems. For instance, in 1994, a total of 168 activities dealing with various aspects of the environment were recorded. Of these, around 24% dealt with planting tree ceremonies in various regions and 21% dealt with organizing workshops and seminars. These numbers have been fluctuating around an annual mean of 28% and 25%, respectively over the past ten years.

### **III. Explaining the Observed Trends in Environmental Movement**

It is obvious that post war Lebanon witnessed a surge in environmental movement. This is by no means an unexpected outcome. After almost fifteen years of war and destruction where running for one's life was the way of life, people started to realize what they have missed. The response of the public sector was establishing the ministry of environment, one of the major accomplishments in environmental management and protection. The response of the private sector was also strong. The establishment of the many new ENGOs sent a message to the government that people have environmental concerns, ranging from availability of clean water to proper management of residential and medical waste to protection of the green areas, and that one of the responsibilities of the ministry would be to help resolve the many issues that they had.

In general, communities tend to organize and form advocacy groups if the expected payoff is positive (Stigler, 1971; Peltzman, 1976, 1984). Expected payoff to

each member of the group is different, and is a function of individual perception of the imposed risk as well as the cost of effecting change. We assume that if a group is formed and an activity is planned and executed, then the participants thought that the activity is worth their effort. The establishment of the Ministry of Environment right after cessation of hostilities is not by chance. It came about because of the need for reconciliation of rights and responsibilities of both people and public agencies.

According to the neoclassical economists, the individual response to environmental concerns would be one that is reflected in the choices that he or she makes. The basic premise is that individuals are utility maximizers, they choose consumption, subject to a budget constraint, to enhance their well being. Environmental degradation reduces utility; hence, it warrants a response. Living at a certain location and after realization of potential or actual environmental problem, individuals adjust consumption such that some of their budget may be allocated to remedy the situation. While there are several options available for the household such as changing location, insulating the house, organizing and demanding regulations, and litigating. The response behavior depends on the opportunities available to the household as well as the costs of decisions. We will argue that when environmental awareness is present but opportunities are not, the environmental movement is slow or dormant and people will settle for less than ideal environmental conditions; however, with affluence people will start to seek better environmental conditions by organizing and demanding action.

Following the logic used in the empirical literature on the environmental Kuznets curve (EKC) which describes how environmental quality evolves as the economy makes a transition from poverty to wealth, we attempt to describe the time path

of environmental awareness and activism a community of people will adopt as economic development proceeds. The EKC hypothesis states that pollution will first increase with income as growth occurs in a poor country because the country places a low priority on pollution control; however, once the country becomes well off, it will start considering protection of environmental quality as a priority issue; a result, pollution will start to decrease at higher levels of income. Note that this reasoning suggests that “economic growth is essential for environmental stewardship” (World Bank, 1992) and “in the end the best – and probably the only – way to attain a decent environment in most countries is to become rich” Beckerman (1992). Nevertheless, the empirical literature on EKC is mixed. While there is some evidence that some pollutants follow an inverse U-shaped pattern relative to income (see Grossman and Krueger (1995), Holtz-Eakin and Selden (1995), the relationship is not universal.

In the balance of this paper, we attempt to test a hypothesis similar to the EKC hypothesis. Specifically, we hypothesize that environmental movement will increase with GDP. Environmental awareness and activism is postulated to be a direct response to prevailing ill environmental conditions. The idea is that nations will put the environmental quality as a priority item on their national agenda upon the request of their citizens and citizens will only act if conditions are grim. The value that individuals place on environment is expected to increase with income, but only through awareness.

To test this hypothesis, we will try to investigate the relationship between awareness and development; in the process, we estimate the following function

$$\text{Log}(A) = \alpha + \beta_1 \text{Log}(G) + \beta_2 \text{Log}(G^2) + \text{error}$$

Where  $A$  is an index of environmental awareness or activism,  $G$  is an indicator of economic growth. We expect  $\beta_1 < 0$  and  $\beta_2 > 0$  indicating that environmental awareness would be decreasing at low income levels and increasing at high income levels yielding a U-shaped curve or an inverse EKC.

#### **IV. Model Estimation**

We empirically test the above model using two different data sets: a time series monthly and annual data on local environmental movement and a cross sectional data on regional environmental movement. The choice is constrained by the availability of published information.

##### **A. Local data**

We assume that environmental awareness, whether local or regional or international, is promoted through any organized effort that seek remediation, or demand alleviation of or reduction in the magnitude of damages to the environment. Environmental movement is nothing but the manifestation of awareness into activism and movement. To test the model locally, we use *Al-Marjaa-Cassander*, a monthly publication, as a source, to compile information pertaining to the number of organized activities to promote the well being of the environment and of people. This publication, established in 1994, represents the only source of credible and consistent information on scheduled public activities on environmental issues. In fact, this publication represents a log of all publicly announced activities that took place in Lebanon over the period 1994

till 2002. The document is still published, but it no longer represents the information in the same manner as before. Hence our data is constrained and stops in 2002.

We construct an index of awareness by summing the total number of organized activities in a given month. Activities included seminars, environmental workshops, and publication of reports pertaining to pollution, reforestation efforts, and rehabilitation of touristic sites, and cleanup days at the beaches. By summing the monthly activities, we then obtain a yearly aggregate on environment promoting activities. The yearly data is presented in Table 5 together with data on GDP, inflation rate and total number of established ENGOs over the period 1991-2002.

A review of Table 5 indicates that as the rate of real growth decreased, the absolute number of environmental activities also decreased while the total number of established ENGOs increased. The Lebanese economy, over the period 1992-2002, went through all stages of business cycle. The first half of the 1990s was characterized by an economic boom, with GDP averaging 6.5% over the period 1992-1995; during this period, environment promoting activities reported a record high averaging 130 activities per year. The economy showed signs of slowdown during 1996-1998; environmental movement has decreased slightly to an average of 117 activities per year. Economic performance hit a rock bottom between 1999-2000 when growth rates were almost zero; during the same time, the average number of environmental activities was 85 per year. Obviously the positive co-movement between the two variables is there. In fact, a similar relationship is also obtained when considering activities that promote health care and awareness. In Table 5 we present an index of Healthcare promoting activities which is constructed the same way as the environment promoting activities.

To estimate the model using the monthly data, we use total level of imports as a proxy for GDP as monthly GDP is not available. Note that trade by far is the second largest component of GDP in Lebanon. In 2000, it accounted for approximately 34 percent of GDP, whereas government expenditures including water and electricity made up 42 percent of GDP. In 2004, the numbers were reversed and trade accounted for 39 percent of GDP while government expenditures accounted for 36 percent of GDP.

Table 6 presents the estimated regression equation at the local level. The signs and the significance of the estimated coefficients are in line with expectations. Environmental awareness and activism is decreasing at low GDP levels and increasing at high GDP levels. Thus, we have an inverse EKC or a U-shaped curve. Unfortunately, we cannot include the variable established ENGOs in the model because we do not have the data.

#### B. Regional level

To estimate the model at the regional level, we maintain the same definition of environmental awareness as above. Basically we continue to assume that environmental movement will only take place if awareness exists. We use the total number of protected areas for each of the Arab countries in the MENA region as a proxy for environmental awareness and using per capita income as the indicator for economic growth, we estimate the above model using OLS with a log-linear functional specification. Table 7 presents the output. Note that the explanatory power of the regional model is better than that of the local model. However, both models yield the same signs for the coefficient estimates. The estimated coefficients are significant at the 5% level or better.

The available data give support to or hypothesis; however, the explanatory power of the model is very shy. In the better case, the coefficient of determination is a timid 0.32 perhaps indicating that income is not the only determinant of environmental concern and thus activism and movement.

## **V. Conclusion**

This paper reviewed the evolution of the environmental movement in Lebanon. It presented a summary of all the international conventions and agreements that the country ratified and/or signed and highlighted that relative to other Arab countries, Lebanon fairs very well in terms of government engagement in the global environmental movement. The Lebanese government has engaged in more international conventions and agreements than any other Arab country in the MENA region.

The review also revealed that at the local level, the establishment of the Ministry of Environment immediately after the cessation of hostilities may have been the most important green movement. The Ministry has been instrumental in creating awareness and mobilizing resources for the promotion of environmental quality. The public private partnership that existed in Lebanon in post war Lebanon may help explain the engagement and the success of the ministry in establishing a host of decisions concerning the management of the environment.

The paper also tested a simple model of behavioral relationship between environmental awareness and movement and economic development similar to the EKC hypothesis, and concluded that the relationship was supported using data at both the local and regional level. While data used on environmental awareness and activism may have



been understated because they included only those organized activities that were made public through the media, they represent the best available information. Many ENGO activities go unreported, especially if the resources of the organizers are limited and they are limited.

In conclusion, the review indicates that the level of awareness and involvement of both the government and the communities are increasing over time as evidenced by the total number of laws and regulations instituted to manage environmental affairs.

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**Table 1**

The International Conventions, Treaties and Protocols Signed or Ratified by Lebanon

<b>Year</b>	<b>Convention, Treaty, or Protocol</b>	<b>Place</b>	<b>Accession or Ratification Date</b>	<b>Law or Decree Number</b>
1949	Agreement for the Establishment of a General Fisheries Council for the Mediterranean	Rome	Accession:20/02/1952	na
1954	International Convention for the Prevention of Pollution of the Sea by Oil	London.	Accession:16/11/1966	Law 68/66
1958	Convention on the Continental Shelf	Geneva	Accession: 10/06/1964	na
1958	Convention on Fishing and Conservation of the Living Resources of the High Seas	Geneva	Accession: 20/03/1966	na
1958	Convention on the High Seas	Geneva	Accession: 30/09/1962	na
1960	Convention on the Protection of Workers against Ionizing Radiations	Geneva	Accession: 17/06/1962	na
1963	Vienna Convention on Civil liability for Nuclear Damage	Vienna	Accession: 12/11/1977	
1969	International Convention on Civil Liability for Oil Pollution Damage	Brussels.	Ratification:12/10/1973	Law 28/73
1969	International Convention relating to Intervention on the High Seas in cases of Oil Pollution Casualties.	Brussels.	Ratification:12/10/1974	Decree 9226
1971	Treaty on the Prohibition of the Emplacement of Nuclear Weapons and other Weapons of Mass Destruction on the Seabed and the Ocean floor and in the Subsoil.	London-Moscow-Washington	Ratification:7/10/1974	Decree 9133
1972	Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter.	London-Mexico City-Moscow-Washington	Signature:15/5/1973	

1973	International Convention for the Prevention of Pollution from Ships	London.	Accession:24/11/1993	
1976	Protocol for the Prevention and Elimination of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft.	Barcelona.	Signature:16/2/1976 Accession:30/6/1977	Decree 126
1976	Convention for the Protection of the Mediterranean Sea against Pollution.	Barcelona.	Signature:16/2/1976 Accession:30/6/1977	Decree 126
1976	Protocol Concerning Co-operation in Combating Pollution of the Mediterranean Sea by Oil and Other Harmful Substances in Cases of Emergency	Barcelona.	Signature:16/2/1976_ Accession:30/6/1977	Decree 126
1976	Convention on the Prohibition of Military or any other hostile use of Environmental Modification Techniques	Geneva.	Signature:18/5/1977	
1980	Protocol for the Protection of the Mediterranean Sea against Pollution from Land-based Sources	Athens.	Signature:17/5/1980 Accession:27/12/1994	
1982	Protocol Concerning Mediterranean Specially Protected Areas.	Athens	Accession:27/12/1994	
1985	Vienna Convention for the Protection of the Ozone Layer.	Vienna	Accession:30/3/1993	Law 253
1987	Montreal Protocol on Substances that deplete the Ozone Layer.	Montreal.	Accession:31/3/1993	Law 253
1989	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	Basel.	Ratification:21/12/1994	Law 387
1990	Amendment to the Montreal Protocol on Substances that deplete the Ozone Layer	London.	Accession:31/3/1993	Law 253
1992	Amendment to the Montreal Protocol on Substances that deplete the Ozone Layer	Copenhagen.	Accession:3/11/1999	Law 120
1992	Convention on Biological Diversity	Rio de Janeiro	Ratification:11/8/1994	Law 360
1992	United Nations Framework Convention on Climate Change	Rio de Janeiro.	Ratification:11/8/1994	Law 359

1994	United Nations Convention to Combat Desertification	Paris.	Ratification:21/12/1994	Law 469
1999	Convention on Wetlands of International Importance especially as Waterfowl Habitat	Ramsar	Accession:1/3/1999	Law 23
2001	Stockholm Convention on Persistent Organic Pollutants for Adoption by the Conference of Plenipotentiaries.	Stockholm	Signature:22/5/2001	

Source: Ministry of Environment - <http://www.moe.gov.lb/Corporate/The+ministry/International+Agreements/>

**Table 2****Total Number of International and Regional Conventions signed by Arab Countries in the MENA Region**

<b>Country</b>	<b>International Conventions</b>	<b>Regional Conventions</b>
Algeria	3	1
Bahrain	12	4
Djibouti	0	0
Egypt	7	1
Iraq	13	5
Jordan	24	4
Kuwait	14	5
Lebanon	28	7
Libya	1	1
Mauritania	0	0
Morocco	5	1
Oman	17	4
Palastine	0	2
Qatar	13	4
Saudi Arabia	19	6
Somalia	0	0
Sudan	0	2
Syria	20	8
Tunisia	4	1
United Arab Emirates	17	4
West Sahara	0	0
Yemen	13	5

Source: compiled by author from Al-Reem Environment website  
[www.alreem.com](http://www.alreem.com)

**Table 3****Decrees issued by the Ministry of Environment**

<b>Decree Number</b>	<b>Date</b>	<b>Description</b>
B/20	01-11-94	Identification of well established and specific measurements for environment protection from pollution
<b>Imports</b>		
1/5	18-8-95	Organize the import of petrocok
1/9	18-9-95	Amend the Decree related to petrocok importation
1/23	06-11-95	Prohibition of importation or use of extinguishing liquid devices
1/27	06-12-95	Amending the Decree 1/9 related to the importation of petrocok
1/37	18-01-96	Licensed importation of asbestos
1/41	25-3-96	Amending Decree 1/37 subjecting the import of asbestos to prior approval from the Ministry of Environment
1/91	24-10-96	Organizing waste importation (chemical, industrial..)
1/22	17-12-96	Amending the Decree 1/91 related to waste importation. It prohibited the import of all plastic waste according to the list provided by the Ministry of Environment
<b>Quarries</b>		
2/93	20-5-93	Organize the activities of quarries, mining and asphalt factories
B/15	21-9-94	Prohibited and stopped the work of all unlicensed quarries and sand mining
B/22	14-11-94	An authorization for a certain private quarry
<b>Manufacturing</b>		
1/22	06-11-95	Imposition of certain environmental standards on industries and factories
1/40	20-3-96	Amending Decree 1/22 applying environmental standards on the industries
1/5	25-1-01	Establish environmental standards for licensing gas stations

1/16	05-4-01	Establish environmental standards for licensing farms
1/75	02-9-01	Establish environmental standards for licensing dye factories
1/4	12-1-01	Establish environmental standards for slaughter houses
1/3	25-1-01	Standards for treatment of slaughter house wastes
1/29	31-5-01	Standards for dairy manufacturing industries
1/5	04-01-01	Standards for storage areas for fruits and vegetables
1/60	29-9-01	Standards for construction stones
1/61	20-9-01	Standards for plastic manufacturing firms
<b>Construction</b>		
1/90	19-01-00	Standards for residential buildings that are adjacent to Rivers Protected by Ministry of Environment
<b>Air</b>		
1/93	11-5-93	Prohibit burning of tires
1/52	29-7-96	Defines the characteristics and specifies ceilings for mitigating air, water and soil pollution
1/8	01-3-01	Changes the decree 1/52 and defines the characteristics and establishes the norms for limiting air and water pollution generated by certain firms and water treatment facilities
1/191	08-10-97	Directional memo on the manufacturing of cement in Lebanon and the environmental pollution generated from it
<b>Biological Diversification</b>		
B/2	21-5-93	Prohibits the use and the import of bird voice recorders
1/102	28-4-93	Divides games into three types: those that can be hunted all year long; those that can be hunted during designated season; and those that cannot be hunted
7/B	10-01-94	Organize hunting seasons and places
8/B	10-01-94	Prohibited hunting all over the Lebanese territory from 1-1-95 till 31-12-97. The decree is jointly issued with Ministry of Agriculture.
1/10	18-5-95	Prohibited hunting of certain games and birds. Treats all migrating birds and resident birds as protected except for those designated as hunting birds and wild pigs. Specifies the hunting season from September 15 till December 31 except for Mondays and Tuesdays.
<b>Land and Natural Reserves Management</b>		
1/15	05-10-95	Prohibition of any work or change in Fakra bridge area, Kesrouan
1/14	06-10-95	Establishment of natural reserves of Karm Chbat
1/97	02-7-98	Declare Nahr El Kalb a protected natural site
1/129	01-9-98	Declare Al Damour River as protected natural site



1/130	01-9-98	Declare Beirut River a natural site
1/131	01-9-98	Declare Al Awali river a natural site
1/132	01-9-98	Declare 1. forests between Ain El Hour, Daraya, Debiye, Berjin; 2. Sheikh Osman forest; 3. Deir al Mokhalis surrounding; 4. Ain w Zein Hospital surrounding; 5. Dalboun forest; 6. Al Mal valley; 7. Kfra wells; and 8. Ainbal valley sites as protected natural sites
1/187	17-11-98	Declare Al Makmel Mountain – Black Summit a protected natural site
1/189	19-11-98	Declare Al Assi River a protected natural site
1/188	19-11-98	Declare Al Arka River a protected natural site

Sources: Ministry of Environment and Chlala, N. (2004)

**Table 4**  
**Environmental NGOs in Lebanon over time**

<b>Period</b>	<b>Total number of registered NGOs</b>
Pre war period (pre-1975)	13
War period (1975-1991)	24
Post war period (post 1991)	85
Establishment date undetermined	16
<b>Total</b>	<b>138</b>

Source: Compiled by author from Ministry of Environment website

**Table 5**

Year	Nominal GDP (in millions of US \$) <sup>e</sup>	Rate of real growth <sup>d</sup>	Inflation Rate <sup>f</sup>	Environment promoting activities <sup>c</sup>	Healthcare promoting activities <sup>b</sup>	NGOs <sup>a</sup>
1991	4,452	--	50	--	--	--
1992	5,546	4.5	99.87	--	--	6
1993	7,535	7.0	24.74	--	--	6
1994	9,110	8.0	8.23	168	265	6
1995	11,119	6.5	10.28	93	218	7
1996	12,992	4.0	8.88	129	258	6
1997	14,862	4.0	7.75	112	191	8
1998	16,165	3.0	4.55	111	101	7
1999	16,458	1.0	0.24	66	133	12
2000	16,399	-0.5	-0.40	105	100	18
2001	16,660	2.0	-0.40	64	58	9
2002	17,300	2.0	4.00	16	47	--

<sup>a</sup> Ministry of Environment<sup>b, c</sup> Al-Marjaa- Cassander, various issues<sup>d, e, f</sup> Bank Audi Report, 2005

**Table 6**  
**Regression Results: Local Data – Lebanon**

Dependent Variable: Logarithm of Awareness Index				
Coefficient	Sign	t-statistic	Significance	
Intercept	+	3.97	0.00013	
$\beta_1$	-	-3.61	0.00046	
$\beta_2$	+	3.16	0.0021	
$R^2$	0.11			
Number of Observations	108			

**Table 7****Regression Results: Regional Data – Arab World**

Dependent Variable: Logarithm of Protected Areas				
Coefficient	Sign	t-statistic	Significance	
Intercept	-	-2.21	0.041	
$\beta_1$	-	-2.85	0.011	
$\beta_2$	+	2.85	0.011	
$R^2$	0.32			
Number of Observations	20			