

Spring 2006

Environmental policy in Jordan : analysis, gap identification, and strategies for improvement

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ABSTRACT

ENVIRONMENTAL POLICY IN JORDAN: ANALYSIS, GAP IDENTIFICATION, AND STRATEGIES FOR IMPROVEMENT

**by
Diana Saed**

Jordan is a country with a tremendously fragile environment. It faces substantial environmental challenges due to its delicate environmental resources and its limited financial assets. These challenges are aggravated by the scarcity of available water, deterioration of the water resources, land contamination, desertification, mismanagement of land use, and air pollution. Attempting to describe the “State of the Environment” and to provide an informed analysis of the threats to the nation’s environment is a Herculean task. This analysis examines the efforts made by Jordan in regard to protection and management of the environment. This thesis provides a snapshot of the major environmental issues and threats the country faces today.

Recommendations for improvement leading to a more sustainable environmental situation in Jordan include: increased emphasis on pollution prevention, training of Jordanian university graduates in environmental policy development and implementation, as well as community-wide environmental education, improved systems for planning and monitoring the use of land and other resources, and a more efficient organization of the Ministry of the Environment that provides enhanced enforcement capabilities. These findings have potential to be important not only for Jordan, but for many neighboring countries in the Middle East as well, because there are many commonalities in the history and geography.

**ENVIRONMENTAL POLICY IN JORDAN: ANALYSIS, GAP
IDENTIFICATION, AND STRATEGIES FOR IMPROVEMENT**

by
Diana Saed

**A Thesis
Submitted to the Faculty of
New Jersey Institute of Technology
in Partial Fulfillment of the Requirements for the Degree of
Master of Science in Environmental Policy Studies**

Department of Chemistry and Environmental Science

May 2006

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APPROVAL PAGE

**ENVIRONMENTAL POLICY IN JORDAN: ANALYSIS, GAP
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To my beloved family

ACKNOWLEDGMENT

I would like to express my deepest appreciation and gratitude to Dr. Daniel Watts, who not only served as my research advisor, but has guided me every step of the way. He was there every time I needed him, to give his support, encouragement, and reassurance. Special thanks are given to Dr. Jay Meegoda and Dr. Qiu for actively participating in my committee even though they were given very short notice when this job was thrust upon them.

This thesis has relied heavily on the assistance of others - public servants, private institutions, NGOs, a multitude of individuals – from across Jordan. I was greatly encouraged by the spirit in which I was received and the help and guidance provided by so many. I am especially indebted to the staff of the Ministry of the Environment who provided me with assistance at every step while I was in Jordan. I would especially like to thank Dr. Nail Moumani for his assistance and guidance with all phases of my work; and Mr. Ahmed Qatarnah, and Belal Shqarin who provided invaluable assistance, and background on the environmental sector of Jordan.

On my visit to Jordan I came in contact with more than one hundred people who assisted me with my task. I am especially grateful to all of them because they provided me with unselfish assistance beyond the call of duty. They eagerly contributed their time, insights, and knowledge of Jordan's natural environment.

Finally I would like to thank my family and colleagues at Al-Ghazaly High School. Their patience with me for the past year has been remarkable. I am deeply indebted to each of them for their guidance and support. May Allah (SWT) shower you with His blessings.

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CHAPTER 1

PURPOSE

At one time in its history, Jordan was a leader in the Middle East for its environmental sustainability. When interest for this research on Jordan emerged, in 2005, the annual report called the Environmental Sustainability Index Report ranked Jordan in 2nd place among Middle Eastern countries in Environmental Sustainability¹. Traveling around the capital of Jordan, Amman, one may realize fairly quickly that Jordan is a country that strives to remain a leader in environmental progress. This can be attributed to the presence of a large number of organizations throughout the city that strive to improve the state of the environment in Jordan. Also, there is a government body known as the Ministry of the Environment (MoE), dedicated exclusively for this purpose.

The same report in 2006 ranked Jordan in 9th place the following year. Such a drop in ranking raises several questions about why the reversal would occur. Finding the answers required research in Jordan that included meetings with members of the government and the academic community, as well as review of many government documents, news reports, and academic publications.

Many members of the Royal Hashemite family including the late King Hussein have announced their concern for the environment. The family continues to emphasize Jordan's active role in protecting the environment. Many environmental organizations around Jordan have been established and are supported by members of the royal family.

The political system also gives a great deal of attention to issues related to the environment. In his letter of Designation to the Prime Minister on June 19, 1991, the late King Hussein said:

“The conservation of the environment is not a luxury but a human duty because of its direct connection with humanity’s livelihood, progress, and even survival. Therefore, we must accord it the priority it deserves in all state activities and make it one of the components of our national culture” (Jordan Times, 1991).

Queen Noor, the wife of the late King Hussein is by far the most active member of the family in environmental issues. She has been an active member of the Royal Society for the Conservation of Nature since 1978. In 1991, she led a commission of over 180 Jordanian specialists to formulate the first National Environmental Strategy in the Middle East for Jordan. This piece of legislation will be discussed further in chapter 7.

According to Queen Noor’s official website, the Queen co-founded the Aqaba Committee for the Protection of the Environment. Working with the Royal Society for the Conservation of Nature (RSCN), she promoted the establishment of nature reserves and the aquarium at the Marine Science Station in Aqaba. She works tirelessly to promote protection of endangered species and has led efforts to clean up Aqaba’s beaches and shorelines. Every year the queen can be found organizing and participating in

¹ The Environmental Sustainability Index report can be found at <http://www.ciesin.org>. It is a joint project organized by the Center for International Earth Science Information Network (CIESIN) of Columbia University, and the Yale University Center for Environmental Law and Policy.

numerous voluntary tree-planting and clean-up campaigns throughout the Kingdom (http://www.noor.gov.jo/personal_profile.htm (official website)).

The website also explains, Queen Noor is a patron of numerous International Environmental Organizations including the World Conservation Union (IUCN), one of the oldest environmental conservation organizations in the world. In 1998, she delivered the keynote address for the organization's World Conservation Congress. She is also the honorary president of Bird Life International, an organization that strives to address global priorities for conservation by using birds as indicators (http://www.noor.gov.jo/personal_profile.htm (official website)).

The Queen's insistent commitment to environmental protection may be one reason that countries from around the world are pouring monetary aid into Jordan to help the country develop its environmental programs. Numerous countries in addition to the US have provided assistance to Jordan. The European Union has pledged 110 million Euros for 2005-2006

The United States government pledged \$72.45 million in economic aid to Jordan in 2004. This assistance focused on the water, education, health, and governance sectors. The US has funded projects in the past aimed at reducing groundwater depletion, and encouraging the reuse of treated wastewater (<http://jordanembassyus.org>). On May 6th 2005, the Jordan Times reported that the US pledged \$350 million in assistance to Jordan for 2005.

**Table 1. Annual U.S. Aid to Jordan Since the Gulf Crisis
(\$ in millions)**

Fiscal Year (FY)	Economic Assistance	Military Assistance	
	Econ. Support	FMF	IMET
1991	35.0	20.0	1.3
1992	30.0	20.0	0.6
1993	5.0	9.0	0.5
1994	9.0	9.0	0.8
1995	7.2	7.3	1
1996	7.2	30.0	1.2
1997	112.2	100.0	1.7
1998	150.0	75.0	1.6
1999	*200.0	*120.0	1.6
2000	*200.0	*225.0	1.6
2001	150.0	75.0	1.7
2002	150.0	75.0	1.8

*In 1999, Jordan received an additional \$50 million in economic assistance and \$50 million in military assistance as part of the Wye Agreement Funds.

*In 2000 Jordan received an additional \$50 million in economic assistance and \$150 million in military assistance satisfying the \$300 million allocated for Jordan as part of the Wye Agreement fund

Source: U.S. Embassy of the Hashemite Kingdom of Jordan
<http://www.jordanembassyus.org/new/aboutjordan/uj1.shtml>

Despite the fact that a serious interest exists within the Royal Hashemite family to protect the environment and that monetary aid is coming into the country from around the

world for this purpose, there remains a gap in measurable results in the environmental sector of Jordan compared to what is being achieved in other nations. There is an extremely large concentration of college educated people in Jordan who could otherwise do an extremely effective job managing the environment. However, an obstacle related to lack of proper training in environmental policy stands in their way. Higher Education in Jordan seems not to pay sufficient attention to the preparation of its students in this field. This was observed during the field research conducted in Jordan in the summer of 2005. During this time numerous government officials, university faculty, and NGO administrators were consulted in order to get a current picture of the environmental sector in Jordan. Details of the techniques utilized and the people consulted to gather information about this sector are more completely explored in the next chapter.

No one can contend that the people working at the various ministries and NGO's of Jordan are not properly educated. It is no ones fault that Jordan happens to be a country that is poor in the resources that are the most vital and necessary for life. Neither can any one person or group of people in Jordan be blamed for the turmoil in the area that causes so many innocent people to flee their countries and seek refuge in a safe and congenial Jordan.

However, there seems to be a problem with lack of coordination among the various sectors of the environmental field. For example, numerous ministries and institutions including the MoE, MoWI, MoA, and the RSCN all have responsibilities related to environmental and resource management. The RSCN for instance, has been allocated the role of nature protection, regulating hunting, national parks and protectorates by the MoA as part of the Ministry's mandate on livestock, forestry, and ranches. At the same time,

the MoE is mandated for nature conservation within the framework of its wider responsibility for environmental protection and sustainable development. According to authorities in the MoE, the RSCN has since its establishment proven to be the “better” performer because of its record and history. This is due because the MoE, was established recently in 2003, while the RSCN has had experience since 1966. This dichotomy is a challenge that the MoE will have to tackle with the best possible means: cooperation, partnership, and effective sharing of responsibility. Furthermore, the issue of shared responsibility and frequent lack of cooperation among respective parties is not a problem of Jordan alone. It is a problem that many countries in the world face, including the United States.

A goal of this environmental analysis of Jordan was to gain insight into the particular challenges that affect the development and implementation of environmental policy in the nation. A further goal was to identify possible changes in practices or procedures that could lead to more effective utilization of monetary aid coming into Jordan from various countries around the world. And in keeping with the Royal family’s pledge to keep the Jordanian environment healthy, it is expected that this environmental analysis of Jordanian policy and practices may provide the following:

- Provide an overall state of the environment report examining the general status, issues and problems related to Jordan’s environmental sector
- Identify the primary causes of environmental degradation in Jordan and suggest options to address them.

- Describe the current and successful approaches of intervention in the environmental sector by various organizations such as the Ministry of the Environment and nongovernmental organizations (NGO's)
- Analyze opportunities and constraints associated with major elements (water, air, land, energy, etc) of the environment
- Provide recommendations as to how Jordan can integrate environment issues into its current and future policy and development portfolio
- Identify the extent to which required actions for conservation are satisfied by current or proposed programs.

CHAPTER 2

RESEARCH METHOD

The research for this analysis was conducted in the summer of 2005 in Amman, Jordan. It entailed an intensive consultation period and a documentation review that was continued until the spring of 2006. Discussions were conducted with various members of government including representatives of the Ministry of the Environment, the Ministry of Water and Irrigation, the Ministry of Municipal and Rural Affairs, the Ministry of Agriculture, and the Ministry of Health. Members of various NGO's and universities throughout Jordan were also consulted. The visits, interviews, and discussions were focused on reviewing environmental threats, issues, and opportunities in the area of environmental policy in Jordan.

The purpose of the field meetings was to consult with specialists with expertise in various fields who are familiar with the current state of the environment in Jordan. These areas include water resources, urban planning, environmental management, energy, public health, and agriculture. The University of Jordan Library was also employed for the purpose of gathering literature about the current situation in the environmental sector of Jordan. The collection of resources housed at the library contained information such as PhD dissertations on various environmental topics which could only be viewed and analyzed at the library itself. Nowhere else could one get access to the information contained there.

The objective in researching the dissertations was to locate any documents that showed serious broad studies performed in the field of environmental policy. These

documents are not always written in English, and thus provided an additional problem in the cases where documents were written in Arabic. The focus of this study was on those that were written in English, because it proved to be too difficult to find someone to properly translate them into English within a useful timeframe. Very few of these documents had anything to do with environmental policy. A great majority of those that did touch on the topic of the environment focused instead on engineering aspects.

One example of a thesis that was reviewed was titled “Environmental Management Systems of Royal Jordanian Airlines (RJA),” (Abdel Majeed Khabour). This thesis provided a framework for RJA to incorporate environmental objectives into their decision making. Other organizations in Jordan could also make use of the research to analyze the requirements of ISO 14001. It facilitated the composition of preventive procedures in order to mitigate negative environmental impacts that could result from their activities. This report illustrated how to implement an environmental plan in Jordan.

A major feature of the research performed for this thesis entailed a series of intensive discussions with government officials and other specialists familiar with the condition of the environment in Jordan. All of the discussions were performed in the same manner and direction. As expected, sometimes the conversations brought up issues that required a supplemental tangent from the prepared set of questions for discussion. However, this type of digression was always found to be a benefit when unexpected issues arose during the conversations. For example during a discussion at the MoE on the beneficial roles of environmental NGO’s in Jordan, it was unexpectedly discovered that

these organizations play a series of conflicting roles with the MoE. This issue is discussed further in chapter 3.

The major focus of the discussions was concerned with the progress and limitations that Jordan is experiencing in the environmental arena. All the discussions held in Jordan began with an explanation about why the work for this thesis was undertaken in the first place. They were informed about the ranking that Jordan received in the Sustainability Index Report. They came to understand that even though Jordan was an environmental leader in the Middle East, their country did not even come close to the top when other countries in the world were included. Therefore, a major issue that remained the theme of all discussions was related to what Jordan has done or was continuing to do in order to improve the state of the environment for its people and in what areas might Jordan still need improvement. Some of the main questions that were raised in the conversations included:

- Have you ever heard of the Sustainability Index Report? (The answer to this question was always no, so an explanation about Jordan's rank was always given)
- Do you have any thoughts as to what made Jordan a leader in the Middle East?
- What might be some reasons that can explain why Jordan is falling behind compared to other countries outside of the Middle East?
- Do members of government outside of the Ministries take an active role in environmental protection? If so who are they, and what are their positions in government?
- What kind of role does the government play to ensure that manufacturing industries in Jordan consider environmental safety when producing their products?
- What is the focus of most environmental projects undertaken in Jordan?

- Do the Universities in Jordan play an active role training their students in the environmental policies of Jordan?
- What is the role of the environmental NGO's in Jordan?
- What are the major problems that the MoE faces today?

English is a primary language in Jordan after Arabic. Most professionals and government officials have a good understanding of the English language, and can thus carry on discussions without a problem. Sometimes during the interviews translations from English to Arabic were required for technical words, but this did not cause a setback.

Table 2 Officials Consulted in Jordan

Specialist	Organization	Specialty Area
Eng. Ahmed Qatarnah	MoENV	Environmental Impact Assessment
Dr.Nail Moumani	Hashemite University	Environmental Management
Saleh Malkawi	MoWI	Water Resources
Dr. Bassam Hayek	Royal Scientific Society	Director environmental research center
Khaled Majali	MoENV	Global Environmental Affairs
Azzam Hamaidah	Marwa	Environmental Policy
Dr. Qasem Al-Newashi	Jordan Environment Society	Environmental Education
Hisham Hailow	University of Jordan	Assistant Dean of Math and Science
Hani Hourani	UJRC	Director general
Belal Shqarin	MoENV	Jordan Environmental Laws

CHAPTER 3

RESULTS

3.1 Environmental Sustainability Index

Every person consulted for the purpose of this thesis had never heard of the Environmental Sustainability Index Report. However, they were glad that Jordan ranked higher than its neighboring countries. Since most of the people consulted were government officials, university faculty, or environmental NGO representatives, they all showed an enthusiastic desire to accomplish the goals of this thesis. They provided their insight and assistance to ensure that all issues and concerns that might be useful were addressed.

Many people had their own opinions about why Jordan might be a leader in the Middle East, while trailing compared to the rest of the world. They attributed their relative success in the environment to the fact that Jordan was the first country in the Middle East to establish a department of the environment with responsibility for environmental protection. This department was created in the Ministry of Municipal and Rural Affairs. It was also the first in the region to complete a National Environmental Strategy (NES) that provided a detailed assessment of the Jordanian environment and an environmental protection plan. The plan prioritized environmental issues for Jordan and identified major environmental challenges for the decade of the 90's.

However, the challenges facing Jordan that cause the country to struggle to compete with other countries in the world include a number of threatening issues that are

discussed throughout the thesis. These include lack of vital resources such as water and a rapidly growing urban population.

3.2 Role of Government

It was discovered from a majority of officials consulted that the government has not taken a highly active role in protecting the environment. The late King Hussein and his wife Queen Noor have insisted that protection of the environment is a mandatory requirement, and not a luxury that the government can overlook. Many other members of the Royal Family have also made public statements about the need to protect the environment in order to guarantee the health and safety of present and future Jordanians. However, even with the insistence of the royal family for a safe environment, it appears that the environment has not been given the priority it deserves by the decision makers in Jordan.

Further discussion with officials consulted led to the realization that the MoE has in the 3 years it has existed has been subjected to frequent leadership changes, having at least 5 different Ministers. This kind of change so rapidly and so often most definitely has affected the accomplishments that the Ministry could have otherwise achieved.

Officials in Jordan believe that this rapid and recurring change in the director of the MoE has placed a heavy load on the most active Directorate of the MoE known as the Directorate of Environmental Impact Assessment (EIA). It is responsible through its subcommittees for the permitting process of almost every major development project in the country and to some extent the monitoring of these activities. Many problematic shortcomings have arisen as a result of the burden carried by the EIA without sufficient staff and consistent leadership. Most notable is the lack of strong implementing agencies. There is no Environment Inspectorate in Jordan. Very limited tasks related to

environmental inspection are partly covered by different ministries and other organizations such as Natural Resource Authority, Forestry Directorate of the Ministry of Agriculture, Police, and the Ministry of Health. The problems and shortcomings of the environmental sector of Jordan are further demonstrated by the gaps in Jordanian environmental policy that are analyzed in this thesis.

Many officials and experts in Jordan believe that the absence of an Environment Inspectorate in Jordan has proven to be a formula for disaster. Many talk about manufacturing plants throughout the country that do not consider the environmental aspects of their production because they are not worried about large monetary fines or even facility closure that an environmental inspector might impose if such an entity existed. Manufacturers in Jordan are not even being encouraged to consider simply reducing the amount of waste and pollution they produce, therefore nobody can be sure they will ever participate in a program that will eliminate such waste all together, which is precisely what effective sustainable development is about. The manufacturers have not been accustomed to considering the negative affects their production has on the environment or the health of the people living around their facilities. They appear to be currently looking into the most effective way to make the largest profit.

3.3 Role of Universities

When surveying any official government policy it is frequently beneficial to consider the thoughts and opinions of university communities. That is the reason why a thorough examination was made of the dissertations and theses that are housed in the University of

Jordan Library. This location houses every dissertation published by a university student in Jordan, and a few from neighboring countries. The focus of this investigation was to research any document written on a topic pertaining to environmental policies in the Kingdom and as a result, to gain insight about the evolution of environmental legislation in Jordan. The main objective was to look for written documents that trace the history of Jordan's environmental concerns, possibly leading to an understanding of how far Jordan has come. However, the environmental documents written in both English and Arabic were found to pertain to discrete topics in environmental engineering and hydrology and did not provide any substantial assistance in meeting the goals of this research.

As a result, in speaking to various university professors and coordinators in Jordan and reviewing the various academic programs at universities in Jordan, it was discovered that none of the universities in Jordan offer instruction at the undergraduate level in environmental fields. These programs are only available at the master's level.² Even with this limited training opportunity, they do not train students in the environmental laws and regulations of Jordan, nor do they prepare them in international environmental legislation. The programs offered are at the graduate level, and focus on environmental management, environmental health, and civil and environmental engineering. According to Al-Newashi (2003), many universities in Jordan teach courses in environmental education within the Elementary Education department. However, not one university in Jordan has yet established an Environmental Education program.

² At the time of this research, the Hashemite University was looking into a joint Ph.D. program with Washington State University. Yarmouk University has also prepared an environmental education program proposal, but this has not yet been established.

3.4 Role of NGO's

Discussions with various members of the MoE and directors of various environmental NGO's in Jordan led to the discovery that there is a policy of encouraging participation by NGO's in the initiation, design, formulation, and management of sustainable development. The emphasis on all stakeholder participation including the NGO's is entrenched in the Environmental Protection Law and is the basic philosophy of the MoE. The MoE encourages and supports the activities of the NGO's in Jordan. It also collaborates with several NGO's to a certain degree.

People at both the MoE and at NGO's believe the government of Jordan has come to realize the importance of developing strong links between resource users and the MoE in order to effectively implement the Law. The Ministry's strategy has been to enlist the support and participation of local people by various means including:

- Providing support in building local capacity to enable them to facilitate sustainable management of the environment and natural resources; and
- Assisting local NGO's to develop their own environmental mini-projects.

Various NGO offices were contacted during the trip to Jordan in order to gain an understanding of the role that environmental NGO's play in the Kingdom. The NGO's and local communities have actively participated and have taken responsibility for ensuring that the environmental concerns are integrated at the local level planning process. NGO's collect and disseminate information regarding the environment. They take action during environmental catastrophes. The organizations make sure that local

people other than the private industrial sector play an active role in environmental planning, decision making, and the implementation of environment-related activities. They also mobilize people and resources to address environmental problems.

The MoE states its support for the NGO's and there is clear evidence to confirm the relationships they have. For example, the National Project for Environmental Management is a specific case where the MoE has executed a contractual relationship with an NGO for professional services. This is an agreement that sets specific tasks to be carried out by each party in the course of the Ministry's efforts to maintain the environment. The RSCN provides specialized services through governmental budgetary allocation and external funding, which has been allocated since the 1960's.

A number of activities performed by the environmental NGO's are of special interest to the MoE. Services provided by the Royal Scientific Society (RSS) range from socio-economic studies to building and construction and industrial chemistry to radiation monitoring and environmental management and research. The Environmental Research Center (ERC) at RSS is well established and a large number of its lab tests are accredited by the government. Its relationship with the MoE is clear and has been going on for several years.

The ERC's cooperation with the MoE has been formalized through two basic channels: training of the MoE staff and in the annual agreement for provision of services on environmental media measurement. This is contained in the National Project for the Management of the Environment in Jordan. According to this agreement a certain number of tests will be conducted by the ERC for a given financial consideration by the MoE. The question however is whether this arrangement can be sustainable over the

years to come. Also of concern is whether the tests are adequate in number and frequency and whether promptness and impartiality are assured.

However, in the absence of capability at the MoE itself (in personnel, lab, expertise, and plans), the accepted alternative available is to continue to use the lab of the RSS. It seems that over the long term, this arrangement may not be the most suitable. Alternatives and capacity expansions should be planned and embarked upon as soon as possible.

CHAPTER 4

BACKGROUND

It is easy for countries in the developing world to claim that they want to develop sustainably, but it is more difficult to actually accomplish it. Countries of the developing world have many issues to deal with when considering their actions in sustainable development. For Jordan, these issues include population growth, unplanned urban development, unsustainable use of resources and many others.

“The debate over the word ‘development’ is not merely a question of words. Whether one likes it or not, one can’t make development different from what it has been. Development has been and still is the Westernization of the world.” (Pieterse, 2000, p.178).

According to Freiburg and Hettne (1985), development is one of the most critical issues facing the world, and has been described as one of the most powerful ideas of the West. They, like many other authors, including Persadie and Ramlogan (2005), argue that appropriate development is the key to improving conditions in the developing world and the issues addressed should include ideals on environmental protection.

Yarbrough & Yarbrough (1994), contend that the “ultimate goal of a country’s development process is an improvement in the well – being of its residents.” This objective should consist of certain universal features such as assuring the population basic necessities such as food, shelter, clothing, education and health, and sanitation facilities, as well as a clean environment.

In Jordan, as in every other country in the world, the state is the most critical player in ensuring effective environmental management. According to Persadie and Ramlogan (2005), because the state is the primary financier of environmental investments, it is imperative that the state embraces environmental concern at both the policy and implementation levels. This concept should apply to all states whether they are developed or still in the process of attaining development.

The problem however, is that many developing countries do not have the financial means to give environmental management priority. Jordan, like many other developing states, attempts to introduce measures to deal with and respond to environmental degradation, however, factors such as rapid population growth make it very difficult to achieve meaningful progress.

Persadie and Ramlogan (2005) believe a major revolution in economic thinking emerged in the 1980's with the formulation of Sustainable Development. This theory balances the needs of the people today against the resources that will be needed in the future. They contend the theory recognizes that development must be geared towards meeting the basic needs of the vast number of poor in the developing world. The following is short version of the theory of Sustainable Development:

We commit ourselves to undertaking concrete actions and measures at all levels and to enhancing international cooperation, taking into account the Rio principles. These efforts will also promote the integration of the three components of sustainable development; economic development, social development and environmental protection as interdependent and mutually reinforcing pillars. Poverty eradication, changing

unsustainable patterns of production and consumption and protecting and managing the natural resource base of economic and social development are overarching objectives of, and essential requirements for, sustainable development.... The gap between developed and developing countries points to the continued need for a dynamic and enabling international economic environment supportive of international cooperation, particularly in the area of finance, technology transfer, debt and trade and full and effective participation of developing countries in global decision-making, if the momentum for global progress towards sustainable development is to be maintained and increased... (UN, 2002, p.8-9).

It is critical that countries like Jordan begin to consider and integrate the principles of sustainable development at this time in their development. It was observed during the information gathering effort for this research that many manufacturing industries are beginning to take shape in Jordan currently. Some of these include local companies, and others international corporations. The management of these enterprises needs to realize that they must assimilate practices of economic development along with environmental protection. This practice is the means by which the kingdom can promote the principles of Sustainable Development and ensure the safety of current and future generations

International organizations such as the State Secretariat for Economic Affairs (SECO) from Switzerland and Sustainable Business Associates (SBA) and Jordanian groups like the Royal Scientific Society have organized programs such as the Cleaner Production Unit (CPU) in Jordan. These groups aim to contribute towards creating a sustainable industrial production mode in Jordan increasing the long-term competitive

position of enterprises while reducing their environmental pollution by applying cost-effective measures and technologies. As a result, Jordan shall be in a much better position to participate and benefit in a sustainable manner from the global economy. It is vital for the future safety of the Jordanian environment that these industries implement the principles of sustainable development

“A ‘backward’ country should not look for the image of its own future in the ‘advanced’ country, but in its own ecology and culture. There is no universal path to development. Each society must find its own strategy” (Freiburg and Hettne, 1985, p. 220). This is exactly the reason why Jordan can not simply perform a so called “cookie – cutter” implementation of environmental policies that are imitative of developed countries like the US or Europe. Jordan must build its own policies and procedures, because nobody but Jordan knows what is best for Jordan’s environment.

Jordan is not alone in the world in suffering from environmental problems caused by man. While the world continues to derive short-term development strategies, it carries on ignoring the importance of a healthy environment.

Jordan is facing a major problem in reference to its continued population growth (UAER, 1994). The country has witnessed many changes in response to the increase in population. According to USAID, Jordan’s population of 5.29 million people is growing at a fast rate of 2.59 percent per year.

Ali and Hassan (1994) contend the response to population growth has included implementation of intensive agricultural and industrial practices. These systems have consequently brought about several environmental problems such as a water shortage, soil degradation, and air pollution.

Considering the fact that Jordan is a country that suffers from an already limited supply of natural resources, attention must be given to pursuing sound environmental policies and procedures that will help the country avoid further resource depletion and misuse. (Please refer to Chapter 10 for further discussion on natural resource limitations). This emphasizes the need to apply sustainable development across all sectors of practice (Tell and Yaser, 1987; GCEP, 1998).

The Jordanian government has the responsibility and obligation to provide for its citizens a safe and healthy environment. In keeping with the notion of Sustainable Development, it must be one that is “meeting the needs of the present without compromising the ability of future generations to meet their needs” (WCED, 1987, p. 43).

Since the 1970's, Jordan has recognized the economic and social implications that are correlated with environmental degradation. Much has been done since then by national organizations (both governmental and nongovernmental) and international agencies to enhance protection of the environment in the country.

At the international level Jordan has made significant progress in supporting environmental policies and programs. For example, Jordan was one of only thirty countries to declare support for the World Conservation Strategy (WCS) in 1980 (Jreisat, 1997). Locally, Jordan has taken many strides toward the protection of the environment, which is an issue the country has placed on its national priority list. The main steps include the birth of the Environment Protection Law (EPL), the establishment of the General Cooperation for Environment Protection in 1995, and the creation of the

Ministry of the Environment in 2001. (The reasons behind the changes in environmental laws are illustrated in Chapter 7).

Throughout the country, there are encouraging signs that public leaders, NGOs and community based organizations (CBOs) are focusing actively on threats to the environment. International donors including Japan, the United States and many countries in Europe are moving in to help implement environmental activities that result in improved livelihoods for the people of Jordan. One example of this is the initiating of the Cleaner Production Unit (CPU) that was discussed previously.

Although Jordan has taken many significant and progressive steps toward improving the state of the environment and the health of its citizens, there is still a lot of effort required. In keeping with the previous example of the CPU, there needs to be a widescale adoption of sustainable industrial practices among all of the manufacturers in Jordan, not just the ones who choose to make the changes. This needs to apply to multinational companies that choose to develop in Jordan as well. It is hoped that this analysis will facilitate a better understanding of what else needs to be done to improve the state of the environment in Jordan.

CHAPTER 5

INTRODUCTION TO JORDAN

Jordan is a small, very arid country about the size of Indiana. According to Patai (1958, p.2), the territory of Jordan located in the southwest corner of Asia, covers about 96,000 square kilometers. It is a country highly dependant on its fragile environmental resource base. One of the most urgent challenges facing the country right now is ensuring the proper and sustainable use of resources such as soil, vegetation and especially water.

Concerns related to the environment have played an important role in Jordanian economic and social plans since the 1970's. Two indicators reflect this: the first was the creation of a central authority, the other treating the environment as a sector of its own. Jordan was the first country in the Middle East to create a department of the environment that has demonstrated its responsibility for protecting the environment by conducting studies and enacting legislation. This department was created within the Ministry of Municipal and Rural Affairs, the Ministry later became the Ministry of Municipal and Rural Affairs and the Environment. The environment was considered a key sector and was later (in 2001) granted its own specialized, independent, Ministry called the MoE. Jordan has confirmed its commitment to sustainable development during the Earth Summit in Rio de Janeiro in 1992.

5.1 Historical Background

The history of Jordan can be dated to 1921 when Britain recognized the Emirate of Transjordan as an independent state under the protection of Abdullah I as its Emir. On

May 26th, 1946, Britain gave up its mandate on Transjordan and the name of the state was changed to the Hashemite Kingdom of Jordan. On May 15, 1948, Jordan joined its Arab neighbors in the first Arab-Israeli war. Two years later on April 3, 1949, Jordan signed the Jordan-Israel armistice. This agreement placed the West Bank and East Jerusalem under Jordanian rule, and joined half a million Transjordanians with a half a million more Palestinian Arabs. The incorporation of the West Bank, with half a million refugees, into Jordan, brought with them severe economic and political consequences.

On July 20, 1951, King Abdullah I was assassinated while praying in Jerusalem. King Talal succeeded the throne for a few months, then Hussein Ibn Talal became King on May 2, 1953.

The 1991 Gulf War forced at least 300,000 more Palestinian refugees back into Jordan. These people had lived and worked in Kuwait for many years and were expelled from Kuwait during the war.

On February 7, 1999, with the passing of his father, Abdullah II Ibn Al-Hussein became king. He too has had to deal with refugees seeking exile in Jordan after George W Bush initiated war on Iraq on March 20, 2003. This time it is estimated that one million Iraqis have fled and are living and working in Jordan (Kenyo, 2006).

5.2 Geography

Jordan is located in the heart of the Middle East in the northeastern edge of the Arabian Peninsula. It is bordered in the north by Syria, in the east by Iraq, and to the eastern and southern fronts by Saudi Arabia. Jordan's western boundary is defined by the Jordan River (Palestine and Israel). The Gulf of Aqaba, located in the southwest region of

Jordan is the country's only outlet into the Red Sea. The coastline is only 26 Km long. Although Jordan's area is limited in space, the landscape reveals a great deal of diversity (Hadidi, 1985).

Jordan has three major geographic zones: the Jordan Rift Valley which runs down the western part of the country and is the main agricultural area; the Mountainous region where most of the major towns of Jordan are located, and where 90% of the population resides; and the Eastern Desert (Badia), which stretches east into Syria, Iraq, and Saudi Arabia.

The most common ecosystems in Jordan are deserts in the east and south, bush steppe in the Mountainous Region and in the northeast Badia, and steppe grasslands and Mediterranean scrub in the Mountainous Region. Juniper and oak woodlands as well as planted pine forests are found at higher elevations in the mountains. Wetlands which provide vital benefits to migratory birds are located in the vicinity of several bodies of water and seasonal marshes throughout the country. The Gulf of Aqaba contains some of the northernmost coral reefs and mangrove stands in the world. The gulf supports over 1,000 different species of fish.

5.3 Climate

Its climate is characterized by a relatively rainy season from November to April, and very dry weather conditions for the rest of the year. The total annual precipitation ranges from 120mm in the East to 300mm in some parts of the West. The rainfall in the South is typically about 300mm, while in the North it can reach 500mm a year (GCEP, 1998).

5.4 Population

The various war-related predicaments in the Middle East are contributors to the causes of uncontrolled population growth in Jordan. The population of Jordan according to estimates in 1996 was 5,906,760 with a growth rate of 2.5% per year (CIA World Fact Book). According to a study done by the GCEP in 1998, the population growth can be attributed to the following factors:

- The compulsory influxes of refugees caused by the Israeli occupation of Palestine in 1948, and the Israeli occupation of the West bank in 1967.
- The consequences of the 1991 Gulf War that led to a large number of Jordanian and Palestinian nationals expelled from the Gulf States.
- While the fertility rate remained constant at a very high level for a long period of time, the mortality rate declined fairly sharply from a crude death rate of 16 per thousand between 1980 and 1990.

5.5 Economy

Jordan is developing industrially however poor it may be in water and other natural resources. There is very limited information available on the economy of Jordan. However, according to the CIA World Fact Book (WFB) section on Jordan, industries include phosphate mining, petroleum refining, cement, potash, light manufacturing, pharmaceuticals, and tourism. Jordan's economic resource base also centers heavily on foreign aid. The same source contends the Industrial Production Growth Rate in 2005 was 7.5%. Since the major part of the territory is too arid for agriculture. Therefore, Jordan must partially depend on itself for support, and also rely heavily on foreign aid.

Unemployment has increased due to subsequent influxes of unemployed Palestinian refugees (Kharoof, 2000).

Jordan's economy and production is obviously much smaller than that of the United States. According to a report by the US government (1999)-Environmental Review of Free trade area between the US and Jordan, Jordan's Gross Domestic Product (GDP) in 1998 was \$7.0 Billion. This amount is less than 1/1000 the GDP of the US in 1998 at \$8.8 trillion. Jordan's per capita GDP in 1998 was \$1,594 which is less than 1/20 the amount in the US in 1998 of \$32,377. The CIA WFB, contains more recent information. In 2005, the GDP was \$11.61 billion. That same year, Jordan's per capita GDP was \$4,800.

5.6 Political System

Jordan is a constitutional monarchy. The present ruler is King Abdullah II Ibn Al-Hussein. The legislature is bicameral, with a Senate, also called the House of Notables (Majlis al-Ayan) and the House of Representatives, also called the House of Deputies (Majlis al-Nuwab). The senate is composed of 55 seats and members are appointed by the monarch. The House consists of 110 seats, and members here are elected by popular vote on the basis of proportional representation. Both of these chambers have been overshadowed by the executive side of the government.

According to the United States Library of Congress, the Jordanian Constitution divides the powers and functions of the government into executive, legislative, and judicial branches. Legislative power is assigned to both the bicameral National Assembly and the king, who is also vested with executive power. The king exercises his

executive authority with the aid of his cabinet ministers, collectively known as the Council of Ministers. Judicial power is vested in independent courts. The authority and services of the central government are extended to all corners of the kingdom through the eight governorates or provinces (<http://countrystudies.us/jordan/54.htm>).

Under the Constitution, the monarchy is the most important political institution in the country. Articles 28 through 40 of the Constitution enumerate the king's powers. He appoints the prime minister, the president and members of the Senate, judges, and other senior government and military functionaries. He commands the armed forces, approves and promulgates laws, declares war, concludes peace, and signs treaties (which in theory must be approved by the National Assembly). The king convenes, opens, adjourns, suspends, or dissolves the legislature; he also orders, and may postpone, the holding of elections. He has veto power that can be overridden only by a two-thirds vote of each house. The Constitution states that the king exercises his jurisdiction by *iradah* (sing.; pl., *iradat*--royal decrees), which must be signed by the prime minister and the minister or ministers concerned. As head of state, the king is accountable to no one (<http://countrystudies.us/jordan/54.htm>).

CHAPTER 6

THE ENVIRONMENT IN JORDAN

The issue of the environment in Jordan is diverse. It involves various disciplines and sectors of society including many organizations and ministries. The elements of the Jordanian environment include water resources, flora, fauna, industry and mining, nature reserves, and other factors.

6.1 Water resources

Jordan's fresh water resources are very scarce. According to Ramadan (1990), very little, and unsteady rainfall make it difficult to depend on natural water resources in future planning. Many studies including one by Kharoof (2000) indicate that much more water from rainfall is needed to satisfy Jordanian needs in the coming years if no other changes take place.

According to the United Nations Food and Agriculture Organization, surface water resources are unevenly distributed among 15 basins in Jordan. The largest source of external surface water is the Yarmouk river, at the border with Syria. Originally, the annual flow of the Yarmouk river was estimated at about 400 million m³ (of which about 100 million m³ are withdrawn by Israel). Total flow is now much lower than 400 million m³ as a result of the upstream Syrian development works which have been carried out in the 1980's. The Yarmouk river accounts for 40% of the surface water resources of Jordan, including water contributed from the Syrian part of the Yarmouk basin. It is the main source of water for the King Abdullah canal and is thus considered to be the backbone of

development in the Jordan valley. Other major basins include Zarqa, Jordan river side wadis, Mujib, the Dead Sea, Hasa and Wadi Araba. Internally generated surface water resources are estimated at 400 million m³ /year.

Jordan's groundwater is distributed among 12 major basins. Total internally produced renewable groundwater resources have been estimated at 500 million m³/year, of which 220 million m³ constitute the base flow of the rivers. Groundwater resources are concentrated mainly in the Yarmouk, Amman-Zarqa and Dead Sea basins.

The safe yield of renewable groundwater resources is estimated at 275 million m³/year. Most of it is at present exploited at maximum capacity, in some cases beyond safe yield. Of the 12 groundwater basins, 6 are being over extracted, 4 are balanced with respect to abstraction and 2 are under-exploited. Average groundwater depletion was estimated at 190 million m³/year in 1990. Over-extraction of groundwater resources has degraded water quality and reduced exploitable quantities, resulting in the abandonment of many municipal and irrigation water well fields, such as in the area of Dhuleil.

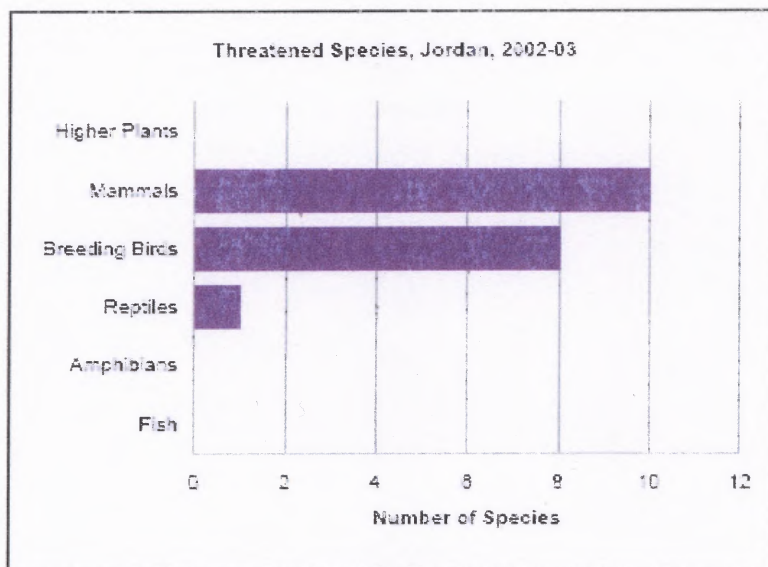
The main non-renewable aquifer presently exploited is the Disi aquifer (sandstone fossil), in southern Jordan with a safe yield estimated at 125 million m³/year for 50 years. Other nonrenewable water resources are found in the Jafer basin, for which the annual safe yield is 18 million m³. In total it is estimated by the Water Authority of Jordan that the safe yield of fossil groundwater is 143 million m³/year

(<http://www.fao.org/ag/agl/aglw/aquastat/countries/jordan/index.stm>).

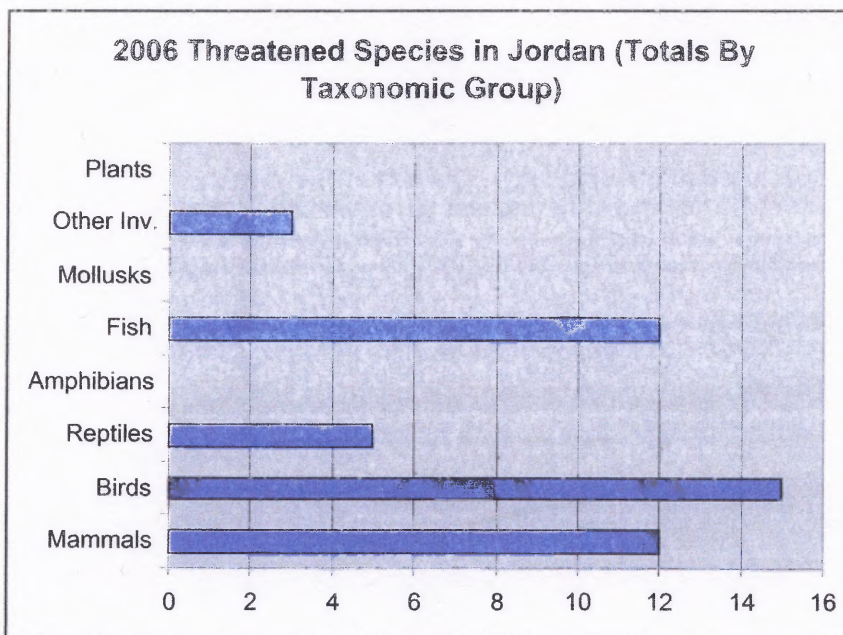
6.2 Fauna in Jordan

According to GCEP (1998), in 1992, the number of animal classifications recorded in Jordan includes 77 species of mammal, 380 birds, 73 reptiles, 4 amphibians, 1000 marine

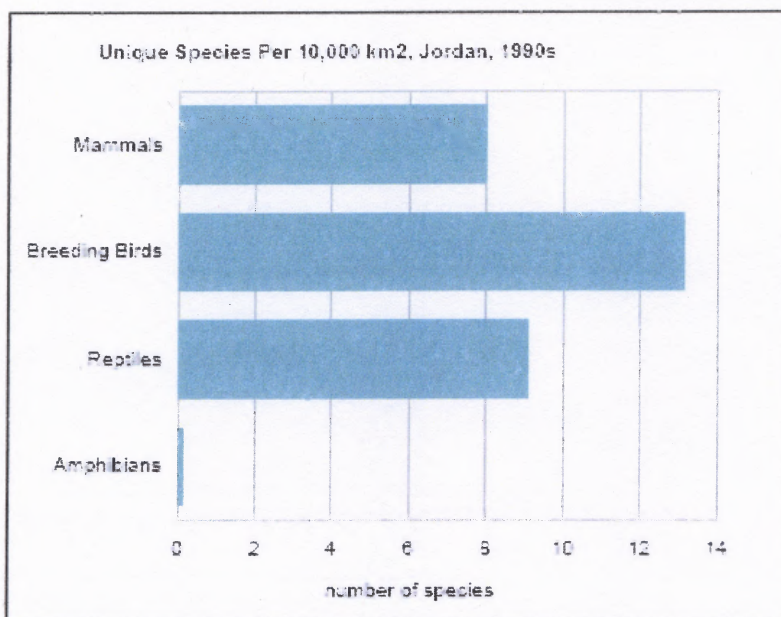
fish, and 18 freshwater fish species. However, there is a decline in the number of species, especially mammals, because of excessive hunting and habitat destruction.



Source : <http://www.earthtrends.wri.org>



Source: <http://www.redlist.org/info/tables/table5.htm>



Source: <http://www.earthtrends.wri.org>

6.3 Flora of Jordan

Jordan's flora is rich and highly diverse. According to Juneidi (1999), in 1992, 2,500 species of vascular plants were recorded in Jordan. These plant species belong to 152 families, representing about 1% of the world's total flora. An estimated 100 species are endemic. Many species are known to be rare and endangered due to both natural factors and human activities. Ongoing destruction of natural habitats causes degradation and disappearance of rare, native plants. The government has relied on the RSCN to handle the issue of nature protection. When species are known to be in danger of extinction, it is the RSCN's responsibility to mitigate the problem. This organization for the past 30 years has been maintaining and protecting the wildlife of Jordan with the establishment of 7 nature reserves (see figure 6.1). However, these reserves have more often been inclined to protect animal species and not plants.

6.4 Industry and Mining

Since the 70's the chemical industry has been expanding in Jordan, and pollution is beginning to surface in areas with high levels of industrial activity. Examples of this type of activity include the Jordan Petroleum Refinery which produces about 4.5 million tons of fuel per year. Cement factories, phosphate mines, and fertilizer companies also produce a large amount of dust into the atmosphere. Numerous efforts have been attempted over the past few years to try to control the emissions. The attempts have been met with a considerable degree of success (Juneidi, 1999).

Environmental management should be among the highest priorities for industry in Jordan. The government of Jordan needs to take into consideration environmental criteria when deciding on the future siting of industries and when adopting guidelines for assessing environmental impacts of new industries, carrying out audit assessments of compliance and openness with the public. The improvement of production systems through technologies and processes that utilize resources more efficiently and at the same time produce less waste is another important pathway towards sustainability for industry.

Traditionally, the approach in Jordan has been to control the regulated pollutants as they are emitted into the environment. In a country like Jordan however, this kind of control often is not very efficient. This is mainly due to inadequate legislation, in addition to gaps in available information. Jordan needs to look into efforts to prevent the emissions from being released in the first place, instead of just trying to deal with them after their release.

6.5 Nature Reserves

Since 1975, Jordan has established seven Nature Reserves, covering a total of 1289 sq km, under the management of the Royal Society for the Conservation of Nature (RSCN).

Table 6 summarizes the general information regarding the reserves in Kingdom.

Table 6 Nature Reserves in the Hashemite Kingdom of Jordan

Reserve (Year Est.)	Location	Area (km sq)	Habitat	Description
Wadi Rum(1989)	South Jordan	560	Rugged Desert	Rosy Mountains
Azraq Desert(1987)	Azraq	320	Marshland	Desert Oasis
Wadi Mujib(1987)	East Shore of the Dead Sea	212	Rugged and Flowing Rivers	the lowest nature reserve on Earth
Dana(1989)	South Jordan, near Petra	150	Mountains and wadis	Helping nature, Helping people
Shaumari(1975)	East Desert, near Azraq	22	Flat desert scrub	Home of the Arabian Oryx
Zubia(1988)	North Jordan, near Ajloun	13	Evergreen oak forest	Evergreen Forest
Azraq(1977)	East Desert	12	Marshland	Wetland

Source: Jordan Country Study On Biological Diversity. GCEP (The General Cooperation for Environmental Protection), 1998, p.161.

CHAPTER 7

ENVIRONMENTAL ISSUES IN JORDAN

Jordan's environment is affected by a number of local environmental issues. In 1998, GCEP identified the main environmental issues as follows:

7.1 Threats to Water Resources

On a global scale Jordan has limited quantities of renewable fresh water available for its citizens. The current demand and use of freshwater by municipalities, industry, and agriculture far exceeds the sustainable water supply. As a result, groundwater resources are being tapped into beyond their renewable yield (HKJ, 1996).

Current trends in water depletion threaten future sustained use. The limited ground and surface water resources are further endangered by pollution from untreated municipal, industrial, and agricultural sources. This in effect reduces the availability of water for use and lowers the quality of the remaining water (Ali & Hassan, 1994).

The water shortage problem is further exacerbated by under pricing water, particularly for agriculture, and inefficiency in collecting water charges. Economic instruments are essential for institutional management and control of the water sector in Jordan (Kharoof, 2000).

7.2 Threats to Land Resources

Jordan is a country composed of mostly arid and semi-arid land. Almost 90% of the country receives less than 200 mm of precipitation per year. This is reflected in the country's soils, in the land cover of range grasses and forests, and in the way Jordanians

use their land. Most of Jordan's economic activity covers about 10% of the land, and competition between different parties for this land is intense (Jreisat, 1997).

The three main environmental issues related to the use of land in Jordan are considered to be:

1. land degradation, which primarily includes the physical deterioration and ultimate loss of land for beneficial uses
2. land contamination, essentially a result of chemical contamination
3. coastal zone degradation

- (HKJ, 1996)

7.3 Threats to the Urban Environment

According to Jreisat, in 1997, over 70% of Jordan's population lived in urban centers. The Human Development Report of 2005 from the UNDP states that 79.1 % of the population of Jordan lived in urban areas in 2003. The same report expects this figure to rise to 81.1% by 2015. Al-Newashi (2003) contends that Jordan has generally coped with Urban Development fairly well. Housing has been made available; people have had access to drinking water, electricity, health services, and education. Municipal waste collection is currently functioning. However, according to officials in Jordan, waste disposal barely meets sanitary requirements. With the exception of a few areas, it tends to pollute land and groundwater. Industries do not make the situation any better. They are usually located in and around urban areas, especially in Amman, Zarqa, Irbid, and Aqaba. The co-location situation makes it more difficult to separate collection of domestic and industrial waste.

An increase in motorization and concentration of motor vehicles in urban areas has caused air quality to be severely degraded (HKJ, 1996). The negative effects of urban and industrial development are likely to increase with increased urbanization and industrialization unless the government acts quickly to adopt mandatory pollution control and prevention techniques.

There are three main environmental issues in the urban environment:

1. **Waste Management:** includes:
 1. Waste Water Treatment: Plans are that by the year 2020 Jordan will have efficient sewage systems operating and available to the majority of the population.
 2. Municipal Solid Waste: None of the existing solid waste disposal facilities are properly designed, nor do their locations demonstrate safe environmental objectives. This is mainly due to the fact that no environmental impact assessments were conducted prior to developing these sites. These facilities threaten the safety of the people living around them, and the groundwater as well (Kahakesh, 1998).
 3. Hazardous Waste: there is a lack of data on the quantity, type, and location of hazardous waste that have been disposed of in Jordan. There is no agency to collect or disseminate technical information on hazardous chemicals. Hazardous materials are not properly disposed of at a licensed disposal sites because these facilities do not exist, and there are as of now, no efforts to quantify the extent of contamination caused by improper disposal of these materials. There are also no proposals to clean up any contaminated sites (HKJ, 1999).
2. **Air Pollution:** There is a lack of coordination among the institutions involved in air quality control monitoring and assessment in the Kingdom. Also, monitoring

of air quality is usually carried out in only certain parts of the country and not others. Several air pollution sources including mobile and stationary sources contribute to the deterioration of air quality in Jordan. Energy generation in the thermal power plants, oil refineries and Khirbet wastewater treatment facility in the Hashimeyah / Zarqa region contribute to elevated sulfur dioxide (SO₂), hydrogen sulfide (H₂S), nitrogen oxides (NO_x), carbon monoxide (CO), hydrocarbons (HC), and carbon dioxide (CO₂). Transportation is a major source of air pollution in Amman and other major cities. Several industries contribute to the elevating dust levels in the country; including phosphate mining, quarrying activities, and cement. Other industries such as iron and steel, chemical, and tannery contribute to odor problems and other gaseous pollutants (HKJ, 1999).

3. **Uncontrolled Urban Expansion:** Jreisat (1997) argues that none of the existing master plans for urbanization in Jordan plan urban expansion realistically nor do they reflect market demands. He further contends the lack of availability of approved national land use plans contributes to a number of consequences including: 1. unacceptable interaction between industrial and urban areas; and 2. the inability to control or combat damage to agricultural lands which are being converted to urban developments.

There is a lack of specialists trained in the area of urban environmental issues in Jordan. Many studies have identified the impacts of this shortfall showing up as problems in managerial aspects, as well as at the professional and technical levels.

Jordanian universities need to train students in fields such as hazardous waste management, air quality control, and industrial safety (Ahmed, 1989; HKJ, 1996).

The Jordanian government needs to improve planning, management, and evaluation systems for land use and land resources. They need to develop policies to support the most practical sustainable management of land. If they do not take action to prevent further inefficiency in land use, resulting damage may not be reversible in the future.

CHAPTER 8

JORDAN'S ENVIRONMENTAL LAWS

Jordan realizes that threats to the environment that pass without response threaten the welfare of its people. It also realizes that protection of the environment and the unfolding development process are inter-linked. As a result, Jordan tries its best to subscribe to a policy of sustainable development in its conscious effort to protect the environment. This can only be achieved through the efficient utilization of natural resources, combating desertification, and enhancing biodiversity (HKJ, 1992) and is exemplified by the evolution of national environmental laws and regulations that have come into effect over the past few decades.

8.1 National Environmental Strategy

According to the Jordanian Ministry of the Environment, in 1991, Jordan was the first country in the Middle East to complete a National Environmental Strategy (NES). It came through an agreement with the International Union for the Conservation of Nature (IUCN), and with funding from the US Agency for International Development (USAID). NES included a detailed assessment of the Jordanian environment and an environmental protection plan. Jordan also devised a five-year national economic and social development plan (1993-1997). This plan prioritized environmental issues and identified major environmental challenges for the decade of the 90's (NES, 1991).

8.2 Environmental Protection Law No. 12/1995 (EPL)

First in 1995, and then in 2003, the government of Jordan published the *Environment Protection Law* that further defined environmental problems and identified specific actions to address these problems. There was no environmental law in Jordan before 1995. According to Al-Omary (1994), before this time, environmental resources were treated as economic tools to be dealt with not as a coherent whole, but on an ad hoc basis.

The 1995 Environment Protection Law in Jordan consolidated national environmental protection authority under a new government entity called the General Cooperation for Environmental Protection (GCEP). In 2003 it was reorganized into the Ministry of Environment. It is currently going through a phase of rapid reform and trying to establish and demonstrate its authority.

Environmental monitoring is being conducted for the Ministry by NGO's like the Royal Scientific Society (RSS) on the basis of annual contracts prepared by the MoE. Unfortunately, there is a lack of strong implementing agencies in Jordan. According to discussions held with government officials, there is no Environmental Inspectorate in Jordan. Tasks dealing with environmental inspections are partly covered by various ministries and other organizations. These include the Natural Resources Authority, Forestry Directorate of the Ministry of Agriculture, Police, and Ministry of Health.

8.3 Environmental Protection Law No. 1/2003 (EPL)

The most recent environmental law was issued in 2003. From long discussions with various members of the MoE, it was apparent that there are many reasons that

explain the repeal of the Environment Protection Law of 1995, and thus the development of the new Environmental Protection Law of 2003. The main reason behind this reform is the need to gain more effectiveness by the replacement of the GCEP with the newly created Ministry of the Environment. The EPL of 2003 gave the MoE the authority to handle issues related to environmental protection and to manage Jordan's natural elements in a sustainable manner. Secondly, it endorsed the MoE to authorize non – government bodies to work in the environmental protection domain. For example, the RSCN was given the authority to handle the issuance of hunting and fishing licenses, and as later discussed to protect wild plants and animals. Third, the EPL of 2003 helped to coordinate the national efforts to protect the environment by creating a national strategy for environmental awareness, education, and connection. Fourth, it established a prohibition on the admission of hazardous substances into the Kingdom. Fifth, it helped promote and improve relations between the Kingdom and other countries particularly in the Middle East, and with International Environmental Organizations, striving to implement agreements related to environmental affairs. Sixth, the new law helped to establish an advisory board of people with experience and competence in order to work together to submit suggestions to the Minister. And finally, it set deterrent penalties with regard to anyone who causes harm to the environment.

CHAPTER 9

INTERNAL STRUCTURE OF THE MOE

The Ministry of the Environment is organized into the following:

- **The Office of the Minister of Environment**

presents before the legislature or Prime Minister amendments to environmental policies and guidelines, appoints the management staff at the ministry, and communicates to the ministry all relevant decisions.
- **The Office of the Secretary General including Liaison Offices**

responsible for the overall development and supervision of the MoE's activities and is also involved in the coordination of the country's environmental programs at national and regional levels.
- **Assistant Secretary General (technical)**
- **Assistant Secretary General (Administration and Operations), proposed**
- **Governorates' Environmental Directorates (Governorate Directors report directly to the Secretary General, no post proposed here)**
- **Inspection and Pollution Control Directorate, proposed to carry on the functions of Air and Water Directorates.**
- **Environmental Impact Assessment Directorate**
- **Waste Management and Chemicals Directorate**
- **Nature Protection Directorate**
- **Awareness and Environmental Media Directorate**

responsible for information, education, awareness, and training. Must include creation and supply of information, promoting the development of adequate environmental knowledge, skills, and awareness to ensure sustainable utilization of the country's natural and environmental resources.

- **Planning and International Cooperation Directorate**

this directorate is not presently clearly defined in its role and does not perform functions relevant to its name.

- **Monitoring and Research Directorate, proposed**
- **Administration Directorate**
- **Directorate of Finance**

Role of the MoE

The functions of the MoE can be summarized as:

- **Coordinate the implementation of government policy and the decisions of the Advisory Committee with members of Cabinet**
- **Ensure the integration of environmental concerns in overall national planning through coordination with the relevant ministries, departments, and agencies of government**
- **coordinate with the private sector, intergovernmental organizations, nongovernmental agencies and governmental agencies within and outside Jordan on issues relating to the environment**

- Introduce environmental policies and strategies and make an effort to implement them directly or indirectly as appropriate
- Initiate and disseminate legislative proposals, standards and guidelines on the environment in accordance with its legal mandate to related Ministries and institutions
- Review and approve environmental impact assessments and environmental impact statements submitted in accordance with ruling regulations or any other law
- Undertake pollution prevention and control programs employing all necessary tools to run the program. These may include an environmental information system, environmental laboratories, Geographical Information Systems (GIS), management systems, appropriate inspection programs and other instruments deemed adequate and practicable
- Promote public awareness through formal and non-formal education about environmental issues
- Undertake monitoring, research, and surveys and submit such reports and recommendations with respect to the environment
- Ensure performance of proper safeguards in the planning and implementation of all development projects, including those already in existence that have or are likely to have significant impact on the environment
- Undertake and/or coordinate research and disseminate information about the environment

- Prepare and disseminate a state of the environment report once every two years
- Mobilize, expedite and monitor resources for environmental management

After elaborate discussion with various environmental stakeholders in Jordan, it was concluded that in order to improve the effectiveness of the MoE the government of Jordan needs to develop a national policy that results in a more effective legislative structure for the Ministry. Based on these discussions, the new mandate should include:

- Establishing environmental protection policies, plans, programs, and projects necessary for sustainable development
- Establishing environmental standards and norms
- Measuring and controlling environmental elements through their own scientific research labs
- Issuing pre-construction licensing guidelines and requirements to ensure proper environmental protection for new projects such as agricultural, commercial, industrial, mining, and development projects
- Monitoring public and private facilities to ensure environmental compliance
- Conducting environmental research studies
- Coordinating the national environmental awareness campaign
- Approving, supervising, and managing the establishment of national parks

- Preparing emergency environmental plans
- Issuing official environmental publications

During the interviews held in Jordan, an attempt was made to analyze the history of the MoE. Many of the discussions with members of government and others revolved around the events that led to the creation of the MOE. It was learned that the Ministry was once part of the Ministry of Municipal and Rural Affairs (MoMRA). This creates a belief that there exists a close and clear management structure and relationship at the municipal level, but this is not the case. The MoE lacks a cohesive knit with the municipalities as would have been expected. Several other ministries and institutions play key roles in the environmental and resource management fields.

The traditional role of these other ministries overcast the conflict of roles between these institutions. These include the Ministry of Water and irrigation (MoWI), the Ministry of Agriculture (MoA), and the Ministry of Health (MoH). Even the Royal Society for the Conservation of Nature (RSCN) an independent organization has been given authority by the Ministry of Agriculture to monitor and control hunting and to enforce the wildlife protection law.

Because RSCN has been established since 1966, and has proved with its record and history that it has had many accomplishments, the MoE will have to cooperate with the organization in an effort to exert its authority in the area of wildlife protection. The MoE will need to partner with the RSCN and effectively share the responsibility in this domain.

Royal Society for the Conservation of Nature

The Royal Society for The Conservation of Nature is an independent voluntary organization devoted to the conservation of Jordan's natural resources. RSCN has the mission of protecting and managing the natural resources of Jordan. It is responsible for protecting wildlife and wild places. Thus, it is one of the few voluntary organizations in the Middle East with such a public service mandate.

As a result of its pioneering conservation work, the RSCN has achieved international recognition. Managing the nature resources of Jordan is realized by setting up protected areas to safeguard wildlife as well as breeding endangered species to save them from extinction. In addition to enforcing governmental laws to protect wildlife, RSCN works to control illegal hunting and raising awareness in environmental issues through educational programs. Ultimately they strive to promote the sustainable use of natural resources.

In its short but rich history, RSCN has accomplished many achievements. The most important of which has been establishing seven protected areas covering over 1200 square kilometers. These areas contain wild plants, animals and other natural resources.

-<http://www.rscn.gov.jo>

CHAPTER 10

INTERNATIONAL AGREEMENTS

Over the past several decades Jordan has signed numerous International Accords in order to ensure effective leadership in the environmental arena among some of its neighboring Middle Eastern countries. To some extent several of these have afforded some benefit.

Jordan is a signatory of a number of agreements regarding Ozone layer protection including the Vienna Convention, Montreal Protocol, and the Copenhagen and London Amendments. According to discussions held with ministers at the MoE, the Ozone Unit at the General Cooperation for Environmental Protection played an effective role in the early 90's. The Unit prepared about 15 sub-projects for phasing out ozone depleting substances in different industries in Jordan. For example, one task it conducted was a climate change project, which was mainly concerned with minimizing Green House Gas (GHG) emissions from different sources in the Kingdom. The Unit conducted a major inventory of GHG and determined that fuel consumption is the main source of GHG. The MoE has been actively pursuing the phasing out of Ozone Depleting Substances (ODS) in different industries to reach the minimum amounts by the year 2006.

Interviews of government officials were often centered on finding out about the progress Jordan has made as a result of signing international agreements such as those listed below. Numerous attempts were made to find out if any particular action was taken by the Kingdom after signing to ensure proper implementation of the agreements. Unfortunately, this information was not provided by the individuals consulted leading to

a conclusion that implementation of policy or projects to implement these types of agreements is spotty at best. Figure 10 illustrates the international environmental agreements that Jordan has signed onto since the 1970's:

Table 10 Global Environmental Agreements Ratified by Jordan

Name of the Agreement	Date Ratified
Constitution of the Food and Agriculture Organization of the United Nations	1/23/1951
International Convention for the Prevention of Pollution of the Sea by Oil	8/8/1963
International Plant Protection Convention	4/24/1970
Convention on the Prohibition of Development, Production and Stockpiling of (Bacteriological) Toxic Weapons and on their Destruction	1972
Convention of the International Maritime Organization	11/9/1973
Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter	8/30/1975
Convention Concerning the Protection of the World Cultural and Natural Heritage	12/17/1975
Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat	5/10/1977
Amendments to Annexes on to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter concerning Incineration at Sea	3/11/1979
Convention of International Trade in Endangered Species of Wild Fauna and Flora (CITES)	3/14/1979
Convention on the Conservation of Migratory Bird Species of Wild Animals	1979
Amendments to the Annexes to the Convention of the Prevention of Marine Pollution by Dumping of Wastes and Other Matter	3/11/1981
International Convention for the Safety of Life at Sea (SOLAS)	11/7/1985
Protocol to amend the Convention on Wetlands of International Importance especially as Waterfowl Habitat	10/1/1986
Amendment to the Convention on International Trade in Endangered Species of Wild Fauna and Flora	4/13/1987

Protocol on Substances that Deplete the Ozone Layer	8/30/1989
Convention for the Protection of the Ozone Layer(Vienna Convention & Montreal Protocol)	8/31/1989
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	5/5/1992
Convention on Biological Diversity (CBD)	2/10/1994
Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer	2/10/1994
UN Framework Convention on Climate Change	3/21/1994
Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer	9/28/1995
United Nations Convention on the Law of the Sea	11/27/1995
Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982	7/28/1996
UN Convention to Combat Desertification	12/26/1996
Cartagena Protocol on Biosafety	
Convention on the Protection of African-EuroAsian Migratory Waterfowls	
Rotterdam Convention on Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	
Stockholm Protocol on Persistent Organic Pollutants(POPs)	2004
Kyoto Protocol on Climate Change	2003

CHAPTER 11

WATER

Jordan's natural environmental resources and the quality of air, water, and soil are severely threatened. Deterioration of water supplies, high population growth and increased refugee migration into Jordan, especially into urban areas are underlying causes of environmental degradation in the country.

Water is a scarce commodity in Jordan. Most of the water supply for municipal and industrial use comes from groundwater and springs. According to Jordan's Agenda 21 report, each citizen is allocated 156 liters of water a day. This amount is one of the lowest in the Middle East and the world. This scarcity is exacerbated by population growth, estimated between 2.5 and 3.5% per year. As the population continues to increase, greater pressures are added to an already limited freshwater resource. This also generates greater waste, threatening the water quality even further.

Both surface and groundwater are deteriorating at an alarming rate. This is mainly due to increased industrial activity, over-exploitation, and increased population growth. The efficiency of delivery of both irrigation water and urban water supply is very low. As a result of this, many people predict that non – renewable groundwater reserves will be exhausted in 50 years (Jordan Agenda 21, pg 3).

There is a fervent need to protect water quality and ensure sound management of wastewater in order to guarantee the most effective protection of the people's health. These are among the highest priorities in Jordan since water is so limited. Trans-boundary water issues are also important in Jordan, because the country shares much of

its water resources with its neighboring countries. Many examples in the history of Jordan have proved that the quality of this water depends on the behavior of these neighbors.

Today, many of Jordan's water and effluent standards are based on guidelines from many international bodies such as the World Health Organization, the Food and Agriculture Organization of the UN, and others from Europe and the United States. However, there is a need to adopt new national standards that are more tailored to local conditions.

Several organizations throughout Jordan including government agencies and non-government associations alike currently conduct water quality monitoring. Unfortunately, there is very poor coordination among these groups to ensure efficiency and coverage. This results in duplicate efforts and dilutes responsibility.

There is also a need to increase the education and awareness campaign as it relates to the dire water situation. Today, there are a few campaigns geared toward educating the public about the water shortage, but they are insufficient. These programs urge ordinary citizens to use less water. However, the current inadequate communication between the planners and users of water must be improved. The programs must be extended to reach the private sector, academics, religious groups, the media, and the rich. These actions need to inform the public about the consequences of declining water quality, and the need to prevent freshwater pollution because otherwise the detriment will be too great.

Agenda 21 on Water

Jordan's Agenda 21 suggests a number of measures to be taken for effectively managing water resources in Jordan. These include the following:

1. Integration of measures for the protection and conservation of fresh water resources
2. Development of interactive data bases
3. Optimization of water resource allocation
4. Implementation of allocation policies
5. Flood and drought management
6. Promotion of scientific research
7. Development of new and alternative resources of water such as:
 - Supplying treated sewage effluent to meet industrial and agricultural demand
 - Recycling and reusing industrial wastewater
 - Using mostly surface water in the wet years to allow for the recharge of aquifers that can be used in the dry years
8. Implementing national policies with specific approaches such as:
 - Regulations regarding the use of water in rural and urban areas
 - Regulations regarding pollution of rivers
 - Use and control of groundwater and inter-basin transfers
 - Applying the concept of cost recovery
9. Improvement of community knowledge and behavior in using water, linking rivers and wadis.

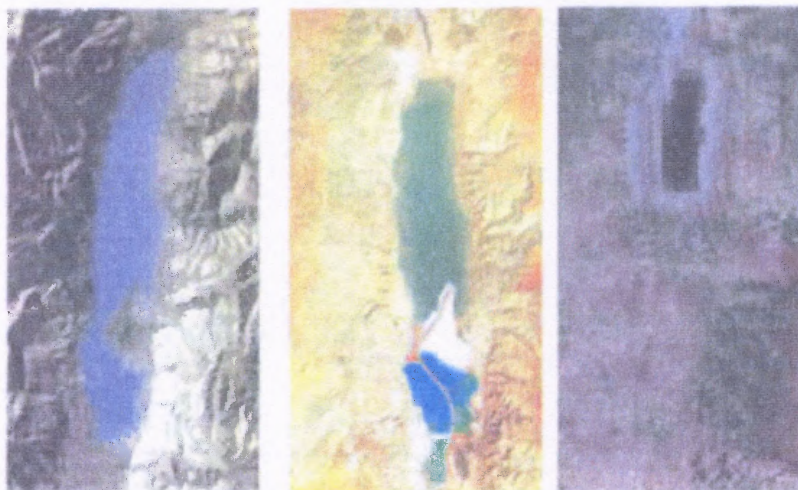
The Ministry of Water and Irrigation has been working hard to achieve viable solutions for Jordan's water problems. However it is obvious that the situation they are faced with is a difficult one because of lack of resources. This includes both the natural and the financial aspects. Nonetheless, the Ministry continues to work diligently with international agencies to address the water shortage issue in Jordan. Together they have

designed and suggested remarkable projects to tackle the problem the lack of one of the most essential resources for the continuation of Life on Earth; fresh water. One such example is the Red Sea-Dead Sea Conduit Initiative.

Red Sea - Dead Sea Conduit

Background:

- **The Dead Sea is the lowest point on the Earth. It is located 410 meters below sea level.**
- **In the year 1935, the inflow into the Dead Sea was 1300 MCM per year. In the 2000, this number was reduced to 300MCM/year.**



1960

2000

2050

- **Projections are that the level will continue to decrease by 1 meter per year**
- **80% of the decline has occurred since 1970**
- **There is a need to get International cooperation to fund this vital project**

CHAPTER 12

AIR

According to UNCED (199), during the period between 1980 and 1997, the emission to air of five principle pollutants increased significantly in Jordan. These five pollutants are: particulate matter (TSP & PM10), sulfur dioxide (SO₂), carbon monoxide (CO), and lead (Pb). Both mobile and stationary sources contribute to the deteriorating air quality in the kingdom.

The problem of poor air quality is wide-spanning and includes many sectors of society. There is a lack of coordination and integration between the various institutions involved in air quality monitoring and assessment in the kingdom. Monitoring of air quality is carried out only occasionally and only in certain parts of the Kingdom; and thereby lacks continuity and comprehensive coverage of pertinent areas around the country. In addition, rapid population growth and its consequential increase in the number of vehicles and energy consumption have led to severe deterioration of air quality in many areas of the country.

The issue of poor air quality leads to many opportunities to advance in order to respond to the situation. It is necessary to set up air quality monitoring stations to cover all the vulnerable areas of Jordan. Also, like every other sector of government, the MoE needs to establish effective coordination, communication, training, and cooperation with the other institutions to produce effective results in improving air quality. The government of Jordan needs to look into improving the quality and efficiency of their public transportation system to reduce the quantity of vehicles causing pollution and

congestion on the roads. They need to promote the connection of Amman, the capital city to other major cities of Jordan by improved public transportation.

Nobody in the past has ever looked into incorporating Automated People Movers (APM) in Jordan as a means to mitigate the congestion and air pollution problem caused by automobiles. In an attempt to meet the mobility requirements of the greatest number of people in Jordan, AMP can provide an innovative alternative and can be incorporated in the various city infrastructures. The APM system is a possible solution to many of the current urban transportation challenges, such as congestion, pollution, and massive space consumption for infrastructure.

Agenda 21 on Air

The UNCED suggests a number of objectives to improve the overall air quality of Jordan:

1. Encourage and expand utilization of renewable energy resources including solar, wind and gas generation from solid waste sites.
2. Enforce production and use of high quality fuel (including low sulfur content in diesel and fuel oils).
3. Conduct Environmental Impact Assessments (EIA) in the initial planning phase of the newly established power plants, industrial factories, wastewater treatment plants and solid waste disposal sites.
4. Conduct environmental auditing and pollution prevention through waste minimization assessment for existing activities.
5. Apply land -use planning strategies prior to the establishment of large scale industrial estates.
6. Promote the application of clean-technologies and the adoption of environmental management systems, such as ISO 14001, as tools for better environmental management.
7. Enforce the "polluter-pays-principle."
8. Conduct occupational health inspection procedures including health checks on inhabitants in vulnerable industrial areas.
9. Enforce air pollution standards including stack emissions standards and enforce installation of air pollution control equipment at industrial sites.
10. Establish preparedness and emergency plans to deal with incidental releases of toxic material into the atmosphere.
11. Encourage the use of public transportation and improve the transportation network linking Amman to all the major cities of Jordan.
12. Promote construction of tunnels and ring-roads to minimize traffic congestion in Amman and other major cities.
13. Expand environmental public awareness campaigns to include automobile traffic regulations.
14. Promote and enforce disposal of medical waste by means of incineration.
15. Establish mechanisms to control occasional fires such as tire and waste burning.
16. Encourage tree planting and expansion of green cover, in addition to accelerating the paving of new roads in all areas to minimize dust problems in the Kingdom.
17. Increase public and farmers' awareness regarding the need to limit the use of agro-chemicals in all areas of the country.
18. Prevent smoking and public transportation, and designate non-smoking areas in all public facilities.
19. Establish regulatory instruments to enforce rehabilitation and reclamation of mined areas and quarries.

CHAPTER 13

CONCLUSION AND RECOMENDATIONS

This analysis identified three major threats to effectively managing Jordan's environment:

- The unsustainable use of natural resources,
- Unplanned urban development
- Ineffective institutional and legislative framework in the Ministry of the Environment (MoE)

In order to effectively manage the environment in a more sustainable manner, the government of Jordan needs to address and mitigate these threats. There is not a lack of awareness about the problems and threats to the environment. Instead, there is a general lack of political will to tackle these issues and problems in a manner that is organized, consistent, and integrated across sectors.

There is a need to address issues like the unsustainable use of natural resources and unplanned urban development. It is understood that unless measures are taken soon, there will be irreversible negative effects on future generations. The government of Jordan needs to implement policies that link the environment to economic development by furthering projects such as CPU described above. These two issues need to reinforce each other and the polices enacted must follow a path positive to both. The capacities of the MoE need to be enhanced so as to guarantee the effectiveness of their efforts toward the achievement of the country's environmental goals. Also, Jordan needs to develop its

national policy on the environment so that it may result in a more effective legislative structure.

The following is a list of priorities that can be aggregated in order to improve environmental management and governance in Jordan:

- Strategy and policy Reform
- Economic incentives
- Research
- Educational awareness, Public Participation, and information
- Institutional strengthen
- Regulation and enforcement including permit procedures and Inspection

13.1 Strategy and Policy Reform

The Jordanian MoE is in need of a carefully defined mission, or an out-right policy formulation and implementation strategy. This policy should help create a sense of direction (mission) and should include clear performance measurement indicators for the MoE as a whole and for all the Directorates within the MoE. This should go further to identify sectoral visions, strategies and specific guidelines. Relevant bylaws and directives may need to be put into place. These actions will require the accomplishment of adequate consultations as well as coordination mechanisms for proper implementation.

Vertical and Horizontal relationships and roles should be forged and incorporated in the exercise. Even though policies are highly centralized in Jordan, they lack coordination. There must be an integrated, multisectoral integration approach to both policy development and implementation.

Jordan must improve and adjust existing legislation which already aim to promote sustainable development and introduce new legislation focused on increasing sustainability of Jordanian economic and social development policies and programs. Further strengthening of local legislation is also essential for ensuring principles of sustainable development that can be effectively integrated into local development strategies, policies, and programs.

13.2 Economic Incentives

The small amount of money that is collected in Jordan from fines and environmental charges are channeled directly to the Ministry of Finance. It would be a great benefit to consider revenues collected due to environmental activity the property of the MoE alone, whereby the ministry can utilize the money for projects they otherwise don't have the funds to carry out. A range of taxes may be employed by the regulator including; pollution taxes, recycling taxes, and others to increase the level of funding available for such projects.

It is also important to consider examples set by some countries in Europe where environmental transformations were forged through cooperative structures. This can include voluntary agreements within the Integrated Pollution Prevention Control setup that may be managed by industry associates as an interface between the regulator and the various industry establishments.

13.3 Research

Deterioration of existing resources has created enormous problems in Jordan. Except for information on water supplies, public records are poor and usually out of date at the ministries. At the local community level the data is virtually nonexistent. There is a definite need for more information, better science and solid monitoring of environmental changes.

Unfortunately most of the documents reviewed in Jordan for this report did not really provide much assistance in meeting the objectives of this need for information, better science, and solid environmental monitoring. Very few dissertations in the University of Jordan Library were written on topics related to the environment, and the few that were, were focused mostly on environmental engineering, not on policy.

The responsibility for changing these circumstances should be placed on the shoulders of university program coordinators and they should be provided the necessary funds to do so. In order to meet the need for more research and data collected in the disciplines of the environment, there is a need to train the students first about the importance and implications of the information.

13.4 Educational Awareness

Environmental education is a tool that can be used by governments and other organizations as a strategy to promote behavioral changes to support sustainable environmental management in the long term. Programs can be implemented to reach a wide audience from the general population to children in schools, to public servants in the government.

There are various efforts in this field. They are supported by many countries and agencies. The supporters include the European Union, the United States, the United Nations Environment Program (UNEP), and many others. The MoE, universities and NGO's have already developed awareness materials and programs, and community conservation initiatives that can be easily integrated by industry and ordinary citizens. However, it is vital that higher education in Jordan begins to focus the training of their students in the field of environmental sustainability. It is also critical that the government of Jordan begin to compel industry to obey environmental laws. Once they accomplish this endeavor, very likely industries will feel obligated to hire trained professionals to direct their environmental management departments.

13.5 Institutional Strengthening

The institutional framework for environmental protection in Jordan needs more focused attention. Administrative and management systems and structures all need improvement if Jordan is to have effective environmental protection.

The capacity to integrate environmental concerns into economic development planning and activities is extremely weak in Jordan. Unfortunately, there is a lack of political will to even attempt to do more. Jordan's laws and regulations related to sustainable development need to reflect, in a comprehensive manner, the principle of integrating environmental protection with socio-economic development. NGO's that address environmental issues are numerous and an important element for protecting the environment. They can benefit by pooling their resources together around issues related

to environmental degradation in order to more effectively induce changes within Industry.

When companies learn about the economic benefits associated with environmental stewardship, they are more willing to provide assistance to NGO's and other local institutions that seek to mitigate environmental problems. One such establishment in Jordan is the Royal Scientific Society (RSS).

The Environmental Research Center (ERC) of the RSS with funding from foreign organizations like the Sustainable Business Association (SBA), has implemented a program to help Industrial companies enhance productivity, cost efficiency and competitiveness using eco-efficient measures.

The Cleaner Production Unit program (CPU) operates under the idea that future market conditions will soon demand companies to deliver competitively priced products which meet customer's satisfaction and are produced in an environmentally sound manner. Environmental protection and management is a precondition for industry to access markets in the United States and Europe. CPU aims to improve the use of resources (including raw materials and energy), and reduce inefficiencies in the production process.

13.6 Regulation and Enforcement

Legal and political frameworks for environmental management require further effort. Improvements in environmental management could be more effective by enforcing existing regulations. This is a very poorly developed area in Jordan (especially at the MoE). Awareness must be raised for the personnel involved in environmental protection and management, such as judges, police, NGO's, government employees, and the army.

They need to fully recognize the interrelated nature of the environment, economics and health. This will require more than just “capacity building,” it will require promoting the political will to see the regulations enforced.

Currently there is no system for permit procedures in Jordan. However, there is an effort to put such a structure into place. The MoE should be the leading agency in this field particularly providing the necessary legislation, procedures, management, and supervision.

The actual value of any law or regulation in support of sustainable development depends mostly on its actual enforcement. Therefore, it is not only important to develop legislation in support of sustainable development, but also the subsequent enforcement of regulations should be accorded equal importance. Jordan has already implemented laws and regulation in support of sustainable development, including the law for environmental protection in 1995, and 2003. The country is now confronted with challenges related to their enforcement. The MoE must expand its capacity to supervise and enforce laws. It must also work to enhance its link with the judicial system to ensure effective compliance.

Pollution control measures need to be adopted as well. Since the MoE does not have at its disposal laboratories to conduct research or environmental monitoring, it must pay for these services. More lab equipment should be purchased through any available funds. The data collected should be effectively managed by trained people.

There is a fundamental need for the information provided by this research on Jordan’s environmental policies, especially since it does not already exist in Jordan or anywhere else. With the population of countries in the Middle East racing towards

expansion, countries in the region need to realize the impact they are going to have on the global natural environment. It is anticipated that the improvements suggested in this thesis to enhance environmental management and governance in Jordan will stimulate different sectors of society and the Middle East as a whole to take more active roles in this effort. For example, universities can begin to address these issues by broadening the academic programs they offer to their students to include more environmentally relevant curricula. Also government officials can put in a genuine, better focused effort to enhance cooperation with other organizations so their work can finally begin to come off the ground.

APPENDIX A

ENVIRONMENTAL PROTECTION LAW 2003

Environmental Protection Law

We, Abdullah the Second, Son of Al-Hussein, King of the Hashemite Kingdom of Jordan, by Virtue of para (1) of article (94) of the Constitution, and pursuant of what the Cabinet has decided on 17/12/2002, to hereby approve, in accordance with article (31) of the Constitution, the following interim law, and order its issuance, temporary enforcement and annexation to the Laws of the State, on the basis of referring it to the Parliament in its first meeting.

Interim Law no. (1) for the year 2003 Environment Protection Law

Article (1)

This Law shall be called (Environment Protection Law for the year 2003) and shall be applicable as of the date of its issuance in the official gazette.

Article (2)

The following words and phrases wherever stated in this law, shall have the meanings specified for them below, unless otherwise indicated in the context:-

The Ministry

The Ministry of Environment.

The Secretary General

The Secretary General of the Ministry of the Environment.

The Environment

The surroundings which include the living and nonliving beings, the materials contained, and what surrounds it, such as air, water, soil, and interactions of any of them, as well as the establishments built by the human being.

The Environment's Elements

Water, air, earth all that included.

Pollution

Any change in the Elements of the environment which may directly or otherwise, harm it, or negatively affects its elements, affects the human being to live his normal life, or to disrupt the normal balance .

Deterioration

The impact on the environment so that it reduces its worth, deforms its nature, exhausts its resources or harms the living beings or antiquities.

Environment Protection

The preservation of the environment's components & elements, its promotion and the prevention of its deterioration or pollution, or reducing them within the safe limits. These elements include air, water, soil, the human beings and their resources.

The Sustainable Development

The development which uses natural resources in a way that sustains them for the coming generations, keeps the environmental integration, does not result in the deterioration of the elements and components of the environmental systems and does not disturb the balance among them.

The Technical Rule

The competent Courts of First instance.

Article (3) (A)

The Ministry shall be regarded as the Authority concerns with the environment Protection in the Kingdom, and the official and national bodies shall implement the instruction and decisions issued in this respect by virtue of this law, and the A regulations issued accordingly, subject to legal responsibility, as provided in the said law and in any other legislation.

(B)

The Ministry shall be the competent reference at the national, regional, and international level, with regard all the environmental issues, and the donors, in cooperation and coordination with the bodies of competence.

Article (4)

To realize the objectives of environment's protection, and improvement of its various elements, the Ministry shall with cooperation and coordination of the related bodies assume the following:-

- Set the public policy for the protection of the environment, and prepare, the plans, programs, and projects, necessary for the realization of sustainable development.
- Prepare the specification and the standard criteria for the environment elements.
- Monitor and measure the environment elements & components, and follow them up through the scientific centers as approved by the Ministry as per specific criteria or standards.
- Issue the necessary environmental instructions for the protection of the environment, its elements, and the requirements for carrying out the agricultural, developmental, commercial, industrial, housing mining projects and others, as well as all the services related to such, in order to be observed and adhered to, within the prerequisites for authorizing or renewal of the above in accordance with the legal established principles.

- Monitor and supervise the institutions and the public & private bodies, including the companies and projects to insure their compliance with environmental standardized specification, criteria and the technical rules adopted.
- Carry out researches & studies related to environment & its protection.
- Set principles (rules) for circulating the substances which are harmful and hazardous to the environment, their collection, classifications, storage, transportation, destruction and disposal according a regulation issued for the purpose.
- Coordinate all the national efforts, aimed at preserving the environment, including a national strategy for awareness, education, environmental connection, transport, use and provision of information related to environment, as well as taking the necessary measures for this end.
- To approve establishing and managing the natural reserves and national parks as well as monitoring and supervising them.
- Prepare environmental emergency plans.
- Issue publications related to environment, and grant or in advance approval to issue any publications relevant to same, by any other body.
- To promote the relations between the Kingdom and the Arab, regional and international states, societies and organizations with regard the matters related to the recommend to associate with and become a member as well as follow up its implementation.

Article (5)

The Ministry, in cooperation and coordination with the institutions (bodies) concerned with the environment issues, at the local, Arab, and international level, shall undertake preserving and safeguarding the environment elements and its components from pollution and to water towards the implementation of the agreements related to these issues.

Article (6)(A)

The substances, which are prohibited from entering the Kingdom, shall be specified, by virtue of the instructions issued by the Ministry Cabinet, based on the recommendation of the Minister.

(B)

It is prohibited to carry out any of the works stated below in accordance with the instruction issued by the Ministry Cabinet, based on the recommendation of the Minister, who is entitled to take the necessary measures for this purpose:-

- Entering any hazardous wastes to the Kingdom.
- Embedding any hazard latent substances in the kingdom's territories, in cooperation with the related bodies.

(C)

In the event of discovering any hazardous wastes admitted to the Kingdom, or letting in any environment pollutants illegally, the Ministry with the coordination of the bodies concerned, shall strive to send these hazardous wastes & pollutants back to their original source, or treat them at the expense of the body which admitted them to the Kingdom and charge it the fines, expenses and losses incurred.

Article (7)(A)

For the purposes of this law, the competent employee, nominated in writing by the Minister as per the recommendation of the Secretary General, shall be given the capacity of judicial police and shall be entitled to enter any industrial, commercial, handicraft, agricultural place or any establishment, institution or any other body, the impact of its activities may involve in any way the environment elements & components, to make sure of its conformity and the conformity of its works with the established environmental requirements.

(B)(1)

The Minister, pursuant to the recommendation of the Secretary General, shall warn the firm, the institution or the business place in violation, shall set a period for the removal of the violation if the place in question fails to do so, its shall be referred to the Court.

(2)

The Minister, in emergency or hazardous cases, and according to the report of the technical

Committee, formed for the purpose, shall issue a decision for the removal of the violation at the expense of the body in question, or order precautionary closure against any of the bodies provided for the item (1) of this para prior to issuing a decision by the Court.

(C)

Any who committed any of the violations stipulated in this Article, after the expiry of the warning period, and non removal of the said violation within the specified time, shall be punished by imprisonment for & period not less than (30) days and not exceeding three months, or by paying a fine not less than (300) dinars and not exceeding (5000) Dinars. In case of recurrence for a second time, the fine shall be doubled and in the third time, the institution shall be closed until the violation is removed.

Article (8)

Taking into consideration the provisions of any other legislation, it is prohibited, and subjects to the legal responsibility, to cast away any polluting or harmful substance to the sea environment in the regional waters of the Kingdom or on the shore area, within the limits and distances specified by the Minister by virtue of the instructions issued for this purpose.

Article (9)(A)

The captain of the steamer, ship, sea carrier or boat, who casts away or spills any polluting substances, emptying or dumping them, in the regional waters of the Kingdom

or on the shore area, shall be punished by imprisonment for a period not less than one year and not exceeding three years or payment of a fine not less than (10.000) dinars, or by both penalties.

(B)

Any who commits, any of the violations provided for in para (A) of this Article, shall be obliged to remove the violation within the time specified by the Court. In case of failure on his part, the Minister or any body authorized by same, shall carryout its removal at the expense of the person in violation, plus (25%) of the removal expenses, as administrative expenses. The steamer, ship or boat shall be seized with all its contents, until the amounts incurred are paid.

Article (10)

Any who plucks out the corals and shells, gets them out of the sea, trade in them or causes their damage in any way, shall be punished by imprisonment for a period not exceeding one year, or by paying fine not less than (10.000) Dinars and not exceeding (250.000) Dinars, or by both penalties.

Article (11)(A)(1)

Its is prohibited to dump any substances, which harm the safety of the environment, discharging or collecting them, whether these substances are solid, liquid, gaseous, radioactive or thermal, in the water sources.

(2)

Its shall be prohibited the storage of any substances, mentioned in item (1) of this para, near the water resources, within the safe limits specified by the Minister, by virtue of instructions issued for this end, so that they include the protection of water beds in the Kingdom, in coordination with the relevant bodies.

(B)

Any person who commits any of the acts stated in para (A) of this Article, shall be punished by imprisonment for a period not less than (3) months and not exceeding two years, or by paying a fine not less than (10.000) dinars and not exceeding (50.000) dinars or both penalties. He shall be obliged to remove the causes of the violation within a period specified by the Court, according to a technical report if he fails to do so, the Ministry, or any authorized party shall undertake the removal at the expenses of the person in violation plus (25%) of the removal expenses as

administrative expenses. He shall pay a fine not less than (50) dinars and shall not exceed (200) dinars for each day of delay after the expiry of the period specified by the Court for the removal.

Article (12)(A)

The sources of noise shall be specified as well as the specification of the maximum level to these sources and the compliance requirements to avoid or minimize them to the minimum level environmentally allowed, as per instructions issued by the Minister for this end.

(B)

Any who violates the instructions issued by virtue of Para (A) of this Article, shall be punished by imprisonment for a period not less than one week and not exceeding a month or by a fine not less than (100) dinars and not exceeding (500) dinars, or by both penalties together.

(C)

The persons or owner of the vehicle or machinery which causes noise shall pay a fine not less than (10) dinars and not exceed (20) dinars.

Article (13)(A)

Every institutions, company, plant or any party, after the enforcement of the provisions of this law, exercises an activity which has a negative impact on the environment, shall be obliged to prepare a study of the environmental impact assessment for its projects, and refer same to the Ministry in order to make the necessary resolution in this effect.

(B)

The Minister shall request any institution, company, from or party, prior to the enforcement of the provisions of this law, which exercises an activity that has an impact on the environment, to prepare a study of environmental impact assessment of its projects if the protection of the environments requires this.

Article (14)(A)

The Minister, at the recommendation of the Secretary General, shall approve the projects the environmental studies, submitted by the official and National institutions as well as the Private sector and NGOs, to the donors, which in their turn, shall submit regular reports to the Ministry on the progress of these projects from the financial & technical aspects.

(B)

The Ministry shall have the right to supervise, from the environmental aspects these projects and shall follow up their work progress, to insure the validity of their execution.

Article (15)

The Ministry Council, as per the recommendation of the Minister, shall form an advisory committee, in which all the parties concerned with the environment shall be represented, provided that the committee's members shall be experienced and competent, shall specify their number, appoint the head of this Committee, its powers and all the matters related to it by virtue of instruction issued for this purpose.

Article (16)

Anyone who infringes the provisions of the Regulation, and the instructions related to the protection of the environment, in the natural reserves and public parks, shall be punished by imprisonment for a period not less than one week and not exceeding one month, or by a fine not less than (100) dinars and not exceeding (1000) dinars, or by both penalties together.

Article (17)(A)

The owners of factories, vehicles, work shops or any party exercising an activity which has a negative impact on the environment, and emits environmental pollutants, shall install devices to prevent or minimize the dissemination of these pollutants, as well as to control the solid molecules before their emission from the factory or the vehicle in the air, to the level permitted pursuant to instructions issued by the Minister for this purpose.

(B)

Any person, of the factory owners who committed any violation of these provided for in Para (A) of this Article, and has not removed this violation within the period specified by the Minister or any person authorized by him, shall be referred to the court, which is entitled to issue a resolution for closing the factory, and pass a rule on the person in violation, by imprisonment for a period of not less than one week and not exceeding (30) days, or by a fine not less than (100) dinar and not exceeding (1000) dinar or by both penalties together, and force him to remove the violation within the period specified for the purpose, as well as to fine him an amount not less than (50) dinars and not exceeding (100) dinars or both penalties for each day of delay after the expiry late of the period specified for the removal.

(C)

Any parson of the vehicle owners or drivers, who committed any of the violation provided for in Para (A) of this Article, and has not removed this violation or minimized it to the levels permitted by virtue of the instructions for this purpose, and during the specified period, shall he subject to the penalty of paying a fine not less that (10) dinars and not exceeding (20) dinars, and the vehicle shall be seized if the act of violation is repeated.

(D)

Any person shall be punished for committing any of the violations provided for this Article, by twice as much as the maximum level for the imprisonment or fining penalty, provided for in Para (B) of same, in case of repeating such violation for the second time and by two times as much as the maximum level of the imprisonment penalty in the event of recurrence for any time later.

Article (18)

There is nothing in this law that prevents the application of any harsher penalty, provided for in any other law in force.

Article (19) (A)

All the movables and non movables, rights and projects belonging to the Corporation, shall be rested in the Ministry, which shall bear all the obligations incurred on the corporation.

(B)

The employees & Staff of the general corporation for Environment Protection shall be transferred to Ministry accordance with the provisions of the civil service regulation in force.

Article (20)

The Minister shall have the right to authorize the Secretary General the governor or the Environment manager in the governorate any of his powers, provided for in this law.

Article (21)

The Cabinet council according to the recommendation of the Minister shall entrust to any of the Ministries institutions voluntary organization related to the field of environment protection, any of the ministry's duties, or authorizes it its powers according to the competence of each and what it believes to be suitable.

Article (22)

Licensing & renewal of same, of the NGOs, working in the domain of environment protection from the bodies concerned, shall be made after obtaining the initial approval from the Ministry as per the instructions of the Minister.

Article (23)(A)

The Cabinet Council shall issue the necessary Regulations for the implementation of the provisions of this law including the following:-

- Regulation of Nature Protection.
- Regulation of environment protection from population in emergency cases.
- Regulation of water protection.
- Regulation of air protection.
- Regulation of sea environment & shores protection.
- Regulation of natural reserves and national parts.
- Regulations of Management of harmful & hazardous Substances, transport and handling.
- Regulation of Management of solid wastes.
- Regulation or Environmental impact assessment.
- Regulation of soil protection.
- Regulation of charges & wags.

(B)

The instructions issued by virtue of the provisions of this law shall be published in the official gazette.

Article (24)

The Law of environment protection No. (12) for the year 1995 shall be repealed,

provided that the Regulation issued by its virtue shall remain effective & in force until they are amended, annulled or replaces by others.

Article (25)

The Prime Minister and the Ministries shall be unchanged of implementing the provisions of this law.

17/12/2002

APPENDIX B

AIR PROTECTION REGULATION

**Issued by virtue of paragraph (a) of Article (23)
of the Interim Law for the Protection of the Environment No. (1) for the year 2003**

Article 1 – This regulation is called “the Air Protection Regulation for the year 2004” and shall be effective on the day it is published in the official gazette.

Article 2 -- The following words and phrases wherever stated in this regulation shall have the following meanings unless the context indicates otherwise:

The law: The interim law for the protection of the environment No (1) for the year 2003

The Ministry: The Ministry of Environment

The minister: the Minister of Environment

The secretary general: The Secretary General of the Ministry

Air pollutants : Any material or materials that enter the air or the air cover and leads to a change in their natural traits during a period of time and with quantities sufficient to harm human, animal, plant or properties or adversely affect man’s enjoyment of his life and properties directly and indirectly .

Working vehicle: the vehicle used inside the kingdom.

Vehicle exhaust emissions: the gaseous air pollutants, and the solid particles, that come out of the vehicle exhaust, as a result of complete or partial combustion of fuel in the engine.

Engine passive speed (velocity): rotational velocity of the vehicle engine at the halt position (the gearshift on neutral position), based on which the number of engine revolutions are equal to 600-900 revolution/minute.

Degree of somberness: a standard measurement showing the amount of blackness (darkness) of vehicle emissions, and is measured with the light penetration degree.

Carbon black (soot??): carbon molecules saturated with tar, resulting from the incomplete combustion of fuel.

Medical wastes: wastes resulting from the health care institutions whether resulting from the diagnosis, treatment or research processes.

Technical base: A document in which the service, product characteristics or the production methods and the administration systems are determined, and it may also

include the symbols, data, packing, and the placing of marks and the label requirements that are applied to the product or its methods of production or limited to any one of them, and its conformity would be compulsory.

Article 3 – This regulation aims at protecting the public health and the surrounding environment and the air cover from the pollution resulting from the human activity directly or indirectly, by curbing the air pollutants resulting from the fixed and moving sources, in agreement with the national legislations annexed to this regulation

Article 4 - a) While carrying out their activities, the established facilities shall be committed not to emit or seep air pollutants in levels exceeding the permissible maximum levels according to the technical base stated in annex (1).

b) The Minister shall form, upon the recommendation of the secretary general, a technical committee from the Ministry and representatives from the concerned entities, that shall determine the existing facilities that need to be granted a time limit to comply with national legislations applicable for air protection, provided that the concerned facility must submit a work plan showing the procedures to be followed during the granted time limit to rectify its environmental conditions, provided that the granted time limit must not exceed 5 years in its maximum limit.

Article 5 – a) The Ministry in cooperation and coordination with the entities concerned with air protection, shall classify the facilities from which the air pollutants are emanated according to the kind and quantity of the emitted pollutants and their potential effect on the environment and public health, and also shall also determine the areas subject to air pollution and the required monitoring programs, and the necessary procedures to control the environmental damages.

b) The Minister may upon the recommendation of the secretary general, and after effecting the classification referred to in paragraph (a) hereof, commit the established facility to the following :

- 1- To install the apparatus and equipments needed to guaranty the reduction of the emission of the air pollutants without exceeding the permissible maximum levels according to the technical base stated in annex (1) hereof
- 2- To cover for the investigations expenses required by the Ministry to monitor the air pollutants resulting from those facilities.
- 3- To provide the Ministry with periodical reports revealing the results of monitoring of pollutants done solely by the facility or in cooperation with any other entity.
- 4- To obtain the Ministry's approval in advance in case of extension of any established facilities in a manner that would increase the emission of air pollutants resulting from those facilities.

5- To set up a plan to confront the emergency cases in which pollutants get seeped into the surrounding air or the air cover.

Article (6): The location of any new facility must be suitable for the its activity in such a manner that: it complies with the decisions of the higher regulatory council, the total air pollution resulting from all the facilities in one area must not exceed the permissible maximum levels according to the technical base stated in annex (2), and takes into consideration all the applicable national legislations.

Article (7) : a) The Minister or any other employee granted the capacity of judicial police by virtue of paragraph (a) Article (7) of the law, may halt any activity or facility that leads to polluting the air or air cover with levels exceeding the maximum permissible levels according to the applicable national legislations.

b) The halt order shall remain valid until the pollution causes are removed.

c) In case the cause of pollution did not conform to removing the pollution within the time limit granted by the Minister, he shall be subject to sanctions as per the provisions of the law.

Article (8):

- a) In order to license the working vehicle whose engine works on gasoline, it must pass the technical test at the drivers and vehicles licensing department, provided for that purpose that the levels of the vehicle exhaust emissions do not exceed the rates stated hereunder, at the engine passive speed :-

Gas	(HC) Hydrocarbons	(CO) carbon monoxide	
Ratio	600 (ppm) parts per million	(5%) in size	

- b) In order to license the vehicle whose engine works on diesel, it must pass the technical test at the drivers and vehicles licensing department, provided for that purpose that the level of carbon black (soot) from the vehicle exhaust does not exceed (70%) opacity degree .
- c) The Ministry, in coordination with concerned entities, shall carry out campaigns to measure levels of polluting emissions from vehicle exhausts on the road, and implement awareness programs in that regard.

Article (9): The Ministry, in coordination with concerned entities, shall take the measures to guarantee the control of pollution from vehicles exhausts including the following:

- 1) To control of traffic congestions through construction of tunnels, building of bridges, and scheduling traffic lights to ensure a better smooth traffic movement.
- 2) To use of techniques to reduce vehicle exhaust emissions.
- 3) To follow traffic policy to reduce vehicle entrance to some crowded locations and close some locations against the vehicle traffic movement.
- 4) To follow pricing policies to promote use of less air polluting fuels.
- 5) To foster the use of the small vehicles in groups and means of the public transportation.

Article (10): The Ministry in coordination with concerned entities shall set a time schedule to carry out the following:

- 1) Reduce the sulfur level in the diesel and heavy fuel according to the international specifications.
- 2) Produce un-leaded gasoline, and ban the production of leaded gasoline.
- 3) Control the levels of Hydrocarbons in various types of fuels, in agreement with international quality specifications, and with no adverse effect on the environment.

Article (11): a) It is not allowed to dump or treat solid and hazardous wastes except in the places allocated for that purpose, and away from residential, industrial, and agricultural areas and watercourses, according to the Solid Waste Management Regulation and the Management of Harmful and Hazardous Substances Regulation both issued by the Ministry.

b) All the working hospitals in the kingdom must be committed to dispose of medical wastes according to the instructions for medical waste management issued by the Ministry of Health.

Article (12): It is not allowed to spray or use pesticides or any other chemical compounds for agricultural or public health purposes or other purposes, until after taking into consideration the conditions and instructions issued by the concerned entities, and particularly the following:

- 1) Not to use internationally banned substances.
- 2) To use protective clothes and methods by spraying workers.
- 3) To warn the citizens in advance about their presence in the spraying areas.
- 4) Not to expose the environment and public health to the harmful effects of these substances.

Article (13): While rummaging, excavating, constructing, demolishing, or transporting the resulting residues or dusts (soils?), all entities and individuals shall be committed to take necessary precautions for storage or safe transport of those to prevent their dispersion, and the authorizing entity shall prove this in the authorization documents as follows:

- 1) To collect and transport the residues in a safe manner causing no adverse effect on the traffic or pedestrian movement, taking into consideration to cover those with possibility of dispersion.
- 2) To allocate special places for these residues to be transported to, away from residential compounds, and at low level, and to fill them up after repletion in a manner that causes no adverse effect on the environment.

Article (14): a) it is not allowed to use materials such as the consumed mineral oils or the rubber tires and others for the purposes of producing energy in all the activities, if they exceeded the maximum permissible levels stipulated in the technical base stated in annex (1).

b) For the purposes of applying the provisions of paragraph (a) hereof, the concerned entity shall re-use these materials and take the necessary measures to guaranty their collection and transportation to their treatment place.

Article (15): All entities and individuals shall when carrying out production, service or other activities, and particularly when operating machines, apparatus, and alarm machines, conform to not exceeding the maximum permissible levels for noise intensity, and the total noises resulting from the group of facilities in the same area shall not exceed the maximum permissible levels stipulated in the instructions for the control and prevention of noise stated in Annex (3).

Article (16): – When designing the chimneys that serve the different activities, they are given a suitable design and height to guaranty the dispersion of gaseous pollutants in a manner that does not affect the public health and environment, and provided that the concentrations of the emitted pollutants do not exceed the maximum permissible levels stipulated in the technical base stated in annex (2) hereof.

Article (17): – The closed and semi-closed public places should fulfill the ventilation means in accordance with the size of the place and its capacity and the kind of activity practiced within, in a manner that guarantees the renewal of air and its purity and its maintenance of suitable temperature, and in agreement with the Jordanian construction code.

Article (18): The Ministry may request from the Jordan Nuclear Energy Commission to take necessary measures to ensure the fulfillment of public safety conditions and requirements, radiancance prevention, nuclear safety, protecting human health and properties from pollution hazards, and exposure to ionized radiations.

Article (19): – All facilities and individuals using materials exhausting the ozone layer (ozone depleting substances??) shall conform to the instructions for controlling the use of materials exhausting the ozone layer (ozone depleting substances??) stated in annex no (4) hereof.

Article (20): Smokers shall commit not to smoke inside public places, public transportation means, public and private hospitals, and health centers.

Article (21) – Whoever violates the provisions of this regulation shall be subject to sanctions stipulated in the law.

Article (22) - The Minister shall issue upon the recommendation of the secretary general the instructions necessary for implementing the provisions of this regulation

Article (23): This regulation cancels and annuls any other regulation that contradicts with its provisions.

Article (24): The Prime Minister and the Ministers bear the responsibility of implementing the provisions of this regulation.

APPENDIX C

WATER PROTECTION REGULATION

Issued by Virtue of the provisions of paragraph (A) Article (33) of the Interim Law for the Protection of the Environment No. (1) for the year 2003

Article (1)

This regulation is called "Water Protection Regulation for the year 2004" and shall be effective on the day it is published in the official gazette.

Article (2)

The following words and phrases wherever stated in this regulation shall have the following meanings unless the context indicates otherwise:

- **Ministry** : Ministry of Environment.
- **Minister** : Minister of Environment.
- **General Secretary:** General Secretary of the Ministry.
- **Water** : Surface and ground water from all sources including seas, lakes, rivers, springs, rainwater, dams, Wells, ponds and tanks, and this word includes mineral water as well as hot water.
- **Water Pollution:** Any change which occurs to the physical, chemical, or micro biological characteristics of the water to an extent which reduces its suitability for the intended usage.
- **WasteWater:** Water resulting from the domestic, industrial, or agricultural usage.
- **Developmental Project:** Any activity, housing, industrial, commercial, service, or recreational facility which aims at improving the social or economic level.
- **The dumping site:** Allocated site with its plant and equipments for dumping wastes with the aim of disposing of them.
- **Wastes:** Undesired solid or semi-solid substances resulting from the industrial, commercial, agricultural activities, or domestic uses.

- **Drinking water:** water prepared for drinking purposes and household use and for food industries and ice industry and which is compatible in its characteristics with the Jordanian standard specification accredited for drinking water.
- **Mineral water:** water filled in sealed containers and prepared for drinking purposes and compatible in its characteristics with the Jordanian standard specifications for mineral water.
- **Filled drinking (bottled??) water:** water prepared for drinking purposes and filled in sealed containers, and the water sold on-site at drinking water treatment plants and compatible in its characteristics with the Jordanian standards for filled drinking (bottled??) water.
- **Water production project:** the allocated site including the plants and equipments for producing drinking water or mineral water or filled drinking (bottled??) water.
- **Treatment plant:** The allocated site including the plants and equipments for purification and treatment of wastewater to become compatible with the standard specifications for treated water and according to the intended end usage.
- **Sanitary?? Sewerage network:** The installations, facilities, utilities and equipments specially allocated to convey water from its sources to the purification plants.
- **Permeable hole:** the hole allocated for collecting wastewater or disposing of it and dispensing it via the soil channels and pores .
- **The collecting tank:** The tank built of concrete or any other insulating or lined material that prevents the filtration of wastewater within the earth.
- **Water exhaustion:** extracting ground water in quantities exceeding the limits of safe extraction, which leads to a change in the ground water characteristics and limits its use for the intended purposes.

- **The water basin:** the geographical sector that replenishes the river, tributary, groundwater or valleys whether permanently or intermittently flowing.
- **The sludge:** the humid or dry solid materials resulting from the purification of waste water in purification plants.

Article 3 – For the purposes of monitoring the quality of water with its different kinds, the ministry in coordination with the concerned entities takes the necessary measures to conduct laboratory investigations and determine its suitability for the intended final use.

Article 4 – For the purposes of protecting the water sources from pollution, the Ministry sets the environmental conditions to be fulfilled to give permission and authorization for the development projects covered by the environmental impact assessment regulation.

Article 5 – It is not allowed to construct any sanitary sewerage plants without the Ministry's authorization, and for this purpose, the Ministry and in coordination with the concerned entities, sets the environmental criteria for establishing sanitary sewerage plants and determines the conditions and requirements for their establishment.

Article 6 – a) It is not allowed to construct any wastes dump site without the Ministry's authorization, and for this purpose, the Ministry and in coordination with the concerned entities, sets the environmental criteria for establishing the wastes dump sites and determines the conditions and requirements for their establishment .

- b) Wastes may not be dumped in other sites than the ones allocated for that purpose.

Article 7 – a) It is prohibited to dump any wastewater into the environment or reuse it unless its quality was in compliance with the accredited standard specifications.

- b) It is prohibited to dump the contents of the wastewater (sewage?) tanks in places other than those allocated for that purpose.

Article 8 – It is not allowed to use any material for treatment, disinfection, conveyance or storage of drinking water, mineral water and filled drinking (bottled??) water until proved compatible with the health conditions and with the consent of the Ministry, and this is done in coordination with the concerned entities to determine the health conditions to be fulfilled in any material.

Article 9 – It is not allowed to construct any project for producing drinking water, mineral water and filled drinking (bottled??) water except with the authorization of the Ministry and for this purpose, the Ministry in coordination with the relevant concerned entities sets the environmental criteria for establishing these projects and determines the conditions and requirements for their establishment .

Article 10 – a) The Minister has the right to issue the decision to halt any activity or facility that threatens to pollute or deteriorate the quality of the water sources.

b) The halting order stipulated in paragraph (a) hereof, shall remain valid till the pollution causes are eliminated.

c).In case the entity causing pollution conforms to eliminate the pollution during the set period of time stipulated herein, the Ministry removes the pollution at the expense of the causing entity added to that 25% of the costs as administrative expenses.

Article 11 – The Ministry, in coordination with the relevant concerned entities, sets the environmental conditions for the processes of collecting, storing and transporting the solid and liquid wastes resulting from the industrial, agricultural, commercial, household and services activities to prevent the pollution of water sources.

Article 12- The industrial institutions that produce wastewater must comply with the requirements stated hereunder, and according to the decisions of a technical committee formed by the Minister for this purpose : -

- a) To set up a purification station to produce water compatible with the accredited standard specifications.
- b) To connect to the public sanitary sewerage network, subject to the fulfillment of the connection conditions issued by the entity owning the network.
- c) To set up a tank for collecting and disposing of wastewater according to the environmental instructions and conditions set by the Ministry.
- d) A hole designed to receive and dispose of wastewater.
- e) Any other scientific method for disposing of the wastewater that the committee deems suitable.

Article 13 – The sludge resulting from the purification of industrial or domestic wastewater must not be used for any purpose, unless it is compatible with the accredited national standard specifications.

Article 14 – The imported water allocated for drinking purposes shall be subjected to laboratory investigations by the Ministry of health to ascertain its fitness for drinking purposes and its compliance with the accredited national or international specifications regarding the traits not mentioned in the national specification, before it is granted permission to enter the kingdom.

Article 15 – The following should be observed for the purposes of rationalizing the water consumption:

- a) The industrial institutions that produce large quantities of wastewater shall be committed to their recycling or re-use as long as that was technically possible and economically feasible, by virtue of a decision issued by the competent committees from the Ministry for this purpose .
- b) Every one that obtains a construction license shall be committed to the necessary construction of a tank to collect rainwater off the buildings roofs.
- c) The competent entities supervising the agricultural activities shall be committed to the conditions and instructions issued by the concerned entities, and pertaining to the kind of cultivated plants and traffic spaces, and quantities of water available for this purpose from all the surface and ground sources.

Article 16 – The Minister shall issue the necessary instructions to enforce the articles of this regulation based on the recommendations of the Secretary General.

Article 17 – This regulation cancels and annuls any other regulation that contradicts with its provisions.

APPENDIX D

NATURAL RESERVES AND NATIONAL PARKS REGULATION

**Issued by Virtue of the provisions of article (23) paragraph (a)
of the Interim Law for the Protection of the Environment No (1) for the Year 2003**

Article (1)

This regulation shall be known as the “Natural Reserves and National Parks Regulation for the year 2004” and shall be effective on the day it is published in the National Gazette.

Article (2)

These words and phrases wherever they appear in the text of this regulation shall have the following meaning, unless otherwise indicated:

The Ministry: The Ministry of Environment.

The Minister: The Minister of Environment.

The Secretary General: The Secretary General of the Ministry of Environment.

The Technical Committee: The committee established upon the Minister’s decision based on the recommendations of the Secretary General to be responsible for studying the requests for construction and management of natural reserves or national parks and submitting its recommendations in that regard.

The Natural Reserve: The area of earth or sea or water surface that contains environmental systems and special natural sanctuaries, and in which unique creatures live, and that is considered a natural reserve based on the Prime Ministry’s decision.

The National Park: The area of earth, water, coasts, oasis, forests or archaeological locations that is considered a national park based on the Prime Ministry’s decision.

The Preserved Land: The land considered a reserve based on the Prime Ministry’s decision.

Region with Protection??: The region embracing a special environmental system or wild living-beings that are threatened to become extinct, and that needs special protection to ensure the preservation of the environmental systems and the wild living-beings.

The Concerned Entity: The legal personality responsible for the construction and management of the natural reserve or the national park.

Article (3)

The Minister shall issue instructions in which he specifies the basis and conditions for the construction, management, monitoring and all relevant aspects of the natural reserves and national parks.

Article (4)

- a) The concerned entity shall submit an application to the Ministry requesting the construction or management of the natural reserve or national park enclosing a study that includes:
1. The objective for the construction of the natural reserve or national park.
 2. The area and borders of the natural reserve or national park.
 3. The citizens' rights within and around it.
 4. A location map showing the land ownership and land use for the lands surrounding the borders of the natural reserve or national park.
 5. A preliminary study of the botanical and zoological group and the environmental system for the natural reserve or national park.
 6. A preliminary study of the archaeological locations if any.
 7. A geological and hydrological study of the location.
 8. Specification of the impacts of establishing the natural reserve or national park on the surrounding lands.
 9. An economical and social study of the natural reserve or national park region.
 10. Protection measures (practices and specifications).
 11. Other information or studies requested by the Minister if dictated by the nature of the region.
- b) A technical committee is formed based on the Minister's decision to study the application for construction or management of the natural reserve or national park and submit its recommendations to Minister to issue the appropriate decision.

Article (5)

It is allowed to adjust the borders of any natural reserve or national park upon the Prime Ministry's decision based on the recommendations of the Minister based on the recommendations of the technical committee stated in article (4) paragraph (b) of this regulation and according to the study submitted to the Ministry by the concerned entity.

Article (6)

A decision is issued upon which the concerned entity defined in this regulation is identified.

Article (7)

- a) The concerned entity shall set-up a detailed administrative plan for the natural reserve or national park within a period not exceeding a year and a half from the date the natural reserve or national park is declared by the Prime Ministry and the plan shall be submitted to the Ministry to issue the appropriate decision within a period not

exceeding 3 months, and if the administrative plan is approved, it becomes a complementary part of it and the concerned entity shall bear the responsibility of implementing it.

- b) The concerned entity shall submit the administrative plan including the following:
1. A detailed description of the location of the natural reserve or national park.
 2. Assessing the components of the natural reserve or national park.
 3. Specifying the objectives of the location's administration and their implementation procedures.
 4. preparing the estimated budget for the administrative plan and available funding sources.
 5. Uses of lands within or around the natural reserve or national park.
 6. Grazing regulation.
 7. Environmental tourism regulation.
 8. Rules for using the natural reserve or national park.
 9. Local community participation.

Article (8)

The Ministry and in coordination with concerned entities shall recommend to any relevant entity to buy or rent or possess the possessed lands within the borders of the natural reserve or national park, and apart from that the owners of these lands shall have the right to use their lands in a manner not contradicting with the protection objectives and the administrative plan of the natural reserve or national park.

Article (9)

Issues concerning the incoming revenues from the natural reserves or national parks and the relevant procedures and ways for saving and spending them are specified according to instructions issued by the Minister based on the recommendations of the Secretary General.

Article (10)

After a location is confirmed of significance (sanctuary) for unique botanical or zoological living-beings or of aesthetical character regardless of its area, the Minister shall declare it with special protection taking into consideration the provisions of any other regulation, and the concerned entity shall establish the special instructions for its protection and management and get the Minister's approval.

Article (11)

Taking into consideration the provisions of any other regulation; the individuals, groups, and other entities are forbidden to carry out any activities within the borders of the natural reserve or national park including the utilization of natural resources without the approval of the concerned entity managing the natural reserve or national park and according to basis and conditions specified based on instructions issued by the Minister for this purpose.

Article (12) The Minister shall issue the necessary instructions to enforce the articles of this regulation based on the recommendations of the Secretary General.

Article (13)

This regulation cancels and annuls any other regulation that contradicts with its provisions.

APPENDIX E

ENVIRONMENTAL IMPACT ASSESMENT REGULATION

**Issued by Virtue of the provisions of article (23) paragraph (a)
of the Law for the Protection of the Environment No (1) for the Year 2003**

Article (1)

This regulation shall be known as the “Environmental Impact Assessment Regulation for the year 2004” and shall be effective on the day it is published in the National Gazette.

Article (2)

These words and phrases wherever they appear in the text of this regulation shall have the following meaning, unless otherwise indicated:

The Ministry: The Ministry of Environment

The Minister: The Minister of Environment

The Secretary General: The Secretary General of the Ministry of Environment.

The Directorate: The Environmental Impact Assessment Directorate at the Ministry.

The Technical Committee: The Committee in charge of studying projects from an environmental aspect, as per the requirements and conditions stipulated in this regulation.

The Environmental Approval: The approval given to the owner of the Project to initiate the implementation of his Project based on the provisions of this regulation
The Significant Impact: an adverse change that affects environment whether this change is dangerous or potentially dangerous.

The Terms of Reference: The basis submitted by the project owner prior to conducting the Environmental Impact Assessment study for his project, according to the framework of environmental requirements approved by the Ministry.

The Environmental Impact Assessment Document: The Report submitted by the Project Owner, prepared according to the terms of reference.

Article (3)

- a) Environmental Impact Assessment is any procedure that aims to identify the impact of all the phases of a certain project on the environment, describe these affects, and study them to learn more about the project and

its impact from a social and economic point of view; and to identify options for limiting any adverse impact on the environment.

- b) The assessment shall be conducted during the planning, design, implementation and operation of the project.

Article (4)

- (a) It is not allowed to start working on any industrial, agricultural, commercial, constructional, housing or tourism project along with all its accompanying services illustrated in Annexes (2) and (3) of this regulation, until it fulfills the environmental requirements, and obtains the environmental approval required for this purpose.
- (b) The Ministry has the right to compel the owner of the project to conduct an environmental impact assessment study for a project not mentioned in the annexes mentioned in paragraph (a) of this article if deemed necessary depending of the nature or location of the project, or its anticipated impact.
- (c) Annexes (1), (2), (3), (4), and (5) attached to this regulation shall be considered as inseparable part of this regulation.

Article (5)

- (a) A technical committee, known as the "Committee for Studying Projects from an Environmental Aspect" shall be established at the Ministry chaired by the Secretary General, and comprising experienced and specialized members from the following Ministries and entities:
- .1. The Ministry of Environment
 - .2. The Ministry of Health
 - .3. The Ministry of Agriculture
 - .4. The Ministry of Water and Irrigation.
 - .5. The Ministry of Municipal Affairs
 - .6. Any other concerned entity specified by the Minister.
- (b) The representative members of various Ministries mentioned in (1-5, paragraph a) shall be nominated by the concerned Minister. Whereas, other members mentioned in (6, paragraph a) shall be nominated by their concerned entities.
- (c) Amongst the Committee members, the Minister shall nominate a vice-chair to chair the Committee when the chairman is absent.
- (d) Amongst the Ministry's employees, the Minister shall nominate a rapporteur who shall call for committee meetings, report and document minutes of meetings, and follow-up on the implementation of its decisions.

Article (6)

The committee shall investigate the terms of reference submitted by the project owner, and review the Environmental Impact Assessment Document, and submit its recommendations to the Minister to issue the required the decision.

Article (7)

The committee shall meet whenever deemed necessary, upon the invitation of the chair or the vice-chair during his absence, and meeting is legal if the majority of the members are in attendance, provided that the chair or the vice-chair is in attendance, and its decisions will be passed based upon the majority of votes.

Article (8)

- (a) The project owner must submit an application to the Ministry to obtain the environmental approval needed to establish his project, according to the special form prepared for this purpose, demonstrating all the necessary information and data, and enclosing the maps, designs, and specification shown in annex (1) of this regulation.
- (b) The project shall be classified as per the decision of the Secretary General issued based on the recommendations of the Director of the Directorate as follows:
 - .1. First Category: includes the projects mentioned in annex (2) of this regulation and which require conducting a comprehensive environmental impact assessment.
 - .2. Second Category: includes the projects mentioned in annex (3) of this regulation and which require a preliminary environmental impact assessment, based on which the need to conduct a comprehensive environmental impact assessment will be determined.
 - .3. Third Category: includes the projects that do not require an environmental impact assessment, neither preliminary nor comprehensive.

Article (9)

- a) If projects are classified in the First Category, the Ministry shall advise the projects owner in writing, requesting him to conduct a comprehensive environmental impact assessment for the Project
- b) When the project owner shall submit the preliminary draft for the terms of reference for the environmental impact assessment study he intends to conduct after agreeing with the Ministry on the content of the draft, the general framework of the study, the scope of the study, the nature of anticipated significant impacts of the project, and the concerned and affected entities.
- c) The Directorate shall call the project owner and any concerned individual or representative of public or private entity that might be potentially

affected by the project to participate in investigating the preliminary draft to identify the significant environmental impacts of the project, provided that all the available information on the project and its surrounding environment is provided to all concerned entities in appropriate times prior to the date of the meeting.

- d) The project owner shall submit a report to the Directorate including a summary of the meeting's discussions, attended entities, and the significant impacts identified; and demonstrating the terms of reference for the environmental impact assessment study, the names of experts responsible for preparation of the environmental impact assessment document, the required technical experience, and the expected level of effort needed to prepare this document; and the Directorate shall submit this report to the technical committee.
- e) The technical committee shall revise the terms of reference within one week from the date of receiving the report, and this duration may be extended based on agreement with the project owner and shall submit its relevant recommendations to the Secretary General to be submitted to the Minister who may issue the appropriate decision in that regard provided that the project owner shall be informed of this decision.

Article (10)

Following the Minister's approval of the terms of reference of the project, the project owner shall prepare the draft of the environmental impact assessment document, and he shall be responsible for the accuracy and authenticity of the contents of this document and it is stipulated that this draft must comprise the significant environmental issues relevant to the project under investigation as mentioned in Annex (5) of this regulation.

Article (11)

- a) Upon the submission of the environmental impact assessment (document??) draft to the ministry, the technical committee shall review and analyze the draft to ensure its compliance with the provisions of this regulation; and if found that the application does not fulfill its requirements, the committee shall compel the project owner to provide any additional information needed to complete its analyses of the draft.
- b) If the environmental impact assessment document draft fulfills all the requirements as per the provisions of this regulation, the Minister shall issue his decision based on the recommendations of the Secretary General which are based on the recommendations of the technical committee, within 60 days from the date the draft was received, and according to the following:
 - 1. Approve the document and consider it the final environmental impact assessment document if it was shown that the project's environmental impacts are appropriately dealt with throughout the study including the plan for

reducing adverse impacts. The approval shall be valid for one year from the date it is issued.

2. Environmental disapproval of the project if it was shown that its implementation would cause significant environmental impact and that the plan for reducing adverse impacts is inadequate to deal with that.
- c) The decision related to the environmental impact assessment study shall be announced to the public in the manner that the Ministry deems appropriate.

Article (12)

The project owner shall abide to the contents of the environmental impact assessment document and any other conditions issued by the Ministry when launching his project and during all the implementation and operation phases

Article (13)

- a. If the project is classified in the Second Category, the Ministry shall request the Project Owner to conduct a preliminary environmental impact assessment to the project, bearing in mind the criteria stipulated in annex (4) of this regulation.
- b. If the preliminary environmental impact assessment revealed that the Project has potential significant impact on the environment, the Minister shall request the project owner to conduct a comprehensive environmental impact assessment study as per the provisions of this regulation

If the preliminary environmental impact assessment revealed that it is not possible for the project to have significant impact on the environment, the project shall obtain the Ministry's approval as per the provisions of this regulation and any other instructions issued by virtue thereof, and the ministry shall inform the project owner of this approval.

Article (14)

If the Project is classified as Category Three, the Ministry shall inform the project owner that his project does not require conducting an environmental impact assessment study, and in this case, the project is approved as per the provisions of this regulation and any other instructions issued by virtue thereof. .

Article (15)

Making any amendments to a current project, or expanding it, is considered a project by itself, and will be treated as a new project. Therefore, the project owner must undertake all the measures stipulated in this regulation regarding environmental impact assessment.

Article (16)a) The project owner may object to the Ministry's decision issued regarding the environmental approval of his project, and present this objection to the Minister within 15 days from the date the project owner is informed of it, and the Minister may appoint a board of independent experts comprising at least 3 members of individuals with the appropriate technical experience, at the expense of the project owner, to look

into the objection submitted by the project owner, and submit its recommendations in this regard.

- c) The Minister's decision issued based on the objection is considered final.

Article (17)

The concerned Directorate at the Ministry must periodically monitor the commitment of project owner to all the conditions and requirements stipulated in the environmental approval issued by the Ministry, during the various phases of the project including its implementation, operation, and disassembling.

Article (18)

The Ministry must make available, to the concerned entities and upon their request, the information and data related to the environment provided by project owner, during the phases of the environmental impact assessment study, and in specific cases dictated by the public interest or the providers' own interest, the Ministry shall have the right to consider some of the provided data or information as confidential.

Article (19)

- a. Upon the submission of the application, the Ministry shall receive the following:
1. Fifteen (15) Jordanian Dinars for projects that do not require an environmental impact assessment study.
 2. Fifty (50) Jordanian Dinars for projects that require a preliminary environmental impact assessment study.
 3. Seven hundred and fifty (750) Jordanian Dinar for projects that require conducting a comprehensive environmental impact assessment study.
- b. The fees for experts and consultants who are assigned to review the environmental impact assessment study shall be provided by the project owner, provided that these fees are determined by a Minister's decision based on the recommendations of the Secretary General.

Article (20)

The Minister, upon the recommendation of the Secretary General, may issue the necessary instructions to execute the provision of this regulation.

Article (21)

This regulation cancels and annuls any other regulation that contradicts with its provisions.

The Annexes of the Environmental Impact Assessment Regulations

Annex (1)

General Information on the Project requiring a comprehensive or preliminary environmental impact assessment study

Annex (2)

Projects that require a comprehensive environmental impact assessment study

Annex (3)

Projects that require a preliminary environmental impact assessment study

Annex (4)

The criteria followed when conducting an environmental impact assessment study

Annex (5)

The items that should be included in the environmental impact assessment study

Annex (1)
General Information about the Projects that Require
A Preliminary or Comprehensive
Environmental Impact Assessment Study

1. A description of the project including:
 - A detail of the project including a description of the nature of the project, the use of the land during the preparatory period, during construction, operation , disassembly and the reclamation of the location.
 - A description of the nature of the production operation (quality, the quantity of the materials used, and the inputs and outputs of production).
 - An estimate of the quantity and quality of the remains and emissions (pollution of the water, air, and soil, noise, vibrations, light, heat, and radiation) which is result from the operation of the project.
 - An estimate of the number of individuals, vehicles, and equipment, and their anticipated movement during the project's various phases.
2. A list of the major options to the proposed project (including the location, design, and the technology used). In addition to a statement of the most important justification for selecting the proposed project, and why it was chosen from all the options, bearing in mind the impact on the environment. If the project owner does not choose the option that is least harmful to the environment in terms of location, design and technology, he should explain why this option was not chosen.
3. A description of the most important environmental aspects that are expected to be affected by the proposed environment, for example, public health, the infrastructure, the flora and fauna, the soil, the water, the air, the climate, the natural scenery, fixed assets (including historical sites and important buildings), and the relationship between these.

Projects that Require a Comprehensive Environmental Impact Assessment Study

1. Refineries for raw petroleum.
2. Electricity generation station.
3. Buildings constructed as permanent stores or dumps to dispose of radiating nuclear waste.
4. Iron and Steel factories.

5. Buildings used to extract, treat and transfer asbestos and any of its components.
6. The complete chemical industries, like petrochemical compounds, and factories that produce fertilizers, insecticides, including the facilities to store petrol, petrol chemicals, and chemical products.
7. Projects for constructing main roads, railways and airports.
8. Stations for the treatment of waste water.
9. Construction of industrial cities.
10. Buildings for the treatment and disposal of hazardous waste materials.
11. Strategic industries:
 - Deep excavations, drilling for water, and geothermal excavations. This excludes excavations to measure the stability of the soil.
 - Mining procedures and the pertinent industries.
 - Extraction of natural resources.
12. Energy-producing industries
 - The buildings pertaining to industries concerned with the transportation of gas, steam, and hot water, and the transfer of electrical energy.
 - The surface storage of natural gas.
 - Storage of inflammable gases underground.
 - The surface storage of fossil oil .
13. Factories for tanning skins and dressing them.
14. Sugar factories.
15. Yeast factories.
16. The construction of sea docks and ports.
17. The construction of basins for ships and boats, and the marine platforms for industrial or entertainment purposes.
18. Bury parts of the sea in order to acquire land to build for industrial, or leisure purposes, among others.
19. Glass factories.

20. Any expansion of the projects mentioned in Annex (2).
21. Any project not mentioned in this annex and for which the Ministry deems it necessary to conduct a comprehensive environmental impact assessment study.

Annex (3)
Projects that requiring conducting a preliminary environmental
Impact assessment study

- 1. Agricultural Projects:**
 - Poultry farms if they have more than 30,000 birds.
 - Cow farms if they have more than 50 heads.
 - Goat farms if they have more than 1,000 heads.

- 2. Projects for the treatment of minerals:**
 - Work involving iron and steel including plumbing, molding factories, and galvanizations and painting factories.
 - Building used for the production of non-iron minerals, including production, melting, purification, molding and galvanization.
 - Molding and pressing of blocks.
 - Treating and coating mineral surfaces.
 - Manufacturing of boilers, tanks, and containers made of mineral sheets.
 - Buildings for processing mineral raw materials.
 - Manufacturing and assembling of compounds.

- 3. Food Industries:**
 - Manufacturers of oils, and animals and plant fat.
 - Canning and bottling of animals and plant products.
 - Milk product industries.
 - Slaughterhouses.

- 4. Textile, Leather, Wood and Paper Industries.**

- 5. Rubber Industries.**

- 6. Infrastructure Industries including housing projects.**

7. **Other projects including:**
 - Household waste dumps.
 - Dumps for the disposal of scraps.
 - Industrial activity centers.
 - Building for the storage of scrap.
8. **Any expansion of the projects mentioned in annex (3).**

Annex (4)

The Criteria that must be abided by in order to conduct the preliminary environmental impact assessment study

The Project is considered to have major impact on the environment if:

- It contradicts the plans and projects of the residents of the area.
- If it has a negative impact on the scenery of the location.
- If it has major impact on a flora or fauna species which is rare or in danger of extinction, or on the location of this species.
- Contradicts with the movement of any species of fish or land animals, whether resident or migratory.
- Contradicts the national criteria related to the treatment of solid or liquid waste.
- Has a negative impact on the quality of the water.
- Leads to the exhaustion of underground water, or diminishes its quality in a remarkable manner.
- Clashes with the feeding of underground water.
- Destroys a historical site or has any negative impact on it or on any buildings of historical importance, or has a negative impact on the culture of a group of people or a certain social strata.
- Encourages large popular growth, or leads to the concentration of a large number of residents in the area.
- Causes an increase in traffic compared to the current status of traffic on the roads network, and their ability to handle this traffic.
- Leads to the immigration of a large number of people from the area's original residents.
- Encourages the implementation of activities that require a large amount of fuel or water, or all forms of energy.
- Leads to an major increase in the level of noise or vibrations in the area,

- Leads to the occurrence of floods, erosions, or major granite sedimentation.
- Exposes people and/or buildings to major geological dangers.
- Leads to the expansion of the sewer system allowing it to serve new development projects.
- Dramatically diminishes the habitat of fish, flora or fauna.
- Leads to the division or disruption of the natural order of the current groups.
- Creates a possible danger on public health, or involves using, producing or disposing of materials that could harm, people, animals, or plants in the affected area.
- Contradicts with the education, religious, scientific, or entertainment purposes of the region/location.
- Contradicts any of the criteria for the quality of the surrounding air, or contributes dramatically to the disruption of the quality of the air.
- Changes the use of agricultural lands for non-agricultural purposes, or reduces the productivity of these lands.
- Disrupts the emergency or evacuation plans.

Annex (5)

The items that should be included in the Environmental Impact Assessment Study

- The Environmental Impact Assessment document must be concise and must focus on important environmental issues. The standard of the document and the accuracy of its contents must be consistent with the negative impact the project is expected to have. The purpose of the document targets the project designers, the companies implementing the project, the project owner, the people affected by the project, and the non-government environmental organizations linked to them. The document must be written in Arabic and English.
- The Environmental Impact Assessment Document must include the following:
 - The executive non-technical summary: which comprises, in both Arabic and English, the most important outcomes and recommendations.
 - The Policy, Legal and Administrative Framework: which describes the terms of reference when preparing the document.
 - Project Description: Which is a brief description of the geographical, practical, and social framework and timeframe of the project, including any work necessary for the project to be conducted outside the project boundary (like molding pipes, opening roads, establishing stations for the generation of energy or providing water, or housing for the workers, or construction facilities for storing raw materials and products).
 - Baseline Data: which includes an assessment of the area's dimensions that were examined, and a description of the natural, social and economic circumstances of the area, including any changes that could occur prior to the operation of the project. Additionally, the proposed , current development activities, falling within the project's boundaries, should be taken into consideration (are indirectly involved with the project).
 - Environmental Impact: Identify and assess the anticipated negative and positive impact of the project on the environment. It is also necessary to identify the procedures to alleviate the negative impact on the environment, which cannot be avoided. The means to improve the environment must be also be studies, as should the quality of the available data, the gaps in it, and the suspicions accompanying the environmental impact or the anticipated ones. It is also necessary to identify the issues that do not require any more research.
- Analysis of Alternatives; including an orderly comparison of the alternatives proposed for the projects, in terms of analysis, location, the

technology used, the environmental impact, the capital costs, the recurrent costs, the degree of stability in light of the local circumstances, in addition to the institutional, training, and supervisory requirements, and the environmental advantages of each option. It is also necessary to include the economic cost of each option wherever this is possible, and indicate the bases which were employed in the selection of the proposed options.

- **Negative Environmental Impact Mitigation Plan:** including the appropriate low-cost procedures for the alleviation of the severity of the negative impact on the environment making them within the acceptable levels, and estimating the possible environmental impact, capital cost, recurrent costs, and institutional training and supervisory requirements of these procedures. The plan must include a detailed description of the proposed work program, provided that the work involving the environmental issues is consistent with the architectural works and the other project activities, during the execution phase, and the plan must include procedures to compensate for the negative impact on the environment if the procedures for alleviating this impact are not adequate or very costly.
- **Environmental Monitoring and Post Auditing Plan:** which includes identifying the nature of the monitoring, and who shall undertake this procedure, and the cost of this, including other issues like training.
- **Appendices, including:**
 - A list of the persons who contributed on the writing of the environmental impact assessment document (individuals and organizations).
 - References (the written materials used in the preparation of the document). This list is very important because of the dependency on unpublished documents.
 - A record of the interviews and consultancies that takes place between the authorities concerned with the projects (including a list of attendees). Consultancy Meetings between the groups affected by the project and the local non-governmental organizations must be documented.

REFERENCES

- Ahmed, A.A. (1989). Jordan Environment Profile-Status and Abatement (in Arabic). Amman, Jordan.
- Ali, S.M. & Hassan, G.A. (1994). Water resources in Jordan (in Arabic). Dar-Elamal, Amman, Jordan.
- Al-Newashi, Q. (2003). Environmental Education in Developing Countries. Madaba, Jordan: Central Press
- Al-Omary, G. (1994). Status of Environmental law in Jordan. Environmental Research Studies: International Environmental law. Friedrich Naumann Stiftung, Konigswinter. National Environmental Information and Education Program. Jordanian Environment Society, Vol.5, pp. 131-134.
- Freiberg, M. and Hattne, B. (1985). The Greening of the World: Towards a Non-deterministic Model of Global Processes. In Development as Social Transformation: Reflections on the Global Problematique (pp. 204-270) London: Hodder and Stoughton.
- GCEP (The General Cooperation for the Environmental Protection) (1998). Jordan Country Study on Biological Diversity. The Study technically Supported by UNEP and Funding from the Global Environment Facility (GEF).
- Hadidi, A. (1985). Jordanian Environment: Geography and History. Dar Al-Kindi, Amman, Jordan.
- HKJ (The Hashemite Kingdom of Jordan) (1992). Jordan Country report to the United Nations Conference on Environment and Development (UNCED), Brazil.
- HKJ (The Hashemite Kingdom of Jordan) (1996). National Environmental Action Plan.
- HKJ (The Hashemite Kingdom of Jordan) (1992). Jordan Agenda 21 report to the United Nations on Progress Toward Sustainable Development.
- Jordan Times (1991). No. 1711, April 2, 1991, Cover Page.
- Jordan Times (2005). No. 4345, May 6, 2005, Cover Page.

- Jreisat, J.E. (1997). Environmental Management: the Will and the Way in In Jabbara, J.G. & Jabbara, N.W. (Eds.), Challenging Environmental Issues, Middle Eastern Perspectives. Brill, New York, pp. 18-30.
- Juneidi, M.J. (1999). Wild Plants of Jordan. Department of Libraries and National Documentation. Amman, Jordan.
- Kashakesh, K. (1998). The Issue of the Environment in Jordan: Legislation and Conservation (1st Ed). Marowah Press, Irbid, Jordan.
- Kenyo, P. (April 4, 2006). Outside Embroiled Iraq, Ex. Pats Wait in Jordan. NPR News Broadcast, All Things Considered Program. Retrieved May 4, 2006 from the World Wide Web:
<http://www.npr.org/templates/story/story.php?storyId=5323590>
- Kharoof, R. (2000). Water Resources and Awareness in Water in Jordanian Schools. Risalat Almualim (Teacher's Message) (in Arabic). Ministry of Education, Amman-Jordan, Vol. 40, No. 2, pp.171-179.
- NES (National Environment Strategy) (1991). National Environment Strategy for Jordan: A Resource Book of Information and Guidelines for Action. Department of Environment, Jordan's Ministry of Municipal, Rural, and Environmental Affairs. Technical Advice by IUCN, Gland, Switzerland.
- Patai, R. (1958). The Kingdom of Jordan. Princeton, NJ, Princeton University Press.
- Persadie, N., Ramlogan, R. (2005). Pursuing Development and Protecting the Environment Dilemma of the Developing World. Electronic Green Journal. Issue 22.
- Pieterse, J. (2000). After Post- Development . Third World Quarterly, 21(2), 175-191.
- Ramadan, S.A. (1990). Assessment of Regional Water Quality Issues in the Middle East. UNESCO/WHO/UNDP. Amman, Jordan.
- Tell, S. and Yaser, S. (1987). The Condition of the Environment of Jordan (in Arabic). A Study Sponsored by the Department of the Environment at the Ministry of Municipality and Rural Affairs, Jordan.
- UAER (United Arab Economic Report) (1994). A Report Published by the Arab Monetary Fund, the League of Arab States, the Arab Fund, and the Organization of Arab Petroleum Exporting Countries.

United Nations. (2002). Report of the World Summit on Sustainable Development. A/CONF. 199/20.

United Nation Conference on Environment and Development (UNCED). (1992). Overview of National Reports. Items 23 and 27. A/CONF.151/PC.98.

USTR (United States Trade Representative) (1999). Final Environmental Review of the Agreement on the Establishment of a Free Trade Area between the Government of the United States and the Government of the Hashemite Kingdom of Jordan.

WCED (The World Commission on the Environment and Development) (1987). Our Common Future (Brundtland Commission). Oxford, Oxford University Press

Yarbrough, B, and Yarbrough, R. (1994). The World Economy: Trade and Finance. Fort Worth, Texas. The Dryden Press.

Websites:

http://www.noor.gov.jo/personal_profile.htm

<http://jordanembassyus.org>

<http://www.jordanembassyus.org/new/aboutjordan/uj1.shtml>

<http://countrystudies.us/jordan/54.htm>

<http://www.fao.org/ag/agl/aglw/aquastat/countries/jordan/index.stm>

<http://www.earthtrends.wri.org>

<http://www.redlist.org/info/tables/table5.htm>

<http://www.moenv.gov.jo>

<http://www.mow.gov.jo>

<http://www.rscn.org.jo>