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ASSESSMENT OF PRIORITY ENVIRONMENTAL THEMES AND SECTORS

Investment priorities for the Jordan Environment Protection Fund
(JEPF)

25 July 2007

This publication was produced for review by the United States Agency for International Development. It was prepared by Rana Dababneh and Farah Hanbali / Al Jidara.

ASSESSMENT OF PRIORITY ENVIRONMENTAL THEMES AND SECTORS

INVESTMENT PRIORITIES FOR JORDAN ENVIRONMENT
PROTECTION FUND (JEPF)

SUSTAINABLE ACHIEVEMENT OF BUSINESS EXPANSION AND
QUALITY (SABEQ)

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OF JORDAN'S ECONOMY>

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INTRODUCTION

THE PURPOSE OF THIS ASSIGNMENT

This document outlines the main findings of a rapid and preliminary review of the most challenging environmental themes in Jordan. The purpose of this assessment is to help identify investment priorities for Jordan Environment Protection Fund (JEPPF) in order to aid the design of a project's selection criterion. The document reports important references and underscores main discussion points in meetings held with various governmental officials and environmental specialists. Below is a list summarizing the meetings held during the assessment period of 1-25th July 2007.

Table 1: Summary of All Meetings

Date	Venue	Attendees	Discussion
25-Jun-07	IFC Offices	AA, RO, LW, MA, SAH	The IFC expressed interest in working together with the SABEQ program towards creating the Jordan Environment Protection Fund. IFC agreed to arrange for a conference call with some of its specialist in August to assist in the effort.
27-Jun-07	RIAL Offices	AH, MAT, SAH, MA, JC	The CDM team briefed SABEQ on their activities. They also discussed the industrial fund idea they had submitted to the ministry. Dr. Amal Hijazi identified several themes that could be tackled by the fund. Another meeting with Dr. Amal Hijazi will be organized upon her return to Jordan.
28-Jun-07	SABEQ	MA, SAH, JC, RO, AK, RaD	Discussion on TOR requirements, feedback of the MoEnv, SABEQ's presentation to the MoEnv on Sunday, July 8, and meetings schedule.
1-July-07	MoEnv	RaD, FH, MA, RZ	Preparatory meeting with the ministry to educate them about the purpose of the assessment and organize meetings with key executives.
2-July-07	RCSN	RaD, FH, YK	Discussion on biodiversity in Jordan and activities with negative impact on biodiversity, similar initiatives such as the global environment facility (GEF) and the Jordan Fund for Nature, which was funded by the USAID.

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Date	Venue	Attendees	Discussion
2-July-07	MoEnv	RaD, FH, RD	Discussion on short, medium and long-term priorities, funding initiatives and programs such as the KFW-IDB, Jordan cleaner production program (JCPP). The discussion concluded with the main polluting sectors.
2-July-07	MoEnv	RaD, FH, MK	Discussion on the hazardous substances, hazardous waste, solid waste and medical waste; in addition to the international conventions and approaches to deal with pollutants and waste, such as PIC, POPs, Basel Convention and SAECM. The discussion concluded with the main sectors producing solid and hazardous waste.
2-July-07	SABEQ	MA, SAH, JC, RO, AK, RaD	Brainstormed on the presentation to the MoEnv on Sunday, July 8 in terms of sequence logic and contents.
3-July-07	RSS	RaD, FH, BH	Discussion on micro and small enterprises that are in need of major funding and cannot self-fund for a cleaner production, negative impacts caused by small and medium enterprises, especially those of air pollution, water waste and negative effects on health, in addition to the IDB-KFW initiative.
3-July-07	RSS	RaD, FH, RA	Discussion on pharmaceutical and medical waste.
3-July-07	JCI	FH, ZA	Briefing on the role of the Chamber of Industry and collection of statistics on the number of member companies.
4-July-07	MoEnv	FH, HB	Discussion on air pollution, causes, hot spots, actions and suggested solutions.
4-July-07	MoEnv	FH, AZ	Discussion on complaints, inspection and law enforcement, air pollution, causes, hot spots and risks.
4-July-07	MoEnv	RaD, HS	Discussion on nature protection, degraded ecosystems and desertification.
4-July-07	MoEnv	RaD, BW	Discussion on environmental themes that are already receiving considerable financial support versus themes that are in dire need for support such as recycling, air emissions and industrial water reuse.

Table 1: Summary of All Meetings

Date	Venue	Attendees	Discussion
5-July-07	NERC	RaD, FH, MaK	Discussion on energy consumption, the dire need for renewable energy, most consuming sectors, the interrelation between energy and other environmental challenges, and the energy fund.
8-July-07	MoEnv	H. E. KI, RD, RO, LW, MA, SAH, AK, JC	The SABEQ team presented its understanding of the Ministry's requirements in terms of developing an assessment report, a concept paper and an action plan to create Jordan Environment Protection. The minister and his team provided their input and the SABEQ team incorporated them in their activities.
24-July-07	MoEnv	RaD, RZ, MA	Review of the assessment draft report and elaborate discussion on data availability at the Ministry and previous reports
25-July-07	MoEnv	RaD, RZ	Review of the assessment draft report and elaborate discussion on data availability at the Ministry and previous reports. A brief discussion on the macro level mainstream of environment into other sectors.

Key:

- AA Ahamad Atiqa, IFC, Resident representative
- AH Amal Hijazi/CDM-RIAL Project
- AK Ala' Al Kurdi/SABEQ
- AZ Adnan Zawahreh/ Ministry of Environment, Director of Inspection and Enforcement
- BH Bassam Hayk/ Royal Scientific Society, Director of the Environmental Research Center
- BW Batir Wardam/ Ministry of Environment, Environmental Claims Unit
- FH Farah Hanbali/SABEQ Consultant
- HB Hussain Badarin/ Ministry of Environment, Director of Monitoring and Assessment, Climate Change focal point
- HS Hussain Shaheen/ Ministry of Environment, Director of Nature Protection
- JC Jacob Cohen/SABEQ
- KI H. E. Khaled Irani/Ministry of Environment, Minister

LW	Lindsey Wellons/SABEQ
MA	Mohammad Asfour/SABEQ
MaK	Malik Kabariti/National Energy Research Center, President
MAT	Mai Abu Tarboush/CDM-RIAL Project
MK	Mohammad Khashashneh/ Ministry of Environment, Director of Waste and Hazardous Substances Management
RA	Ra'fat Ahmad/ Royal Scientific Society, Director of Industrial Chemistry Research Center
RaD	Rana Dababneh/SABEQ Consultant
RD	Raouf Dabbas/ Ministry of Environment, Minister's Advisor
RO	Rodrigo Ortiz/Chief of Party, SABEQ
RZ	Ruba Al-Zu'bi/ Ministry of Environment, Director of Policy and Development
SAH	Souad Abdul-Hamid/SABEQ
YK	Yahya Khaled/ Royal Society for Conservation of Nature, Director of Royal Society for Conservation of Nature
ZA	Zaki Ayoubi/ Chamber of Industry, Board Member-Director General
MoEnv	Ministry of Environment
RSS	Royal Scientific Society
RSCN	Royal Society for the Conservation of Nature
JCI	Jordan Chamber of Industry

For the minutes of the meetings refer to the appendix.

AN OVERVIEW OF RELEVANT ENVIRONMENT INITIATIVES

GLOBAL ENVIRONMENT FACILITY (GEF)

[The Global Environment Facility \(GEF\)](#), an independent financial organization, was established in 1991; Jordan has been a member since 1994. GEF helps developing countries fund projects and programs that protect the global environment and grants support projects related to biodiversity, climate change, international waters, land degradation, the ozone layer, and persistent organic pollutants.

The implementing agency for GEF in the MENA region is the UNDP. The UNDP-GEF supports the development of projects and it also manages two corporate programs, the

Small Grants Program and the GEF National Consultative Dialogue Initiative. UNDP-GEF also managed the Biodiversity Planning Support Program.

The maximum grant amount per project under the Small Grants Program (SGP) is US\$50,000, but averages around US\$20,000. Grants are made directly to community-based organizations (CBOs) and non-governmental organizations (NGOs). The National Coordinator for the Small Grants Program in Jordan is The Royal Marine Conservation Society of Jordan (JREDS).

GEF has undergone four phases in Jordan. Table 2 outlines the number of projects implemented through each phase and the total funding for each phase.

Table 2: Supported Projects in Jordan (Value)

Phase and Duration	Number of Projects	Total Support US\$
Pilot Phase December 1992- December 1995	12	450,000
First Operational Phase May 1997- December 1998	20	600,000
Second Operational Phase December 1999- February 2005	76	2,250,000
Third Operational Phase March 2005- On-going	20	682,000
Total	128 Projects	3.982.000

In terms of focal area concentration, the supported projects can be broken down as follows:

Table 3: Supported Projects in Jordan (Sector)

Focal Area	Portfolio Share	Portfolio Share %
Biodiversity	60	47.2%
Climate Change	14	11.2%
International Waters	18	13.6%
Sustainable Land Management	25	19.2%
Persistent Organic Pollutants	0	0%
Multi-focal	11	8.8%
Total	128 Projects	100%

JORDAN FUND FOR NATURE

Established in 1995, Jordan Fund for Nature (NatureCenter) was created to provide a financial support to the RSCN in its core activities and development program. The initial target for the Fund's capital endowment was JD 5 million. In 1996, a sum of JD 1 million was secured through USAID and this was placed in a government account, from which the RSCN has since received a baseline bank interest on the capital. Early in 2002, both the Ministry of Finance and the Ministry of Planning agreed in principal to allocate additional funds from the

local currency transfer program to bring the total of the Fund towards the target sum of JD 5 million.

The RSCN created a strategic management and investment plan for the fund through which uses of the endowment fund are proposed and a 5-year financial projection of expenditure on RSCN's strategic goals is presented.

The income from the endowment in the Trust Fund is now directly used to contribute to the operating costs that RSCN is incurring in striving to achieve its primary goals. They are:

Goal number 1: to establish six more protected areas

Goal number 2: to effectively manage all designated protected areas

Goal number 3: to save endangered species in the wild

Goal number 4: to expand environmental education to all schools in Jordan

Goal number 5: to use Jordan's natural assets to provide more income and jobs for local communities; and

Goal number 6: to strengthen law enforcement to reduce illegal hunting and other wildlife crime

Goal number 7: to further develop RSCN's institutional efficiency

IDB-KFW

The Industrial Development Bank, IDB, signed an agreement in 1995 with the German bank "Kreditanstalt Für Wiederaufbau", KFW, to grant between 6 – 8 million dollar loans for environment-related projects; Friends of Environment (NGO), along with certified consultants, was responsible for assessment of projects proposed to the banks. The project however did not fully accomplish its ideal goals when the bank, being a financial institution, approved of projects that were financially more feasible and neglected the project's alignment with environmental priorities. The project lasted for about seven years and ended in 2002.¹

JORDAN CLEANER PRODUCTION PROGRAM (JCPP)

In 2002, the United Nations Development Program, UNDP, and the United Nations Industrial Development Organization, UNIDO, initiated the Jordan Cleaner Production Project in order to create awareness projects, perform energy audit and in-plant assessments to bring out a cleaner production. The project is a governmental/nongovernmental cooperation program represented through a consortium of 9 governmental ministries, universities and NGOs and targets small and medium enterprises in Jordan.

The Ministry of Environment has regulated the cleaner production mechanism in a recently drafted by-law on inspection and enforcement.

¹ Meeting with Mr. Raouf Dabbas – Prime Ministry Advisor – Ministry of Environment
Monday, July 2, 2007

ENERGY FUND

Due to the common benefits and goals of the energy fund and the environment fund, there is a talk at the ministerial level to combine both funds into one. The current energy fund assesses a project's eligibility in two steps: The first is a primary energy audit that is done at no cost; and the second is a detailed energy audit that is done at a specified cost. Once the detailed audit proves feasibility of the project, the project is given a soft loan that could reach up to 60% of the total cost of the project. ²

THE FRENCH AGENCY FOR DEVELOPMENT (AFD) CREDIT LINE

The AFD credit line mission is to scale-up investments in Energy Efficiency (EE), Renewable Energy (RE), and Environmental Performance (EP). The AFD credit line is not operational. AETS, a consultant funded by AFD, estimated an investment potential in these areas of JD90-160 million over the five year period 2007-2011. Table 4 details the estimated investment potential.

Table 4: Total Investment needs in the next 5 years (in JD)

Scenario	High	Medium	Low
Environment	50 000 000	40 000 000	30 000 000
EE Industry	37 200 000	31 000 000	24 800 000
Gas Conversion	34 500 000	23 000 000	14 500 000
Cogeneration	20 000 000	10 000 000	5 000 000
EE Commercial	19 200 000	14 400 000	9 600 000
Solar Water Systems	5 200 000	3 900 000	2 600 000
Total	166 100 000	122 300 000	86 500 000

Source: AETS 2007, potential large investments (unit cost > 10M Eur) are excluded.

AFD intends to make available to interested banks a dedicated credit facility. The AFD loans would carry lower interest rates than the market that are given to eligible projects.

² Meeting with Mr. Malek Kabariti – President of National Energy Research Center (NERC) - Thursday, July 5, 2007.

PRESENTATION OF RESEARCH FINDINGS

This assessment exercise aims at aligning the environmental fund financing priorities with Jordan's most pressing environment concerns so as issues with high environmental impact and a relative low cost are tackled first. The following is a broad and ground level assessment based on a preliminary research and collection of information primarily from the National Agenda, the national environment strategies, the Ministry's action plan, and several meetings with the Ministry's executives and other environmental specialists and activists in Jordan.

According to a study conducted by the World Bank in 2004, the cost of environmental degradation in Jordan was estimated to be 3.1% of GDP annually with a total of 205 million JDs estimated for five environmental sectors in the following respective order: Water pollution (0.71 – 1.24 percent of GDP), air pollution (0.69% of GDP), land degradation (0.46% of GDP), soil salinity (0.14% of GDP), inadequate waste collection (0.11% of GDP), and the coastal degradation in Aqaba (at 0.09% of GDP).

Keeping these figures in mind, the following environmental themes are to be evaluated and prioritized and sector-based distribution of environmental impact is to be assessed (depending on already available information).

WASTE MANAGEMENT

Around 60% of waste in Jordan is organic and land-filling is the preferred method of waste disposal, by contrast to more developed countries.

SOLID WASTE

From the conducted discussions, the sources with the highest environmental impact from solid waste are as follows: Industrial, household, commercial, agricultural; however, the sources of solid waste that should be dealt with urgently are arranged as follows: agricultural, household, industrial, and commercial. In a concept paper prepared by the Environmental Research Center at the Royal Scientific Society, it is noted that solid waste disposal sites lack proper location, design and management which influence the population in those areas.

HAZARDOUS / CHEMICAL WASTE

Hazardous waste is a result of processing hazardous substances.

The National Agenda indicated that hazardous and chemical waste is expected to increase by over 50% annually on average, creating serious environmental risks.

The main sectors contributing to hazardous waste in Jordan are:

- The Energy sector: mainly caused by electricity distribution companies. According to the Ministry of Environment's National Implementation Plan for Stockholm Convention on Persistent Organic Pollutants (POPs), the main source of Poly

Chlorinated Biphenyl's (PCBs) is electrical equipment, such as transformers, capacitors and other special machinery that contain PCBs based oil.

- Uncontrolled combustion and waste incineration
- The medical sector including hospitals, laboratories and research centers (producing radioactive materials, chemical solvents)
- The pharmaceuticals sector
- Transportation: mainly caused by car batteries
- Painting and electroplating resulting from SMEs (i.e. industrial workshops)
- Agriculture: use of pesticides
- Hotels, Households, and hospitals: disposal of cleaning detergents.

The Ministry of Environment's National Implementation Plan for Stockholm Convention on Persistent Organic Pollutants (POPs) states that the working team of the Ministry identified 21 transformers that may contain PCBs, owned and operated by Irbid Electricity Distribution Company. The Plan also identifies the following hot spots:

- Marka old solid waste dumping site
- Greater Amman Municipality (GAM) landfill / Russeifa
- Aqaba old landfill site
- Kufur Awan solid waste dumping site / Irbid
- Tayba solid waste dumping site / Irbid
- Sorrow solid waste dumping site / Irbid
- Wadi Katter liquid waste dumping site / Zarqa
- Sludge disposed in As-samra area
- Chlorine factory fire accident / Zarqa

Table 5 indicates the most significant sources of PCDD/PCDF releases.

Table 5: Summary of the Results of PCDD (Poly Chlorinated Dibenzo Dioxin)/PCDF (Poly Chlorinated Dibenzo Furan) Releases

Source Categories	Air	Water	Land	Products	Residue	Total	%
Waste Incineration	9.365	0	0	0	0.1	9.417	11.5
Ferrous and Non-Ferrous Metal Production	0.707	0	0	0	2.2	2.857	3.5

Power Generation and Heating	0.35	0	0	0	0	0.35	0.43
Production of Mineral Products	0.341	0	0	0	0.1	0.417	0.51
Transportation	2.353	0	0	0	0	2.353	2.88
Uncontrolled Combustion Processes	51.204	0	0.074	0	1.9	53.14	65.1
Production of Chemicals and Consumer Goods	0	0.001	0	0.345	0	0.35	0.43
Miscellaneous	0.002	0	0	0	0	0.046	0.06
Disposal/ Land filling	0	0.419	0	0	12.3	12.672	15.5
Total	64.32	0.42	0.07	0.34	16.44	81.6	100
Percentage	78.84	0.51	0.09	0.42	20.15	100	

Source: The National Implementation Plan for Stockholm Convention on POPs, Ministry of Environment, June 2006

MEDICAL WASTE

According to the national agenda, half of the medical waste generated in the Kingdom is left untreated. The following list represents the sources of medical waste in descending order.

- Public health care centers causing about 40% of medical waste.
- Ministry of Health hospitals producing about 23% of medical waste.
- Private hospitals producing about 20% of medical waste.
- The Royal Medical Services are causing 13% of the medical waste.
- University hospitals having the lowest effect of about 5%.

WASTEWATER

The National Agenda indicated that over 85% of total wastewater is discharged in streams, wadis or low-lying areas.

POLLUTION

AIR POLLUTION

The importance of the air pollution theme in Jordan is emphasized through the fact that emissions in Jordan exceeded the World Health Organization standards in some areas, such as Al Hashemiya where the Petroleum Refinery as well as the Al Hussein Energy Station are location.

The following air polluting sectors were mentioned during the conducted discussion.

- Petroleum refineries & Industries: although industrial zones are higher in risk than other establishment, but there is awareness on the risks/dangers of these zones. The fact that industrial zones are now located in certain areas only has decreased their effect.
- Power stations
- Mechanical works: the majority use low-quality material and substances that have a negative impact on the environment; in addition to the infrastructure that is barely maintained.
- Electro-mechanical works
- Agriculture
- Transportation
- Municipal waste
- Industries using ovens

Type of fuel: Type of fuel used in Jordan is high in air pollutants; the sulphur level in diesel is 28 times more than national standards and 35 times more than the average global level; although the country is moving towards the usage of unleaded gas, however, a very high number of vehicles use diesel, i.e. using unleaded gas will solve part of the problem but not all.

- Old vehicles around the Kingdom have a major negative impact on the levels of pollution
- Establishments such as quarries, handicrafts and construction.

In addition to the above-mentioned sectors, Dr. Bassam Al Hayk, Director of the Environmental Research Center at RSS, agrees that air pollution is high in Amman city center due to traffic and commercial activities; in addition, the approximate 50% increase in the number of vehicles during the summer increases the effects of air pollution.

WATER POLLUTION

In the water scarce country, Jordan, the conservation, reuse and recycling of water are critical issues faced by communities, industrial enterprises, and individuals.

According to the National Agenda, water samples tests taken from different areas of Jordan show that the quality of surface water in Jordan is in line with international standards. Dr. Bassam Al Hayk states that “water is the prime priority area for Jordan”. The main problems facing water Resources are: over-use of fresh water in industries, especially the garment sector in QIZs, the high amounts of industrial wastewater and water quality monitoring.

SOIL POLLUTION

According to the National Agenda, Jordanian cultivated land appears to be not polluted by fertilizers, and quantities used are below world average.

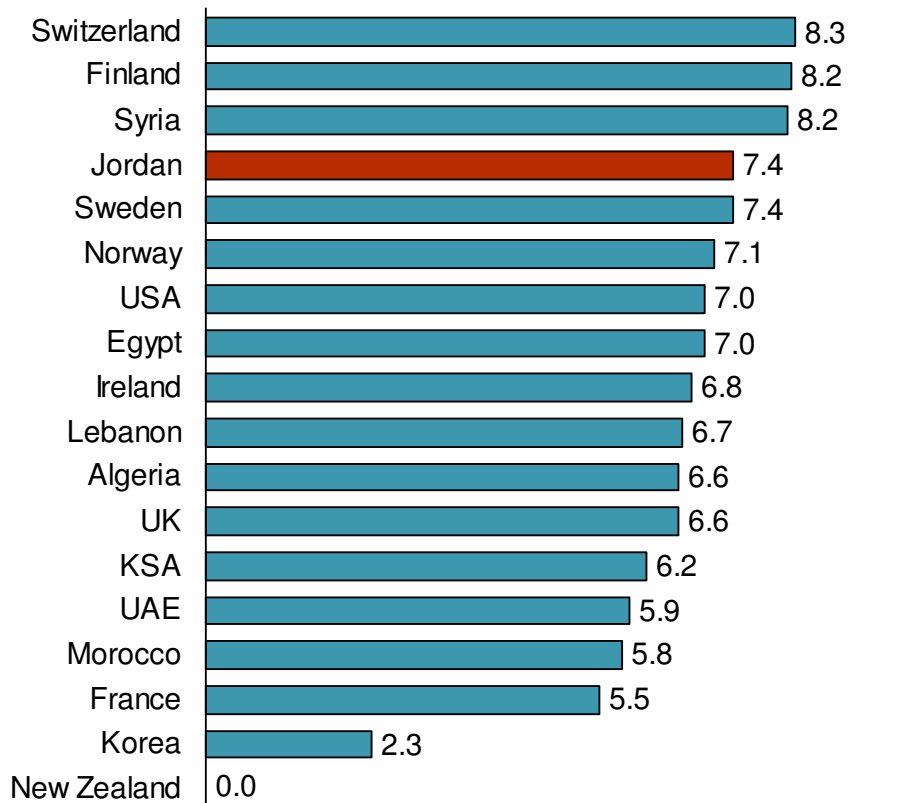
NOISE POLLUTION

According to the National Agenda, noise pollution does not seem to be a problem in most parts of the Kingdom.

NATURAL HERITAGE

BIODIVERSITY AND NATURAL RESERVES

According to the National Agenda and the Environmental Profile of Jordan 2006, The 2005 Environmental Sustainability Index ranks Jordan amongst the top-tier countries in terms of biodiversity (see figure below). Additionally, Jordan's protected areas (around 10,000 cubic kilometers of protected areas, of which 1,144 cubic kilometers are natural reserves), distributed across natural reserves, forests rangeland reserves, and national parks, are above world average, relative to its area.



After reviewing the Jordan's National Biodiversity Strategy and Action Plan and based on interviews with various experts on the subject, the following priority sectors under biodiversity and natural reserves surfaced.

Mining and Quarrying: Limestone aggregate quarry sites, mine dumping sites, and building stones quarry sites, especially in forest areas, such as Ajloun.

Phosphate: The impact of the phosphate company gypsum dump on marine life in Aqaba

Urbanization and real estate: the need for preserving biodiversity-rich areas through urban planning

Manufacturing: Due to the various environmental effects of the manufacturing sector that cut across many environmental themes, such as air pollution and hazardous waster, the biodiversity is indirectly affected especially in certain areas where industrial activity is common.

Biotechnology and bio-safety: Biotechnology: Local production and importing of biotechnological products, particularly genetically modified organisms must be regulated to reduce risks on biodiversity and human health.

Eco-tourism: The rapid and unplanned development of hotels and other facilities to support the industry has lead to significant environmental impacts; Jordan's weak planning and development is the main source of biodiversity loss. The country does not yet have an effective land use planning system and tourism development is usually based on random projects without reference to agreed national criteria or guidelines. Biodiversity is only considered within the framework of the project. Most aspects of tourism development at the site level are regulated by the Ministry of Tourism and Antiquities' Tourism Law which concentrates on the protection of antiquities, but it does not deal with the protection of important natural features like habitats and species. There is little awareness both within and outside the tourism industry of the environmental impacts of tourism and of different approaches like eco-tourism. The negative impacts of tourism on the biodiversity could be reduced if the basic principles of eco-tourism were adopted for all tourism developments. These basic principles are the protection of the resources, support for local communities and support for conservation. The Dana Nature reserve applies elements of eco-tourism which are currently being implemented in Azraq Wetland Reserve. Also, the Ministry of Tourism and ASEZA in cooperation with the RSCN has been implementing some principles of eco-tourism into Petra and Wadi Rum. In both sites, Management Plans were drafted to make provisions to safeguard the natural assets of the sites including their wildlife. The implementation of the Plans will be the main challenge because both sites have a long history of use and disagreements with local communities. Also, in many of these areas environmental degradation is severe.

Agriculture: As for the negative impact of agriculture, Jordan could learn from the "set aside" initiative in the UK, where approximately 20% of land each year is left untouched.

DESERTIFICATION

According to the National Agenda, over 90% of Jordan's area is composed of deserts, with low quantities of rainfall.

The National Strategy and Action Plan to Combat Desertification, published by the Ministry of Environment in 2006, outlined the following as the main causes of desertification:

1. Irrational Cultivation & Irrigation: The increasing demand led to the spread of cultivation to areas of low rainfall, which accelerated land degradation. In addition, the expansion of irrigated farming to areas with minimal water resources put the land under the risk of salinization³.
2. Overgrazing: Prolonged heavy grazing of land with low rainfall accelerates land degradation; it results in fewer, smaller and less nutritious plants. "Productivity of grazed semi-arid areas ranged from 11%-33% of the amount of vegetation produced by adjacent protected areas" notes the strategy.

On the other hand, a number of natural and induced processes cause desertification as well; the main causes are:

1. Degradation of the vegetative cover.
2. Water erosion.
3. Wind erosion.
4. Salinization.
5. Reduction in soil organic matter.
6. Accumulation of substances toxic to plants of animals.

The discussions conducted with key people in the field came up with the following main causes of desertification:

- Refineries.
- Petroleum industries.
- Heavy metals industries.
- Urbanization

Overall, industries that use furnaces and produce emissions are all causes desertification.

In this regards, The Ministry of Environment developed the Jordan National Strategy and Action Plan (NAP) with the main objective of highlighting desertification as a national priority in addition to outlining measures needed to combat desertification and mitigation effects of drought and misuse of land.

Furthermore, NAP includes six major programs, each of which includes a number of projects aiming at monitoring and controlling desertification. The programs are:

Table 6: NAP Main Programs and Projects

³ Salinization: the process by which a non-salty soil becomes salty, as by the irrigation of land with brackish water.

Programs	Projects	Estimated Budget
Desertification Information System (DIS)	Establishing a Desertification Database	US \$500,000
	Desertification Mapping	US \$1,000,000
	Public Awareness	US \$400,000
Drought prediction and desertification control.	Center of Drought Monitoring and Prediction (CDMP)	US \$4,000,000
	Assessment of Drought Impacts	US \$1,000,000
Capacity building and institutional development	National Training Programs in Desertification Monitoring and Control	US \$200,000
	Establishing a National Fund to Combat Desertification (NFCF)	US \$2,000,000
	Desertification Legal Framework for Monitoring and Development	US \$200,000
Restoration of degraded ecosystems of rangelands and forests	Community Based Rangeland Rehabilitation	US \$2,000,000
	Rehabilitation and Development of Forest Environment	US \$1,500,000
Watershed management	Documentation of Traditional Knowledge on Soil and Water Conservation	US \$200,000
	Artificial Recharge of Groundwater	US \$1,000,000
	House Roof Water Harvesting	US \$1,000,000 – Revolving Fund
	National Rainfall Water Harvesting Project for Agriculture Farming	US \$5,000,000 – Partially Revolving
	Use of Reclaimed Water for Greenbelt areas around villages and along roads in arid areas of Jordan	US \$200,000
Human, social and economic development initiatives	Modules of comprehensive training for communities	US \$1,000,000
	Integrated socio economic development of communities in the arid lands of Jordan	US \$5,000,000

DEAD SEA

Information regarding the Dead Sea could not be collected through the conducted discussion; however, according to the National Agenda, the Dead Sea level has been shrinking year after year since 1920, primarily due to the diversion of freshwater and high

rates of evaporation. (Note: water and wastewater management should be given high priority in the Dead Sea area especially for the agricultural sector)

MARITIME LIFE

Information regarding the maritime life could not be collected through the conducted discussion; however, according to the National Agenda, the threat to the Red Sea shore in Jordan is mainly caused by the following:

- Ships dispose of waste water without treatment
- Spills of minerals (e.g. Phosphate, Sulfur) and organic matter (such as grains) resulting from bulk cargo loading operations damage the coral reef
- Poor regulated resort development
- Sewage discharge into the gulf waters affects the water quality and also animal life
- Intensive concentrated port activity
- Over-fishing and lack of maritime control over fishing seasons and quantities
- Reef damage caused by the mounting number of divers, snorkelers and boaters who visit the reef areas

ASSESSMENT OF ENVIRONMENTAL THEMES AND PRIORITY SECTORS

This section attempts at compiling a panoramic view on the environmental themes and the priority sectors by incorporating the key findings of tens of concept papers, strategy documents, and environmental studies in addition to the important work of the National Agenda and the valuable input received from the executives of the Ministry of Environment and other specialists in the field.

However, it is important to note that the team of consultants has encountered difficulties in obtaining sector-based distribution statistics and/or a quantification of the main pressing environmental challenges. In fact, a comprehensive, quantified, sector-based statistics on environmental themes are lacking and the need to develop a data bank on this level is greater than ever.

The good news is this data deficiency is highly recognized by the Ministry of Environment as well as other stakeholders. Moreover, the Country Environmental Analysis (CEA)⁴ is currently underway to evaluate environmental priorities in Jordan. Upon finalization of the CEA and other similar efforts, we strongly recommend revisiting this assessment work to reflect new findings and supporting material. In fact, this assessment report should be considered a live document that is continuously updated and enriched by recent studies and investigations.

The following is a presentation of the documents and statistics that were resorted to throughout the course of this assignment followed by a final review of priority environmental themes and sector.

REFERENCES AND SUPPORTING STATISTICS

In addition to meetings held with different government officials and stakeholders (see table 1), a number of reports, studies, and concept papers were resorted to during the course of this assignment. The following are the references listed in alphabetical order.

⁴ CEA is a diagnostic analytical tool that helps to evaluate systematically the environmental priorities of client countries, the environmental implications of key government policies, and countries' capacity to address their environmental priorities. The aim of CEA is to provide the analytical underpinning for sustainable development assistance.

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7. Jordan Agenda 21: National Strategy for Environmental Education, Awareness and Communication, Jordan: UNDP, 1999
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24. The Royal Society for the Conservation of Nature, *The Jordan Fund for Nature: Summary of Strategic Management and Investment Plan*, Jordan: RSCN, May 2002.
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26. UNEP, *GEO-3 Integrating Environment and Development 1972 – 2002*, UK: Earthscan Publications Ltd., 2002.
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Aside from the meetings and the review of the references, the team of consultants reviewed the complaints and violations log compiled by the recently established “Inspection and Enforcement” Directorate. It is worthy to note that the Ministry of Environment is striving to strengthen its “control and command” function through this directorate. Moreover, the Ministry has recently established a hot line for civilians’ environmental complaints.

Tables 7 - 9 represent the number of complaints received by the Ministry, the number of warnings that are given to industries, workshops and other businesses and the total number of closures⁵ during the first half of 2007 respectively.

Table 7: Ministry of Environment - Directorate of Inspection & Enforcement

Complaints Summary Table 2007 / by location

	Location	Total	Industrial	Workshops	Agricultural	Services & Others
Action Taken	Deir Allah	1	-	-	-	1
No Action			-	-	-	-
Action Taken	Amman	53	11	10	5	16
No Action			1	-	-	10
Action Taken	Irbid	2	-	-	1	-
No Action			-	1	-	-
Action Taken	Zarqa	9	2	1	1	1
No Action			2	1	1	-
Action Taken	Fuhais & Mahis	2	1	-	-	1
No Action			-	-	-	-
Action Taken	Mafraq	0	-	-	-	-
No Action			-	-	-	-
Action Taken	Karak	1	-	-	-	-
No Action			-	1	-	-
Action Taken	Balqa	14	-	8	3	2
No Action			-	-	1	-

Source: Ministry of Environment, Inspection and Enforcement Directorate

Table 8 - Ministry of Environment - Directorate of Inspection & Enforcement

Summary Table of Warnings for 2007

		Total	Industrial	Workshops	Agricultural
Taken Action	Amman	42	10	9	1

⁵ Inspections take place upon receiving complaints, which are usually submitted by citizens. The violations are then identified as administrative-related issues, minor malpractices and serious ones. Minor malpractices are given a first warning of 21 days to fix the misconduct; if no action was taken within the warning period, a second warning is given to the organization; if after the second warning no action was taken, it will lead to closure of business. Serious malpractices on the other hand lead to immediate closure of the business.

No Action			5	16	1
Action Taken	Irbid	80	--	18	--
No Action			2	60	--
Action Taken	Zarqa	3	--	--	--
No Action			3	--	--
Action Taken	Mafraq	5	--	1	--
No Action			1	3	1
Action Taken	Zarqa	3	--	--	--
No Action			--	1	2

Source: Ministry of Environment, Inspection and Enforcement Directorate

Table 9: Ministry of Environment - Directorate of Inspection & Enforcement

Closures Summary Table 2007

	Industrial	Workshops	Agricultural	Others & Services
Deir Allah	-	-	-	-
Amman	5	1	-	-
Irbid	-	2	-	-
Zarqa	1	-	-	-

Source: Ministry of Environment, Inspection and Enforcement Directorate

As can be noted from tables 7-9, the complaints and violations database that house historical and comprehensive data is still at its infancy, which makes it difficult to assess the impact of different sectors on the various environmental themes. Additionally, the inspection function at the Ministry has been recently under the spotlight and is still undergoing an improvement stage. Therefore, the data presented in the above tables may not be indicative especially that current inspection visits only take place when complaints are received.

FINAL REVIEW

The "Analytical Review of Previous Environmental Strategies" report conducted in December 2005 highlights the current priority environmental themes based on a review of previous environmental strategies.

Listed below are the priority themes categorized as follows:

Environmental themes that top the priority list and were not achieved yet:

- Land management and urban planning

- Water resource management
- Energy
- Cultural and natural heritage
- Air pollution
- Environmental Impact Assessment (EIA)
- Public health
- Forest conservation
- Climate change
- Information management
- Waste management
- Local agenda in sustainable development

Environmental themes that top the priority list but a considerable amount of effort has been done to achieve them:

- Agricultural land management
- Coastal zone management
- Socio-economic programmes
- Capacity building
- Biodiversity and Conservation
- Education and awareness

Moreover, according to the Proposed National Environment Information Strategy prepared by the National Information Center in 1999, air pollution, water pollution, solid waste, and hazardous waste were highlighted as main environmental concern.

Based on this prioritization and the review of the afore-mentioned reference as well as the meetings conducted with the relevant stakeholders particularly the Ministry of Environment, the team of consultants summarized the main environmental priorities and priority sectors in table 10.

Table 10: Environmental themes, sub-sectors and pollutants

Environmental Theme	Sub-sectors	Causes
Pollution	Air	Petroleum refineries & Industries, power stations, mechanical works, electro-mechanical works, agriculture, transportation, municipal waste, industries using ovens and heat, establishments the type of fuel used in vehicles and the long-age of vehicles.

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	Water	Municipal waste, dairy and food sectors, battery producers (acidic water), pain industries, textile industries, metallic finish, over use of water.
Waste Management	Medical	Public Health Care Centers, Ministry of Health Hospitals, Private Hospitals, University Hospitals, Royal Medical Services.
	Solid	Industrial, household, commercial, agricultural.
	Hazardous/ Chemical waste	The Energy sector, uncontrolled combustion and waste incineration, the medical sector, the pharmaceuticals sector, Painting and electroplating, Transportation, Agriculture, hotels, households and hospitals.
Natural Heritage	Biodiversity/Natural reserves	Mining and Quarrying, phosphate, Urbanization and real estate, Manufacturing, Biotechnology and bio-safety, Eco-tourism, Agriculture.
	Desertification	Irrational Cultivation & Irrigation, Overgrazing, Refiners, Petroleum industries and heavy metals industries.

Source: Meetings/Interviews with key people in the environmental sector

POTENTIAL BENEFICIARIES

There was a general consensus amongst most interviewees regarding the potential beneficiaries that the fund should support and be directed to in which the majority focused on micro, small and then medium enterprises. From an economic point of view, the Jordan Environment Protection Fund should support enterprises with the highest impact at the lowest cost. Large industries can and should be able to self-fund and develop environmental friendly practices. The “polluter pays” principle should be forced on large polluting activities such as the petroleum refinery and waste water treatment plants.

Although NGOs are very valuable and active in the environmental sector, however, they represent the one and only target of the Global Environment Facility, GEF. That being the case, the SMEs are left out with no external financial resources to support them and the lack of self-funding ability to develop environmentally-sound practices.

Finally, Local authorities such as municipalities and the public sector in Jordan should also have their share of the fund.

INDUSTRIES

The following table represents the number of micro and industrial companies that are registered in the Chamber of Industry, grouped by sector. Each sector influences one or more environmental theme. As mentioned before, the majority of industries release emissions that affect the purity of the air. The mining and agricultural sectors, in specific, have a high impact on biodiversity. Food, leather and garments’ producers produce high amounts of waste that negatively impact the water resources.

Note however that the Micro enterprises in the following table refer to those who employ less than 10 Jordanian employees with a registered capital of less than 30,000 Jordanian Dinars; these enterprises constitute about 87% of the total number of enterprises in the Jordanian industrial sectors. Industrial enterprises on the other hand refer to those who employ 10 Jordanian employees or more with a registered capital of 30,000 Jordanian Dinars or more.

Unfortunately, the sectoral categorization that we could get hold of and which is represented in the table below is very broad and each sector represents a wide range of differentiated products; more detailed classification of the size of enterprises was not available either.

On a final note, we would like to add that the classification of companies according to type of pollution they cause is not available since the environmental themes were gathered from the

National Agenda and through the discussions conducted while the sectoral classification of establishments was collected from the Chamber of Industry. The potential beneficiaries in this case could be identified through relating the main environmental themes that need urgent solutions and the industrial activities which have negative impacts on these themes.

Table 11: Number of Companies in Each Sector

	Industrial	Micro	Total
Leather and Garments	244	864	1108
Therapeutics and Medical	53	46	99
Chemical and Cosmetics	188	207	395
Plastic and Rubber	116	151	267
Engineering, Electrical and IT	323	4053	4376
Furniture and Wooden	85	2556	2641
Construction	152	2002	2154
Food, Supplies Agriculture and Livestock	334	798	1132
Packing, Packaging, Paper, Carton and Stationeries	185	430	615
Mining	-	-	12
Leather and Garments	244	864	1108

LOCAL NGOS

A number of local NGOs, directly and indirectly involved with environmental issues in Jordan, came together in 2004 to form a union that would fight the severe environmental problems the country is facing from shortage of water, to pollution and habitat degradation. Today, several local NGOs are concerned and involved with environmental issues; their main focus is spreading awareness on the importance of environment protection, conducting studies, research and assessment of the environment, identifying pollution problems, developing solutions to these problems and preserving natural, archeological sites, marine and wild life.

There are about twenty five NGOs that are concerned with environmental issues; however, these NGOs are in need of special attention towards developing their institutional and

human resources capacity in order to handle their environmental friendly projects. Table 10 names just a few of these NGOs.

Table 12: Local NGOs

Name	Mission
<p>Royal Scientific Society (RSS)</p> <p>Tel: 962 6 534 4701 rssinfo@rss.gov.jo www.rss.gov.jo</p>	<p>RSS is the largest applied research institution, consultation and technical service provider in Jordan. The Environment Research Center (ERC) at the RSS specializes in environment research, assessment and protection, and provides technical services and consultation.</p>
<p>Royal Marine Conservation Society of Jordan (JREDS)</p> <p>Tel: 962 6 567 6173 information@jreds.org www.jreds.org</p>	<p>JREDS contributes to the conservation and sustainable use of the marine environment in Jordan through conservation programs, advocacy, education, outreach and empowerment.</p>
<p>Royal Society for the Conservation of Nature (RSCN)</p> <p>Tel: 962 6 533 2528 www.rscn.org.jo</p>	<p>RSCN seeks to conserve wildlife and natural habitats. Thus, integrating conservation with economic development, while promoting wider public support for the protection of natural environment.</p>
<p>National Environmental Wildlife Society (NEWS)</p>	<p>NEWS engages in activities concerning protection of the environment, wildlife issues and promotion of sustainable development. NEWS consists of a team of volunteers who create, refine and disseminate environmental knowledge to help policy-makers and the general public protects the environment and wildlife and manages the usage of natural and environmental resources.</p>
<p>The Society for Combating Desertification & Badia Development</p>	<p>JSDCBD aims at conducting studies and researches concern with the desertification phenomenon and propose solutions. Moreover, the society executes awareness raising activities addressing community at large to fight this problem. The society also works to assist in improving the natural environment of Jordanian badia and develop the livestock and rangelands.</p>

<p>Jordan Environment Society</p> <p>Tel: 962 6 569 9844</p> <p>jes@jes.org.jo</p> <p>www.jes.org.jo</p>	<p>JES works towards promoting environmental awareness and the adoption and application of policies, standards and procedures to protect the Jordanian environment and control pollution within the framework of the National Environment Strategy; in addition, it identifies the environmental pollution problems and participates in finding solutions to them.</p>
<p>Friends of Environment Society</p> <p>Tel: 962 6 551 4430</p> <p>www.foe.org.jo</p>	<p>Foe society members volunteers interested in encouraging the younger generation to take an active part in conserving and improving their natural environment. The society focuses on encouraging, the private sector to become more aware of its environmental responsibilities; FoE is funded by donations from the private sector, individuals, national and international organizations as well as membership fees.</p>
<p>Arab Group for the Protection of Nature</p> <p>Tel: 962 6 567 3331</p> <p>info@apnature.org</p> <p>www.apnature.org</p>	<p>APN protects the natural and human resources in Arab countries by initiating campaigns and plans, implementing projects, supporting and partaking in efforts to achieve this goal and spreading awareness of the degradation of the environment caused by acts and practices committed during wars and occupations; in addition it seeks to enhance capacities of Arab civil societies to actively engage in international debates on environmental issues.</p>
<p>Shajarah</p> <p>Tel: 962 79 555 5150</p>	<p>Shajarah is a newly-established NGO that maintains existing forests in Jordan, and replenishes lost ones; in addition, Shajrah enhances the areas planted by forest trees and spreads the awareness amongst the Jordanian community on the importance of forests and ecological balance.</p>
<p>Jordan Badia Research and Development Centre</p> <p>Tel: 962 6 533 5284</p> <p>info@badia.gov.jo</p> <p>www.badia.gov.jo</p>	<p>BRDC was established in 1992 with the purpose of developing and conserving the Jordanian semi-arid area of Badia and the natural resources; in addition, BRDC looks into improving the quality of life for the Badia inhabitants.</p>

LOCAL AUTHORITIES

Local authorities in Jordan have limited institutional, financial, and human resource capacity and are in dire need for help if they are to engage in environmental projects. As an example, the election of Petra as one of the world's seven wonders will pose a challenge for the Petra Municipality for combating the environmental pollution that will arise from the increase in numbers of visitors and tourists to the area. It is also worthy to note that the municipal waste

is a major contributor to both air and water pollution and municipalities have a major role in devising environmentally sound projects in this regard.

PUBLIC INSTITUTIONS

Similar to local authorities, public institutions require assistance in increasing its institutional and human resource capacity in order to manage and implement environmental projects. As an example, the public health centres, which cause about 40% of the medical waste, are in need of assistance to be able to manage and implement relevant projects.

MINISTRY OF ENVIRONMENT REVENUE STREAMS

During the phone discussion with Mr. Essam Faqir, Director of Financial Services at the Ministry of Environment, Mr. Faqir indicated that the revenue streams for the Ministry of Environment are similar to those of other public institutions. The main source of funding is the licensing fees for different purposes around the Kingdom. These fees are deposited into the Central Bank of Jordan's domestic revenue account. The second source of revenues deposited into this account by the Ministry of Environment is the fees paid by establishments for environmental violations; these fees are not held by the Ministry of Environment but rather are included in the domestic revenue account. On monthly basis, the Ministry of Environment estimates the value of its monthly expenditure, just like any other public institution, and is given that amount as long as it does not exceed its quota specified by the Ministry of Finance.

On the other hand, revenues from projects, grants, donations and awards given to the Ministry of Environment by internal and external organizations are not included in the Ministry's external budget but rather held by the Ministry itself, after approval from the cabinet regarding the source of these funds. One example of these funding streams is the environmental friendly projects that aimed at minimizing the amount of polluting gases.

Following the climate change convention, the Ministry of environment proposed projects that are related to minimizing the amount of gases/chemicals. Perspective investors approached the ministry with their offers/bids where the highest bidder would take on the project.

- An average of 5 – 6 projects is conducted yearly on a five year period.
- Examples of projects are: (1) a protocol to minimize carbon dioxide; to implement the project, developed countries helped developing countries get rid of carbon dioxide; the project returned 1.4 million euros. (2) Using Methane for electricity; a project that returned 22 million euros.
- 15% of the amount was fees that were transferred to the Environment protection fund. This was not included in the Ministry's budget. (Was purely used for environment protective projects. The total return from all projects is estimated at 150 million euros; 22.5 Million of which are designated towards the Environment fund.⁶

⁶ Meeting with Eng. Hussein Badarin – Director of Monitoring and Assessment, Climate Change Focal Point – Ministry of Environment - Wednesday, July 4th, 2007

APPENDIX

Annex I – Minutes of Meeting

1. Meeting with Mr. Yahya Khaled – Director General of the Royal Society for the Conservation of Nature – RSCN

Monday, July 2, 2007

Al Jidara team opened the discussion by giving a brief about SABEQ (A one-page briefing about SABEQ was handed out to the interviewee) and stating the purpose of this assessment and this meeting in particular.

Being the area of his specialization and interest, Mr. Yahya Khaled focused the discussion on biodiversity, in addition to a talk about the Global Environment Facility, GEF.

Mr. Khaled began the discussion with nothing the three main sectors that have the highest negative impact on biodiversity and landscaping which are mining, real estate and agriculture. Although there have been no studies to qualify the negative impact of these main sectors on biodiversity, Mr. Khaled believed that the mining sector has highest negative impact on biodiversity.

Noting that the agricultural activities also impact biodiversity, Mr. Khaled suggested learning from the “set-aside” initiative that is implemented in the UK, where approximately 20% of land each year is left untouched. Mr. Khaled also suggested establishing a positive incentive that will both minimize the pollution and increase the positive effects

Mr. Khaled then discussed the relevant initiatives such as the Global Environment Facility, GEF, and the Jordan Fund for Nature.

The Jordan Fund for Nature is a trust fund that concentrated on not diluting the funds in administrative and operational financing but rather help RSCN perform its projects and programs and avoid conflict of interests; the capital for the fund was a grant from the USAID which was invested according to an investment strategy in bonds, stocks and projects that do not have any sort of influence on biodiversity; the return was used to support projects protecting biodiversity.

GEF on the other hand was established as a result of the earth summit in 1993 as a mechanism to assist countries in complying with the summit conventions. Mr. Khaled indicated that GEF was concerned in various areas of environment protection such as biodiversity and climate change, among others, and funded NGO's projects only. GEF was divided into three categories according to the value of the fund as follow:

- Small GEF, with maximum of 50,000 dollars per project.
- Medium GEF, with maximum of 1,000,000 dollars per project.
- Large GEF, with projects valued more then 1,000,000 dollars.

Mr. Khaled added that there is a national steering committee which receives an annual budget of 500,000 dollars and decides where to direct the funding after examining proposals submitted by local NGOs.

2. Meeting with Mr. Raouf Dabbas – Prime Ministry Advisor – Ministry of Environment

Monday, July 2, 2007

Al Jidara team opened the discussion by giving a brief about SABEQ (A one-page briefing about SABEQ was handed out to the interviewee) and stating the purpose of this assessment and this meeting in particular.

Mr. Raouf Dabbas highlighted a number of issues during the discussion; He commenced the discussion with sectors and issues that are in urgent need of support. Mr. Dabbas indicated that priorities should be divided to short, medium and long term priorities. An example of short term priorities is damage control which should be dealt with urgently to minimize the harm caused. Long term priorities on the other hand should concentrate on intangibles, such as enhancement of the educational system and spreading awareness amongst the youth to empower them with research and development skills; moreover, Mr. Dabbas noted that support and awareness should also be done on individual basis to support those motivated individuals who are capable of making a difference and to help create a self-sustained model.

On an environmental level, Mr. Dabbas outlined the main polluting sectors in Jordan and arranged them in the following order, starting with the ones having the highest impact on purity of the environment:

1. Waste management (municipal and industrial), which impact air quality and underground water.
2. Transportation
3. Industry.

The discussion with Mr. Dabbas then focused on a number of agreements and projects that were concerned with the protection of the environment. The following is a briefing of the projects highlighted by Mr. Dabbas:

- **IDB-KFW Agreement:**

The Industrial Development Bank, IDB, signed an agreement in 1995 with the German bank “Kreditanstalt Für Wiederaufbau”, KFW, to grant between 6 – 8 million dollar loans for environment-related projects; Friends of Environment (NGO), along with certified consultants, was responsible for assessment of projects proposed to the banks. The project however did not fully accomplish its ideal goals when the bank, being a financial institution, approved of funding projects that were financially feasible regardless of the environmental friendliness of the projects; the project lasted for about seven years and ended in 2002.

- **Jordan Cleaner Production Agreement – JCPP:**

In 2002, the United Nations Development Program, UNDP, and the United Nations Industrial Development Organization, UNIDO, initiated the cleaner production project in order to create awareness projects, perform energy audit and in-plant assessments and grant certifications. This project was targeting small and medium enterprises in Jordan. On a financial aspect, an agreement was signed with Tatweer who took the lead in funding the project. On the technical level however, Mr. Dabbas discussed the system developed for inspections regarding the violations committed by enterprises; after inspection, violations are identified as administrative, minor and serious. Serious violations led to closure of business while establishments

committing minor violations were given twenty one days for amending the malpractice; to help improve these businesses, the violators are provided with a list of certified consultants who are specialized in the field.

Mr. Dabbas concluded the discussion with noting that the Ministry of Environment is currently working on the “State of Environment” in Jordan; in addition, Mr. Dabbas suggested specifying an amount of the Jordan Fund for Protection of Nature to the benefic of the King Abdullah award that is presented to companies who perform environmental actions and show prove environmental competence.

Kindly, Mr. Raouf Dabbas provided us with supporting documents and publications that were of benefit to the report, such as the National Biodiversity Strategy and Action Plan.

3. Meeting with Dr. Mohammad Khashashneh – Director of Waste and Hazardous Substances Management - Ministry of Environment Monday, July 2, 2007

Al Jidara team opened the discussion by giving a brief about SABEQ (A one-page briefing about SABEQ was handed out to the interviewee) and stating the purpose of this assessment and this meeting in particular.

Mr. Mohammad Khashashneh focused in his discussion on the hazardous waste and substances in addition to other kinds of waste.

Mr. Khashashneh started the discussion with differentiating between hazardous waste and hazardous substances. Hazardous substances are the chemicals and products that are considered harmful and dangerous; hazardous waste on the other hand is the product and residual of manufacturing and processing hazardous substances. The impact from chemical and hazardous waste is relatively high, indicated Mr. Khashashneh.

Mr. Khashashneh named Bromine, Phosphate, Pesticides and Pharmaceuticals as being the most popular hazardous substances in Jordan; in addition, medical waste, such as x-ray sheets, is also considered hazardous waste and is in need of proper management due to its high impact; moreover, Mr. Khashashneh noted that two authorities in Jordan are designated to watch over the amount of these substances; the Ministry of Health was concerned with the amount of chemicals and the Ministry of Agriculture was concerned with the amount of pesticides. Nevertheless, there is still a gap in the system governing hazardous waste which makes their harm relatively high.

Next, Mr. Khashashneh spoke about Persistent Organic Pollutants, POPs, which include hazardous waste and hazardous solids; in this regards, he kindly provided us with the POPs-NIP report which added valuable data to the report.

In terms of international conventions and agreements, Mr. Khashashneh slightly mentioned the Prior Informed Consent – National Implementation Plan, PIC-NIP, which deals with chemicals and pesticides in terms of trade; in addition he mentioned the Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal and the Strategic Approach to International Chemical Management, SAICM, which includes eleven different agreements and protocols and which agreed that it should concentrate on industrial chemicals and pesticides in Jordan.

Next, Mr. Khashashneh discussed solid waste, which include non-hazardous waste as well, and is relatively less harmful than hazardous waste and have a lower impact on purity of the

environment; however, solid waste is more spread in Jordan and therefore has a higher impact when measured by quantity rather than effect. In this manner, Mr. Khashashneh noted that approximately one kilogram of solid waste is produced daily by each person in Jordan. The Ministry of Environment is working on a “segregation at source” program which will facilitate the process of dealing with solid waste.

Mr. Khashashneh indicated that the sources with the highest environmental impact from solid waste is as follows: Industrial, household, commercial, agricultural; however, the sources are arranged differently when discussing the need of dealing with these sectors where the agricultural and household sectors stand as a priority followed by the industrial then commercial sectors.

As a general note, Mr. Khashashneh mentioned two approaches to environment-friendly practices, the Best Available Practice, BAP, and the Best Environment Practice, BEP. The BAP depends on the industry dealt with while the best environment practice depends on the substances dealt with.

4. Meeting with Dr. Bassam Hayk – Director of the Environmental Research Center – RSS

Tuesday, July 3, 2007

Al Jidara team opened the discussion by giving a brief about SABEQ (A one-page briefing about SABEQ was handed out to the interviewee) and stating the purpose of this assessment and this meeting in particular.

Dr. Bassam Hayk commenced the discussion with pointing out that funding should be directed towards small and micro enterprises who cannot afford environment-friendly theme; medium enterprises on the other hand can afford to be compliant; large enterprises and establishments such as phosphate and potash can and should be self-funded. With regards to small and micro enterprises, funding should be directed to those with the highest impact on their surrounding communities.

Dr. Hayk then talked about solid waste where he indicated that part of the fund should be directed towards some municipalities for solid waste. Within the context of solid waste, Dr. Hayk indicated that QIZs are environmentally unsound and face major health and safety issues; something has to be done towards CSR (Corporate Social Responsibility). He also indicated that some levels of solid waste are considerably higher outside the capital Amman.

The following table, illustrated by Dr. Hayk, represents the level and/or sector of funding for NGOs, municipalities, and micro, small and medium enterprises.

NGOs	Municipalities	Micro	Small	Medium
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<p>- Should take a role in municipal CBO (Community Based Organization) to solve the communities' problem. NGOs are also cross-cutting between all other categories.</p>	<p>- Solid waste – start from household to landfill</p>	<p>- Fund 100%; work on health and safety issues in specific. - Food Processing; Electromechanical workshops.</p>	<p>- Fund 30%.</p>	<p>-Fund 15-20% as a push for the enterprises to create an environmental-friendly business. (co-funding). These are the highest with hazardous waste, industrial waste water and air pollution.</p>
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With regards to SMEs, Dr. Hayk indicated that metallic finish workshops and industries, paint industries, textile industries, in specific, QIZ and food processing industries have a high impact on water consumption and purity. On average, SMEs use up about 600 cubic meter of water per day, on other words, they produce high amounts of industrial waste water in addition to the high water consumption. Dairy and food sectors in specific cause major waste water in addition to misuse of water.

Dr. Hayk emphasized on the fact that textiles, especially in the QIZ, use clean waters in production and produce high amounts of waste water; in addition battery produces (car batteries) produce acidic water.

As a solution, Dr. Hayk indicated that waste needs to be minimized during production rather than coming up with post-production solutions/waste treatment.

Moving to air pollution, Dr. Hayk noted that air pollution is low-medium in Jordan; however, it is considered to be medium-high in certain areas only, such as Hashmeyeh/Zarqa.

Air pollution is mainly caused by the following industries:

1. Mechanical and electro-mechanical producers (large industries) who use boilers and ovens have a high impact on air pollution.
2. Power stations (electricity) ex. Old Hussein powerplant, also have a relatively high impact on air pollution.
3. Waste water treatment (Al-Samra)
4. Transportation.

Dr. Hayk ended the discussion by briefing out the IDB-KFW fund which provided soft loans from the bank after environmental consultation.

5. Meeting with Dr. Ra'fat Ahmad – Director of Industrial Chemistry Research Center – RSS

Monday, July 3, 2007

A very brief discussion was held with Dr. Ra'fat Ahmad where Al Jidara team opened the discussion by giving a brief about SABEQ (A one-page briefing about SABEQ was handed out to the interviewee) and stating the purpose of this assessment and this meeting in particular.

From his experience in the Industry Chemistry Research, Dr. Ra'fat Ahmad believed that the funds should target large industries and industrial zones which are dangerously harming the purity and cleanliness of the environment, being water or air pollutants. Dr. Ahmad indicated that the pharmaceutical industry waste and the medical waste is a major pollutant and has a high negative impact on the environment. 20% of the residual of x-ray sheets that are disposed in water are hazardous.

6. Meeting with Dr. Zaki Ayoubi – Director Management – Jordan Chamber of Industry Monday, July 3, 2007

Al Jidara team opened the discussion by giving a brief about SABEQ (A one-page briefing about SABEQ was handed out to the interviewee) and stating the purpose of this assessment and this meeting in particular.

The Discussion with Dr. Zaki Ayoubi focused on the role of the Chamber of Industry and its sectoral and geographical divisions.

Dr. Ayoubi commenced the discussion by outlining the Chamber's main objectives, which are:

1. The participation in formulation of industrial policy through advocating for the industry laws to be conducive to businesses in Jordan.
2. The participation in reviewing laws and draft laws in addition to working towards industrial development.

Dr. Ayoubi mentioned that approximately 35,000 industrial establishments exist in Jordan; 96% of which employ less than 10 people. Kindly, Dr. Ayoubi provided us with "A Study on the Jordanian Industrial Sectors" that includes statistics on the number of establishments in each sector.

Dr. Ayoubi noted that the Chamber of Industry divides the industry to ten sectors depending on raw material and particularity of technology; in addition, the chamber of industry divides the industry into eight geographical chambers. In enforcing laws, geographical areas should be taken into consideration, as well as the environment in each area. The amount of waste allowed in one area could be harmful in another, i.e where water sources and residential areas are found. In conclusion, technology, location and size of industrial activity should all be taken into consideration upon enforcement of environmental laws.

Dr. Ayoubi noted that unfortunately the chamber does not have any kind of assessment for environmental risk or scientific documents regarding assessment of industries' compliance with the environment laws.

As a final note, Dr. Ayoubi suggested that funding and resources should be directed towards SMEs and supporting sustainable environment without destroying SMEs, in other words, funding feasible solutions to the problem rather than closure of establishments.

7. Meeting with Eng. Hussein Badarin – Director of Monitoring and Assessment, Climate Change Focal Point – Ministry of Environment

Wednesday, July 4th, 2007

Al Jidara team opened the discussion by giving a brief about SABEQ (A one-page briefing about SABEQ was handed out to the interviewee) and stating the purpose of this assessment and this meeting in particular.

During the discussion, Eng. Hussein Badarin talked about the main environmental themes, the causes of air pollution and a number of suggested solutions.

The main environmental themes that need to be addressed are air pollution followed by water pollution and solid waste.

In terms of water saving and protection, Eng. Badarin discussed the influence of climate change on agriculture and agriculture on water. The constant change in climate and global warming affects agricultural activities; for example, instead of planting certain types of fruits in the Jordan valley, the weather change should be taken into consideration and therefore planting these fruits in areas where the environment is more suitable (since the temperature is in constant increase); this will save water that could otherwise be wasted when planting in areas that were once suitable but are now too hot.

- Polluted water should be both treated and reused.

Next, the discussion was diverted to talk about air pollution. Eng. Badarin pointed out Zarqa, Hashmi, Central Amman, Phosphate Mines and Fuhais as hot spots of air pollution that need major action and support.

The main causes of air pollution are as follows:

1. Type of fuel used in Jordan is high in air pollutants; the sulphur level in diesel is 28 times more than national standards and 35 times more than the average global level; although the country is moving towards the usage of unleaded gas, however, a very high number of vehicles use diesel, in other words, using unleaded gas will solve part of the problem but not all.
2. Old vehicles around the Kingdom have a major negative impact on the levels of pollution.
3. Maintenance and mechanical workshops in Jordan; the majority use low-quality material and substances that have a negative impact on the environment; in addition to the infrastructure that is barely maintained.

Eng. Badarin ended the discussion with pointing out two solutions that have been done by the ministry in order to enhance the environment in Jordan.

1. Following the climate change convention: the Ministry proposes projects that are related to minimizing the amount of gases/chemicals. Perspective investors approach the ministry with their offers/bids; the highest bid takes up the project. An average of 5 – 6 projects is conducted yearly on a five year period. Examples are: (1) a protocol to minimize carbon dioxide; to implement the project, developed countries helped developing countries get rid of carbon dioxide; the project returned 1.4 million euros. (2) Using Methane for electricity; a project that returned 22 million euros. Eng. Badarin pointed out that 15% of the amount was fees that were transferred to the Environment protection fund. This was not included in the Ministry's budget and was purely used for environment protective projects. The total return from all projects is estimated at 150 million euros; 22.5 Million of which are designated towards the Environment fund.
2. On a small level, periodical projects of groups of students cleaning forests and spaces of land.

On the other hand, Eng. Badarin suggested two solutions that could be done on a small level but will however have a high impact if implemented:

1. Segregation at source.
2. Adding a minor percent of commodity costs (such as bottles of water and cans of soda) and returning the amount to the consumer upon return of the solid waste (cans and bottles).

8. Meeting with Eng. Adnan Zawahreh – Director of Inspection and Enforcement - Ministry of Environment

Wednesday, July 4th, 2007

Al Jidara team opened the discussion by giving a brief about SABEQ (A one-page briefing about SABEQ was handed out to the interviewee) and stating the purpose of this assessment and this meeting in particular.

As Director of Inspection and Enforcement, Eng. Adnan Zawahreh focused the discussion on inspection and violations in addition to a number of remarks regarding air pollution in Jordan.

Eng. Zawahreh commenced the discussion by pointing out that air pollution is in major need of problem-solving because it is inescapable and cannot be avoided or replaced.

The following are the main causes of air pollution indicated by Eng. Zawahreh:

1. The highest causes of air pollution are establishments such as quarries, handicrafts and construction; establishments have a high impact since the majority is located in residential areas.
2. The second major cause of air pollution is Industrial activities and petroleum refineries. Eng. Zawahreh pointed that although industrial zones are higher in risk than other establishment, but there is awareness on the risks and dangers of these zones. The fact that industrial zones are now located in certain areas only has minimized their effect.
3. Agriculture is the third major cause of air pollution causing the pollution by the pesticides and other chemicals used in agricultural activities.

Eng. Zawahreh then pointed out the hot spots of air pollution being Zarqa and Hashmeya, i.e where Al Hussein Energy Station, Samra treatment plant and the petroleum refinery are located.

The discussion was then diverted to the other topic, that being the inspection system at the Ministry of Environment. Eng. Zawahreh indicated that inspections take place upon receiving complaints and not on random basis; complaints are usually from the residents of area where the malpractice or violation occurs; major complaints are received about the sewage system especially in Zarqa and water treatment plants.

Eng. Zawahreh also noted that the Ministry of Environment's limited budget does not provide the inspection department with the required expertise, and qualified people; in addition, inspection field work requires more advanced technologies, resources and tools that are not available. The fact that inspectors do not have protection utilities limits their ability to inspect accurately and come up with precise conclusions. The estimated budget needed for inspection utilities is 100,000 – 150,000 Jordanian Dinars.

Kindly, Eng. Zawahreh provided us with data regarding the total number of inspections, warning and closures for the year 2007; data by sector or type of violation where not available.

9. Meeting with Eng. Hussein Shaheen – Director of Nature Protection – Ministry of Environment

Wednesday, July 4th, 2007

A brief discussion was held with Eng. Hussein Shaheen where Al Jidara team opened the discussion by giving a brief about SABEQ (A one-page briefing about SABEQ was handed out to the interviewee) and stating the purpose of this assessment and this meeting in particular.

Eng. Hussein Shaheen commenced the discussion with noting that he believes the environment fund should be a national fund that is used for training and workshops for the Ministry of Environment staff and provide capacity building and spread awareness to the public; we believe there is a misconception regarding the main target of the fund and should be dealt with through spreading awareness of the purpose of this fund.

Eng. Shaheen then pointed out the urgency of helping the Zarqa area which is in high danger and is described as a “hot spot”. Zarqa is a “degraded ecosystem” with its quarries and phosphate hills.

Next, Eng. Shaheen indicated that the main causes of desertification are refineries, petroleum industries, and heavy metals industries, all of which cause waste water as well. In addition, all industries with emissions and smoke are causes of desertification.

10. Meeting with Batir Wardam – Environmental Claim Unit – Ministry of Environment

Wednesday, July 4th, 2007

Al Jidara team opened the discussion by giving a brief about SABEQ (A one-page briefing about SABEQ was handed out to the interviewee) and stating the purpose of this assessment and this meeting in particular.

Mr. Batir Wardam commenced the discussion with noting that financial resources should be used for “debt for environment swap” – rescheduling for debt to environmental projects. Mr. Wardam slightly mentioned the JCPP and IDB-KFW programs.

Mr. Wardam then discussed environmental themes; he believed that some environmental themes, such as the water sector, are financially supported by certain national and international donors and therefore are in no need of directing any funding. As top priority, Mr. Wardam suggested that funding should be directed to support the following sectors:

- Recycling and solid waste separation.
- Air emissions through providing filtering systems and improving the air quality.
- Industrial water through improving technologies that would allow the reuse of the water.

On the other hand, Mr. Wardam also pointed out that technology transfer that is suitable for the environment and desertification need financial support as well.

As a final note, Mr. Wardam indicated the lack of environmental projects such as a sector-based distribution for environmental impact.

11. Meeting with Mr. Malek Kabariti – President of National Energy Research Center (NERC)

Thursday, July 5, 2007

Al Jidara team opened the discussion by giving a brief about SABEQ (A one-page briefing about SABEQ was handed out to the interviewee) and stating the purpose of this assessment and this meeting in particular.

Mr. Malek Kabariti commenced the discussion with pointing out the on-going discussion regarding combining both the energy fund and the environment fund into one fund due to common benefits and goals of both. Mr. Kabariti then spoke about the energy fund which included two levels, the first of which was a primary energy audit that was done at no cost; the second level was a detailed energy audit that was done at a specified cost; once the detailed audit proved feasibility of the project, the project is given a soft loan that could reach up to 60% of the cost of the project.

The discussion was then diverted to talking about the sectors with the highest impact on energy waste being transportation, industrial, domestic accommodation and water pumping. The following is a summary of the points proposed by Mr. Kabariti regarding each sector.

Transportation:

- 31% to 36% of the fuel in Jordan goes to the transportation sector.
- The decrease of import tax on large vehicles and the increase of import tax on small vehicles are increasing the pollution and the excessive use of energy by vehicles.
- Mr. Kabariti's proposed solution: The case of European law where tax is imposed according to how much CO₂ the vehicle ommissions.

Industrial sector:

The industrial sector also includes the commercial sector such as hotels. This sector needs significant energy audit in order to improve the energy consumption.

Domestic accommodation:

- The energy amounted 26% of the GDP in 2006; Mr. Kabariti noted that 29% of that energy is consumed as fuel and electricity in households.
- The government of Jordan has to impose regulations and methods to save energy such as insulation, lighting and type of windows used; in addition, the domestic use of energy is in urgent need of enforcing the building codes of Jordan that was approved in 2004 (Law No. 7).

Water pumping:

- Mr. Kabariti indicated that water pumping consumes over 16% of the energy.
- Almost every house in Jordan has a water pump to pump water during the week; in this regards, NERC proposed a study to the Ministry of Water and Irrigation that can save up to 50% of the energy used for water pumping.

Minutes of Meeting:

Phone discussion with Mr. Essam Faqir – Director of Financial Services

Thursday, July 12, 2007

A phone discussion was held with Mr. Essam Faqir where Al Jidara team opened the discussion by giving a brief about SABEQ and stating the purpose of this assessment and this meeting in particular.

During the phone discussion with Mr. Essam Faqir, Director of Financial Services at the Ministry of Environment, Mr. Faqir indicated that the revenue streams for the Ministry of Environment are similar to those of other public institutions. The main source of funding is the licensing fees for different purposes around the Kingdom. These fees are deposited into the Central Bank of Jordan's domestic revenue account. The second source of revenues deposited into this account by the Ministry of Environment is the fees paid by establishments for environmental violations; these fees are not held by the Ministry of Environment but rather are included in the domestic revenue account. On monthly basis, the Ministry of Environment estimates the value of its monthly expenditure, just like any other public institution, and is given that amount as long as it does not exceed its quota specified by the Ministry of Finance.

On the other hand, Mr. Faqir indicated that revenues from projects, grants, donations and awards given to the Ministry of Environment by internal and external organizations are not included in the Ministry's external budget but rather held by the Ministry itself, after approval from the cabinet regarding the source of these funds. One example of these funding streams is the environmental friendly projects that aimed at minimizing the amount of polluting gases.

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