Protecting Ground Water

Strategic Master Plan

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Executive Summary

The contamination of groundwater, which is a principal source of drinking water, is a serious health and environmental problem in many areas of the world.

It is generally acknowledged that the underlying rock and soils can act as a filter for a number of pollutants, thus preventing most of the pollutants reaching the aquifers. However, inadequate disposal of effluent and solid waste, improper agricultural and industrial practices will have a detrimental effect on the groundwater quality. Most of the groundwater pollution is human induced.

Therefore, it is of utmost importance to identify potential threats to the groundwater and apply preventive mitigation measures to minimize the pollution of the groundwater, thus minimizing the health hazards.

Currently EcoPeace Middle East is in the process of implementation of the Protecting Groundwater Project funded by the European Union through ENPI CBC MED program. The project is being implemented in the three neighboring countries Jordan, Palestine and Israel. The objective of this project is to enhance the capacities of the municipal staff in dealing with the groundwater pollution. Through the previous stages the Hazard Reduction and Prevention (HRP) guidelines and the audit report of current state of environmental hazards to groundwater were developed which provide a systematic approach for reduction and prevention of groundwater pollution. Based on the developed audit report a strategic Master plan and detailed plans are required to be developed.

The current report provides description of legislative and institutional frameworks. Existing statutory regulations in regards to environmental protection, including groundwater protection and regulations for prevention of the potential pollution of the groundwater resources provide tools for monitoring and preventing groundwater pollution. Therefore, actions in the implementation plans should be in compliance with the legislative and regulatory requirements. The desk study was conducted in order to assess the legal framework for the implementation plans.

Also, a number of institutions are involved in regulating the groundwater issues. In some cases jurisdictions of different institutions overlap and in other cases different institutions address different aspects of the same issues without proper coordination between them. The institutional framework is assessed. Hierarchy, roles and responsibilities of relevant institutions are described.

Through the assessment of the participating municipalities, it has been discovered that there is little or no awareness on the relationship between the human activities and potential hazards to the groundwater resources. Consequently, there are no established protocols for addressing the potential hazards and no specialized unit for dealing with such issues. In order to institutionalize
the groundwater protection in municipalities, the consultant has provided recommendations to establish the following:

- Red-Line and Red-Alert protocols to handle different types of hazards: the criteria for identification of Red-Line and Red-Alert situations
- Hazard Management Protocols: including monitoring, inspections and enforcement schemes and the material, HR and financial requirements.
- Establishment of a Hazards Reduction and Prevention (HRP) Manager position/unit in the municipalities.

For the existing and planned activities that might have a significant negative impact on the groundwater, Red Line and Red Alert protocols are suggested.

The following criteria are suggested:

- Scale/area of the activity;
- Severity/Hazard Index;
- Probability of its occurrence;
- Duration of the activity;
- Location (e.g. in high risk areas)

The values will be assigned for each criterion, and the summary values of them could be considered either as Regular, or Red Line and Red Alert Protocols. The activities identified as Red Line and/or Red Alert will require more frequent monitoring and strict enforcement of relevant regulations.

The consultant has prepared the generic Master Plan based on holistic approach applicable to the whole area.

The generic Master Plan has been customized and adopted for each individual municipality, identifying the specific issues for each community, based on the Audit Report findings.

The strategic action plan is prepared in the form of the Log Frame Analysis (LFA). The LFA is an analytical process and set of tools used to support project planning and management. It provides a set of interlocking concepts which are used as part of an iterative process to aid structured and systematic analysis of a project or program idea.

The following matters were taken into consideration while preparing the Master Plan:

- Inadequate involvement of the relevant Ministries in the groundwater protection in the Jordan Valley. Although Jordanian Government has made a significant effort towards the decentralization of the government, however, most of the governance issues are still highly centralized. Therefore, the involvement of the line Ministries are crucial for the implementation of the Action Plan;
• At present, the financial situation of the Jordan Valley Municipalities is quite desperate: the funding from the government is limited and they already have financial obligations in the forms of loans that they can barely meet.

The main goal of the Strategic Master Plan is prevention of human induced groundwater pollution.

• The main objectives of the Strategic Master Plan are:
  1. Prevention of groundwater pollution from industrial activities;
  2. Prevention of groundwater pollution from agricultural activities;
  3. Prevention of groundwater pollution from urban activities.

The general outline of the Generic Master Plan is:

Prevention of pollution from industrial hazards:

• Inspection of the industries existing in the area;
• Creation of the database of the existing industries including the time table for regular inspections and monitoring;
• Enforcement of existing applicable legislation; in case of the violation of laws and regulations coordinate with the relevant institutions if necessary;
• Monitor licensing of the new industrial activities;
• Coordinate with the relevant authorities monitoring during the construction phase;
• Raising awareness of the owners on the issues on protecting groundwater.

Prevention of pollution from agricultural hazards:

• Create database of the agricultural irrigated areas and planted crops in the vicinity of the municipalities;
• Coordinate with the Directorate of the Ministry of Agriculture and provide inspection and monitoring on the use of fertilizers and pesticides;
• In coordination with the Water Authority of Jordan provide monitoring of the water quality in the existing wells;
• Monitor the drilling of the illegal wells that could lead to intrusion of the saline water into the aquifer and enforce legislation in case of discovering such wells;
• Monitor licensing and construction of the new wells;
• Monitor licensing of the newly planned farms;
• Coordinate with the Jordan Valley Authority on the issue of the quality and quantity of water supplied for irrigation;
- Raise awareness of the farmers on the issue of groundwater pollution and introduce the alternatives such as Integrated Pest Management

Prevention of pollution from **urban hazards**:

**Long term:**

- Provision of the sanitary sewage network and wastewater treatment facilities;
- Provision of the adequate solid waste disposal facilities.

**Short Term:**

- Create database of existing residential and public facilities including the timetable of inspection of the facilities and timetable of the cesspits clearing;
- Regular inspection of the existing cesspits;
- Enforcement of relevant regulations in case of violations;
- Coordination with the relevant institutions such as Directorate of Health on issues of monitoring schools and health care facilities;
- Monitor timely disposal of the solid waste
- Monitor adequate proper disposal of the solid waste

For further capacity building of the municipalities the training courses were recommended, which include, but not limited to:

- GIS Principles & Addressing the Hazards Points
- Map Contouring and Analyzing Pollution Hazards
- Hazard (EXPOSE) and its Control measures
- Groundwater standards applications
- Wastewater standards and guidelines
- Sanitary inspections forms and applications
- Emergency planning and measures
- Online environmental data bank
- Financial Planning and Access to Finance
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ABBREVIATIONS AND/OR ACRONYMS

EcoPeace - EcoPeace Middle East, formerly EcoPeace/Friends of the Earth Middle East (FoEME), is an exceptional organization that brings together Jordanian, Palestinian, and Israeli environmentalists to protect their shared environmental heritage.

JRV  Jordan Rift Valley
MOMA  Ministry of Municipal Affairs
MOPIC  Ministry of Planning and International Cooperation
WAJ  Water Authority of Jordan
JVA  Jordan Valley Authority
KAC  King Abdullah Canal
1 Introduction

Currently EcoPeace Middle East is in the process of implementation of the Protecting Groundwater Project funded by the European Union through ENPi CBC MED program. The project is being implemented in the three neighboring countries Jordan, Palestine and Israel. The objective of this project is to enhance the capacities of the municipal staff in dealing with the groundwater pollution. Through the previous stages the Hazard Reduction and Prevention (HRP) guidelines and the audit report of current state of environmental hazards to groundwater were developed which provide a systematic approach for reduction and prevention of groundwater pollution. Based on the developed audit report a strategic Master plan and detailed plans are required to be developed.

The municipal staff has received training on GIS mapping of the existing issues which pose a potential threat to the groundwater resources. Based on the received training the municipal staff conducted field visits and registered hazardous points, which were used to prepare the hazard maps for each municipality.

In order to prepare the Master Plan the findings of the prepared audit report were taken into consideration including developments in the study area.

1.1 Objectives
The main goal of the Strategic Master Plan is prevention of human induced groundwater pollution.

The main objectives of the Strategic Master Plan are:

- Prevention of groundwater pollution from industrial activities;
- Prevention of groundwater pollution from agricultural activities;
- Prevention of groundwater pollution from urban activities.

1.2 Scope of the Report
The scope of the present report encompasses the following:

- Overview of the methodology and approach;
- Overview of the institutional and legislative frameworks;
- Established protocols for addressing the potential hazards, including Red Line and red Alert Protocols;
- Generic Master Plan and Master Plans for each municipality participating in the project
- Proposed training courses for further capacity building of the Municipalities
- Financial mechanisms and schemes
2 Overview of the Project Methodology

2.1 Institutional and Legislative Framework

Existing statutory regulations pertaining to environmental protection, including groundwater protection and regulations for prevention of the potential pollution of the groundwater resources provide tools for monitoring and preventing groundwater pollution. Therefore, actions in the implementation plans should be in compliance with the legislative and regulatory requirements. The desk study was conducted in order to assess the legal framework for the implementation plans.

Also, a number of institutions are involved in regulating the groundwater issues. In some cases jurisdictions of different institutions overlap and in other cases different institutions address different aspects of the same issues without proper coordination between them. The institutional framework is assessed. Hierarchy, roles and responsibilities of relevant institutions are described.

2.2 Establishing the municipal frameworks for addressing groundwater pollution hazards and minimizing their risks

The consultant has reviewed the available materials provided by the client and assessed the information presented in them. Upon assessing the existing available reports, the team has provided recommendations to establish the following:

a) Red-Line and Red-Alert protocols to handle different types of hazards: the criteria for identification of Red-Line and Red-Alert situations  
b) Hazard Management Protocols: including monitoring, inspections and enforcement schemes and the material, HR and financial requirements.  
c) Establishment of a Hazards Reduction and Prevention (HRP) Manager position/unit in the municipalities. The description encompasses the following:  
  • position in the organizational structure of the municipality,  
  • functions and responsibilities, including launching and maintaining the HRP guidelines and conducting periodical (6 months) performance report,  
  • material, financial and HR resources requirements,  
  • job description  
  • communication framework within the municipality and between the relevant authorities.

2.3 Development of a Master Plan

Although only seven municipalities are participating in the project, the groundwater pollution issues are common between the municipalities located in different areas of the Jordan Valley. Therefore, we could make an assumption that the issues identified in these communities could be used as a model for the larger area covering most of the project area.
The consultant has prepared the generic Master Plan based on holistic approach applicable to the whole area.

The generic Master Plan has been customized and adopted for each individual municipality, identifying the specific issues for each community, based on the Audit Report findings.

The strategic action plan is prepared in the form of the Log Frame Analysis (LFA). The LFA is an analytical process and set of tools used to support project planning and management. It provides a set of interlocking concepts which are used as part of an iterative process to aid structured and systematic analysis of a project or program idea.

3 Institutional and Legislative Framework

3.1 Legislative Framework

The general concept of a legal framework is to provide law and policy makers with the practical information and guidance to understand, or to develop or strengthen the legal capacity for a specific environmental-management issue. A framework can be applicable at either the international, regional or national level or a combination of these levels.

National environmental legislation consists of the legislation, standards, regulations, institutions and administrations adopted to control activities damaging to the environment within the state. It includes: environmental legislation; sector legislation; and incidental legislation.

3.1.1 Laws

The primary environmental legislation is Law No. 12 of 1995 which has been substituted by the temporary Law No. 1 of 2003 and consequently by Law No. 52 of 2006. Environmental legislation forms the backbone of environment protection in Jordan. Jordanian government had issued a number of laws and regulations covering almost all aspects of environmental protection relevant to any developmental activity in Jordan.

Overview of the most relevant laws is presented below:

Environmental Law No. 52 for the year 2006

In view of the issuance of the Royal decree with regards to establishing the Ministry of environment, the Interim Law No. (1) for the year 2003 (Interim Environment Protection Law) was established to replace the Environment Protection Law No. (12) from the year 1995, and consequently, the cancelling of the Environment Protection Corporation, to be replaced by the Ministry in order to realize the following purposes:
• To consider the Ministry of Environment, the Competent Authority with all that related to
the environment Protection and the issued related to same at the national, regional and
international level.
• To protect the environment and promote all its elements such as water, air and land in a
sustainable manner, as well as to monitor the measuring of these elements and their
components.
• To authorize (license) to non-government bodies, working in the environment protection
domain.
• To coordinate the national efforts aimed at the environment protection, through setting a
national strategy for the awareness, education and the environmental connection.
• To prohibit the admission of harmful & hazardous substances, costing a way or
embedding them in the Kingdom's lands.
• To promote the relations between the Kingdom, and the countries, and the Arab, regional
and International societies and organizations in the environmental matters, and to strive
to implement the agreements related to the environment affairs.
• To establish an advisory body of persons with experience & competence and from the
bodies concerned with the environment in order to submit their suggestions to the
Minister.
• To set the deterrent penalties with regard any who causes harm to the environment

In accordance with this law, the following systems were issued:

• Nature protection system.
• The system of environment protection from pollution in cases of emergency.
• Water protection system.
• Air protection system
• Marine and coastal protection environment system.
• Natural (reservation) places and public parks system.
• The management of harmful and dangerous materials, its transfer, and handling System.
• The management system of solid waste.
• The evaluating system for environment impact.
• Soil protection system.
• Fees and wages system.

In 2005 and in the field of legislations, 8 Regulations were issued as per the provisions of the
Environmental Protection ‘Interim’ Law No. 1 for 2003:

• Protecting the Environment from Pollution in Emergency Situations Regulation.
• Air Protection Regulation
• Soil Protection Regulation
• Protection of Marine environment and Seacoasts Regulation
• Natural Reserves and National Parks Regulation
• Management and Circulation of Hazardous and Harmful Substances Regulation
• Solid Waste Management Regulation
• Environmental Impact Assessment Regulation
• Water Protection Regulation (in the pipeline)

In 2006, the interim law No. (1) for the year 2003 was replaced by the Environmental Law No. 52 for the year 2006 with no major changes on the main articles except for issuance the necessary Regulations for the Environmental Protection Fund.

The Law of Public Health No. (54), 2002

The Law stipulates (Article 53): The Ministry of Health supervises the water of Sewage system and the sewage system networks and the internal installations and the refinement stations in coordination with other concerned Departments, and according to its own legislations, in order to ensure the presence of health standards and conditions, so that no harm could reach the public health.

Water Authority Law No (18) for the year 1988

The Water Authority of Jordan (WAJ) in charge of water and sanitation service provision directly or through public companies that it owns. WAJ is also responsible, together with the Ministry of Water and Irrigation, for water resources planning and monitoring. WAJ also regulates water abstraction by all users, including itself, by issuing licenses.

Jordan Valley Authority Law No. 19. 1988, amended by Law No. 30, 2001

Article 38:

(1) It is forbidden to pollute the water of the Valley or cause such pollution. Or it is illegal to bring a certain material to the Valley from whatever source in case the General Secretary declares in the official gazette that such material is causing pollution; unless it was allowed with certain written permission issued for this purpose and containing the conditions that must be met and to restrict and specify the way that these materials are stored.

(2) To fulfill the goals of item (1) of this paragraph, the Authority will carry out repeated Lab analysis for the water biologically, chemically and physically and address the concerned Department, and follow up and check those who are behind the partial pollution.

Criminal Law No. (16) 1960, amended 2002

Articles 455-458 The law stipulates protection of water resources from polluting and consequent punishment for such acts.

Planning of Cities, Villages & Buildings Law No. (79) for the year 1966
The law classified the land areas covered into three major zones: development zone; agricultural zone; natural reserve zone. Development in each zone was governed by a set of regulations. These regulations stipulated the type of construction allowed the built-up densities, the required set-back from existing or proposed roads and the procedure for land parcelling. When construction takes place without a permit, the law stipulates that an enforcement notice be issued requiring the restoration of the land by the owner within 15 days, but allowing submission of an application for a permit. If the permit is refused, or a construction plan is not adhered to, the authority may restore the land, including demolition of structures.

**Municipalities Law No. 14, 2007** The law refers to Municipalities (Baladiyyat) as “institutions endowed with financial autonomy”, “aimed at preparing, implementing and following-up plans and programs to ensure sustainable development jointly with local communities”, as well as engaging in all what directly concerns local development, including public services and local development projects, also in co-operation with the private sector or local civil society organizations (Article 3).

The Law delegates to Municipalities 29 specific functions (Article 40, including town and street planning, building system, sewage system, etc.) and a general function which allows municipalities to “practice any developmental authority and establish developmental projects that generate public benefits to the municipal residents”. The most significant feature of the new Law resides in the introduction of direct election for the Mayors and the local municipal Council members for which a 20% quota for women representation applies.

**Agriculture Law No (44) for the year 2002**

Ministry of Agriculture sets the necessary preconditions that must be met for the purpose of establishing, operation, and modernization of Industry: organizational, environmental, health preconditions

**3.1.2 Regulations (By-laws)**

A number of regulations and By-laws were issued in regards to environmental protection. The overview of the regulations and by-laws relevant to the project is as following:

**Sanitary Wastewater System Code, and the Water Supply Code (Ministry of Public Works and Housing, 1988):** These codes provide guidelines for the design and installation of plumbing systems on domestic properties, which the concerned municipalities should be monitoring. The Sanitary Wastewater System Code provides guidelines for internal and external drainage and wastewater systems, and extensive design guidelines for septic tanks. It requires building managers to discharge wastewater into the municipal drain where possible, and failing this, to a septic tank.

**The Regulations of the Sewage System No. (66) for the year 1994, issued through**

Article (33) from the amended Water Authority Law No. (18) for the year 1988: Article (6) “It is forbidden for any person to drain into the resources of water, or any natural pathway, or
any empty place liquid waste, water sewage or normal (water) until it was processed, and taken a
written approval from the Authority to this effect, allowing its drain based on Jordanian standard
specifications for this purpose.”

Solid Waste Management Regulation No (27) for the year 2005 issued according to item (8)
from paragraph (a) from the Article 23, from the Environmental Law No. (1) for the year
2003. This system consists of (7) Articles as following:

Article (1) naming the system

Article (2) words and terms that aim to implement the system. These include terminology that
defines solid waste:

“Thus the solid materials and semi-solid which are produced by activities, that must be processed
or we ought to get rid of it; and they are not classified as harmful or dangerous waste. What is
mentioned is the management of harmful and dangerous materials, its transfer and the way it is
handled”

Article (3, 4): The Organization and the management of solid waste by healthy methods to
environment, within specifications and standards that should be adopted.

Article (5) the pre-conditions that must be present in the establishment that produces solid waste.

Article (6) the implementation of the system by the Ministry of Environment and concerned
Departments.

Article (7) issuance instructions and directives.

Soil Protection Regulation No. 25 for the year 2005 bylaw according to item (10) from
paragraph (a), form the Article (23) from the Law of Environment Protection No. (1), for
the year 2003

Article 2. Desertification: It is a deterioration process in which ecosystems loose the ability for
survival leading to deterioration of soil fertilization, its production and lead to the vanishing of
its economic output.

Article 3. Ministry of Environment assumes the following:

3. Observing the causes of soil erosion and desertification and taking effective measures to
protect soil and stop desertification.

6. Stopping soil deterioration in the dry regions as well as the pastoral areas and the Badia by
establishing proper projects, developing these areas, and rehabilitating them.
3.1.3 Strategies
Between 1998 and 2006 an array of sector policies, strategies and action plans were developed and provided basis for a solid policy framework.

National Environmental Strategy:
The National Environmental Strategy (NES) which was prepared in 1992 with support of IUCN and USAID was the first important step carried out to confront environmental problems. NES catalogued all environmental pressures and problems and contained more than 400 specific recommendations and suggested actions in the field of environmental protection and conservation.

Five strategic directions for action were recommended under the NES:

- The constitution of a legal framework for environmental management including the enactment of a comprehensive environmental law and complementary environmental legislation and the creation of a national environmental impact assessment process.
- Strengthening institutions working for environmental protection and conservation
- Focusing on cross-sector priorities such as water resources management and population expansion
- Managing protected areas, including the creation of new natural reserves and a marine national park in Aqaba, to complement the existing reserves and the rehabilitation of the core area of the Azraq oasis.
- Fostering public additional environmental and conservation education environmental health awareness mechanisms for public participation in natural resources environmental decision making (EIA process), and creation of a system of urban nature parks and green spaces.

Main shortcomings of NES:

- of prioritization of the suggested actions
- Institutional capacity issues were not addressed
- Lack of linkages with other national policies and strategies
- Inadequate estimation of financial costs

National Environmental Action Plan:
The National Environmental Action Plan provided a comprehensive assessment of environmental problems and remediation opportunities in Jordan, combined with a prioritized and phased plan of action for addressing the issues.

The NEAP identified 41 environmental priority needs, which included the needs of four cross-sectorial environmental management capacity building and 37 sectorial environmental actions. Immediate attention was recommended for a “short list” of 19 priorities that were clustered under four projects related to desertification and land degradation which were:

1. Development of a national land use planning/zoning system
2. Management of agricultural plastic waste  
3. Preservation of forest lands  
4. Urban and regional land use planning  

**National Agenda 21:**  
Jordan has prepared in 2002 its National Agenda 21 document under the supervision of the General Corporation for Environment Protection (Currently MOE) and the assistance of UNDP. Agenda 21 outlined a multi-disciplinary national plan of action for an environmentally sound and sustainable economic development.  

Agenda 21 demonstrated an umbrella document that identified combating desertification as a national priority and promotes its integration into the national policy and called for the involvement of all stakeholders in the implementation of proposed programs and actions. The agenda proposed a number of projects based on a set of priorities that were identified following a thorough review of public needs in general, and the environmental sector in particular.  

Agenda 21 introduced the concept of "integrated resource management" by linking the sectors of water resource management, land resource management, agricultural resources, energy resources and mineral resources.  

The outline of the Agenda 21 failed to integrate biodiversity issues within the "integrated resource management" section and placed biodiversity under the section on "natural and cultural heritage" providing little conceptual linkages with natural resource management.  

The issue of land degradation was addressed specifically in section 1.2 on land resources and was supported by other sections on rangeland resources management, agricultural land use and alleviation of land degradation. The section on alleviating land degradation focused on measures against soil erosion, soil pollution, mining spills and enhancing urban planning issues.  

**National Agenda 21 proposed the following strategic objectives:**  

**Combating Land Degradation and Desertification**  

- Develop a methodology for addressing and mapping the dynamics of desertification, and the processes and hazards in each ecological zone in Jordan.  
- Setup criteria to determine priority areas to combat desertification.  
- Diversify the income of people to mitigate poverty and reduce pressure on land resources.  
- Adopt sustainable land use plans and sustainable management of the water resources with aid of contemporary tools of remote sensing and GIS.
Rangeland development

- Increasing the productivity and improving the management of rangelands on a sustainable basis, through management techniques, involving studies, installation of native species and other fodder species in association with water harvesting and other soil treatment techniques.
- Strengthening capacity building by setting-up appropriate training, planning and management units, a research unit and improving capacities of human resources.
- Ensuring a sustainable utilization of the forest and range resources by the design and implementation of rational management systems, which will provide employment, help to enhance people's participation and develop income generation activities for the rural communities.

**Water Strategy and Policies:**
The strategy stressed the need for improved water resources management with particular emphasis on the sustainability of present and future uses. Special emphasis was given to protect Jordan’s water resources against pollution, quality degradation, and depletion.

The Water Strategy ensures that the rightful shares of the Kingdom’s shared water resources shall be defended and protected through bilateral and multilateral contacts, negotiations, and agreements.

The strategy defined the long-term goals that the government of Jordan seeks to achieve in the water sector. The strategy was supplemented with different water policies in four water sectors aiming to make a balance between water demand and supply and emphasizing the role of private sector and attracting private investment into the economy.

The policy addresses:

- Groundwater management, irrigation water,
- Water utilities
- Wastewater management.
- Legislation and Institutional Arrangements;
- Standards, Regulations and Quality Assurance;
- Research and Development; Financing and Investment;
- Public Sector Participation;
- Human Resources Development;
- Public Awareness.

The water utility policy encourages government to transfer infrastructure and services from the public to the private sector in order to improve the performance and efficiency. The use of management contracts and other private sector participation in water utilities was introduced in this policy. Recovery of capital costs, and BOT systems became part of all water management policies. The MWI then introduced different prices for different qualities and uses of water.
Profitable markets (tourism, industry) shall pay the full water cost. The water policy states that existing water distribution systems should be rehabilitated and enhanced.

Wastewater Management Policy
The policy considered reclaimed wastewater in a significant part of the country water resources at the present and in the future. The policy addresses the management of wastewaters including development, management, collection and treatment, reuse, and standards and regulations.

Specific policy statements address:

- Resource Development by considering wastewater is an integral part of renewable water resources; treatment targeted toward producing effluent fit for reuse in irrigation.
- Resource Management by basin management approach, as possible; irrigation use has highest priority; industries encouraged to recycle part of wastewater.
- Wastewater Collection and Treatment: existing level of services to be sustained and promoted; treatment so effluent meets WHO and FAO. Guidelines; advanced wastewater treatment technologies promoted.
- Reuse of Treated Effluent and Sludge: priority to agricultural use for unrestricted irrigation; blending of treated wastewater with fresh water to improve quality, where possible; treated effluent quality should be monitored; potential storage of excess treated wastewater in reservoirs or ground water aquifers should be studied.
- Pricing: fees shall cover at least operation and maintenance costs; treated effluent should be priced and sold to cover delivery costs.

National Strategy for Agricultural Development:
The strategy stressed on sustainable agriculture and protection of natural resources. The strategic and operational programs were comprehensive and covered most issues of biodiversity conservation and sustainable use in addition to combating desertification.

The NSAD identified certain environmental added values and benefits that could be achieved through its implementation and considering of following actions:

- Conservation of land, water and natural vegetation, through the sustainable utilization that ensures long-term agricultural production.
- Conservation of Jordan’s biodiversity in parallel to sustainable agricultural development.
- Improvement of the technical and managerial capabilities of the agricultural sector to cope with probable climate and environmental changes, and absorb their consequences.
• Halting unplanned expansion of urban areas on agricultural land that are violating current legislation of prohibiting building on agricultural land, through denial of services to these buildings.

• Combating desertification and protecting the environment, the agro-biodiversity and agricultural resources, to secure requirements for sustained development.

• Conservation of agricultural land by controlling soil erosion in steep mountainous areas, through improved agricultural practices and water conservation measures.

Poverty Reduction Strategy:
The strategy to alleviate poverty includes short, medium, and long-term initiatives in each policy area. Policy objectives include social safety, employment, education, and healthcare; within these areas, policy objectives include improving the social safety-net for the poorest of the poor, improving employment opportunities for those capable of working, providing access to education, and assuring access to healthcare.

The strategy recommends comprehensive measures to reduce poverty and to build on current experiences by addressing issues of health, environment, education, sustainable micro-finance, improving economic security of low-income working families, and increasing employment opportunities in rural areas and secondary towns.

National Biodiversity Strategy and Action Plan

The Jordanian National Biodiversity Strategy and Action Plan (NBSAP) has been formulated as a response to the obligations of CBD and has been developed as a guide to the implementation of the biodiversity convention in the country. The NBSAP has been published by the Ministry of Environment in 2002 based on a national consultation process.

The main strategic goals of the NBSAP are:

1. Conserve biodiversity and use biological resources in a sustainable manner by protecting the various species of animals, plants and micro-organisms in their different agricultural environments; and productivity of environmental systems, especially wildlife habitat, forests, grazing land and agricultural land within a balanced environmental order.

2. Improve the understanding of ecosystems, increase resource management capability, and promote an understanding of the need to conserve biodiversity by using biological resources in a sustainable manner.

3. Manage natural resources and distribute roles among institutions in a way that conserves the basic natural resources which are necessary for human growth and survival, such as
soil, water, plant cover and climate, developing these elements and using them appropriately in a sustainable manner.

4. Maintain or develop incentives and legislation that support the conservation of biodiversity and the sustainable use of biological resources; and

5. Work with other countries to conserve biodiversity, use biological resources in a sustainable manner and share equitably the benefits that arise from the utilization of genetic resources.

**National Population Strategy**

The National Population Strategy was prepared and launched in 2002 and it included seven strategic sections with one section focused on "Population, the Environment and Natural Resources".

The main objectives stated under this section are:

- Reducing the imbalance between water supply and demand.
- Reducing the imbalance between the local demand for and the local supply of food products.
- Increasing the level of efficiency in the utilization of local energy resources.
- Achieving a better balance between the population size and environmental conditions, where the population in the arid zone is characterized by a high birth rate.
- Achieving a better balance in the geographical distribution of the population between urban and rural areas.

**National Energy Strategy**

The strategy focused on the development of renewable and sustainable energy sources and linkages between environmental protection and transition to sustainable energy.

The strategy did not include issues of climate change and the opportunities for both environmental protection and sustainable energy through the Kyoto protocol, but the strategy is considered to be a suitable planning road map for sustainable energy production and consumption. The strategy identified a target of 2% contribution of renewable energy of the total energy mix in Jordan and increasing the share of renewable energy in electricity to 8%.

**National Strategy and Action Plan for Drought Mitigation**


National Strategy and action plan for drought management has been prepared and final recommendations and conclusions were discussed in a national workshop held for this purpose.

These included:
1. Establishing a high committee
2. Formulation of the following sub-committees: technical, follow-up and evaluation of risk committees with membership of the mentioned institutions to supervise whatever effects drought occurrence, establishing standards for declaring drought and writing reports for the high committee.
3. For the sustainability of the work; training programs on drought issues is vital with an independent budget. Also training of the local communities to involve them in decision-making and drought mitigation.
4. Importance of Signing MOU within different institutions so as to clear duties and responsibilities of each party.
5. Training of Trainers (TOT) so as to clear the concepts and the vision on drought issues.

**Jordan Poverty Alleviation Strategy**

The Jordan Poverty Alleviation Strategy was announced by the Ministry of Social Development in 2002 and sets out a road map to improve education, health, and employment opportunities of the poor. Interventions place special emphasis on expanding the National Assistance Fund to reach more of the poor, encourage work and supporting working families; support to job creation and higher wages in the private sector, support to business development in targeted communities, e.g. through village cluster approaches; infrastructure improvement, expansion of nutritional services, and health prevention, e.g. using the Healthy Villages model; the elimination of gender disparities, and the development of more entrepreneurial attitudes.

It identifies a number of key entry points for targeted interventions- such as sustainable micro-financing, development of village clusters of enterprises, and the establishment of business support centers in the Governorates.

PRS objectives:

- Institutional building for good governance with special emphasis on the public institutions providing support to the rural sector.
- Poverty reduction, with special emphasis on social and economic empowerment of the rural poor, including women.
- Protection of the environment, with special emphasis on conservation of natural resources, soil, water and rangelands.

### 3.1.4 Related Environmental International and Regional Conventions and Treaties

Jordan is a signatory to the number of international conventions, treaties, and protocols aiming at protecting the environment. The most relevant to the project are the following:

- Kyoto Protocol on Climate Change, 2003
- Convention Concerning the Protection of the World Cultural and Natural Heritage, 1975
- Ramsar Convention of Wetlands of International Importance, 1971
- Vienna Convention and the Montreal Protocol for the Protection of the Ozone Layer
- Convention on Biological Diversity (CBD) - 1994
- UN Convention to Combat Desertification (UNCCD) - 1996
- Cartagena Protocol on Bio-safety
- Convention on the Protection of African-Eurasian Migratory Waterfowls
- Convention on the Conservation of Migratory Species of Wild Animals, 1979
- Stockholm Protocol on Persistent Organic Pollutants (POPs), 2004

**Table 1: Relevant Legislation and Responsible Authority**

<table>
<thead>
<tr>
<th>Legislation</th>
<th>Responsible Authority</th>
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<tbody>
<tr>
<td><strong>Cross-Sectorial</strong></td>
<td></td>
</tr>
<tr>
<td>Environmental Law No. 52, 2006</td>
<td>Ministry of Environment</td>
</tr>
<tr>
<td>Agriculture Law No. 44, 2002</td>
<td>Ministry of Agriculture</td>
</tr>
<tr>
<td>The Law of Public Health No. (54), 2002</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>Management and Administration of Government Properties Law No. 17, 1974</td>
<td>Ministry of Finance</td>
</tr>
<tr>
<td>Municipalities Law No. 14, 2007</td>
<td>Ministry of Municipal Affairs</td>
</tr>
<tr>
<td><strong>Water Resources</strong></td>
<td></td>
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<tr>
<td>Water Authority Law No (18), 1988</td>
<td>Water Authority of Jordan</td>
</tr>
<tr>
<td>Jordan Valley Authority Law No. 19, 1988, amended by Law No. 30, 2001</td>
<td>Jordan Valley Authority</td>
</tr>
<tr>
<td>Drinking Water Instructions, 1981</td>
<td>Water Authority of Jordan</td>
</tr>
<tr>
<td><strong>Waste Management</strong></td>
<td></td>
</tr>
<tr>
<td>Legislation</td>
<td>Responsible Authority</td>
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<tr>
<td>Solid Waste Management Regulation No (27) for the year 2005</td>
<td>Ministry of Environment</td>
</tr>
<tr>
<td>The Jordanian Standards for Industrial Wastewater No. 202/1991</td>
<td>Water Authority</td>
</tr>
<tr>
<td>The Regulations of the Sewage System No. (66) for the year 1994</td>
<td>Water Authority</td>
</tr>
<tr>
<td>Prevention of Repulsive Waste and Fees for Solid Waste Collection within Municipality’s Boundaries No. 1.</td>
<td>Municipalities</td>
</tr>
<tr>
<td><strong>Air Quality, Noise and Soil Protection</strong></td>
<td></td>
</tr>
<tr>
<td>Soil Protection Regulation No. 25 for the year 2005</td>
<td>Ministry of Environment</td>
</tr>
<tr>
<td>Environmental Law No (52) for the year 2006</td>
<td>Ministry of Environment</td>
</tr>
<tr>
<td>Criminal Law No. (16) 1960, as amended in 2002</td>
<td>General Security Department</td>
</tr>
<tr>
<td><strong>Nature Conservation</strong></td>
<td></td>
</tr>
<tr>
<td>Civil Defense Order No. 1: The Protection of Forestry in Jordan, 1993</td>
<td>Civil Defense Department</td>
</tr>
<tr>
<td>Protection of Birds and Wildlife Bylaw No. 113, 1973</td>
<td>RSCN</td>
</tr>
<tr>
<td>Natural Reserves and National Parks Bylaw, 2005</td>
<td>Ministry of Environment</td>
</tr>
<tr>
<td>Environmental Law No. 52, 2006</td>
<td>Ministry of Environment</td>
</tr>
<tr>
<td><strong>Cultural and Archaeological Heritage</strong></td>
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</tr>
</tbody>
</table>
3.2 Institutional Framework
Various key ministries and departments and a number of research and development and autonomous organizations functioning at the national level are involved in management and protection of natural resources.

As part of the process of formulation and implementation of the national planning, the Government has formulated a number of policies and has enacted several legislations to ensure proper conservation and management of natural resources.

In the present project, the Municipalities are assumed to take the leading role in the management of the issues related to the groundwater protection based on the identified potential hazards. Therefore, it is essential to present the overview of the Municipalities functions and organizational structure to have a clear picture about the Municipalities capabilities in order to provide the better approach for the Master Plan actions.

While the legal framework allows municipalities to fulfill a wide range of duties, in fact, their role is generally much more limited in scope. In practice, centralized governmental departments or entities have assumed responsibility for many of the functions itemized in the Municipalities Law. Actual practice depends on the size and scale of the municipality, however for the purpose of a broad generalization, the municipalities in the Jordan Valley generally focus on these service and infrastructure related functions:

- solid waste collection and street sweeping
- street paving and maintenance
- construction and maintenance of local roads
- public street lighting
- provision of library and park services
- culture and sports
- issuing construction permits within municipal borders
The primary source of revenue for municipalities originates from the Central Government redistribution of shares of taxes on petrol products, road transport duties, buildings and land property taxes. Own source revenues are limited. Municipalities have a role in the collection of various fees (like property fees), although the majority opt instead for the Ministry of Finance to collect the fees for them with a surcharge. Rates are set by the central government.

Other services such as water and wastewater provision, education, health, public housing, etc. are now provided by the service-oriented Ministries and their local entities. Despite the moves towards decentralization and local accountability, there is no indication that these services are to be intended to become the responsibility of the municipalities any time, and that might not be appropriate in any case. But what should be developed is a commitment to an increased role of the municipalities in prioritization and planning of services and in local advocacy/community relations.

The Law also provided for direct election of councils and mayors, but only recently this has been implemented. Prior to 2013 elections, the mayors were appointed by MoMA, and half of the member councils appointed and half elected. The Mayor is considered the executive authority of the municipality and its departments. The Mayor is to comply with the decisions of the municipal council to execute them.

In terms of organizational structure, there appear to be two ways this is approached. One is to apply the model chart provided by MoMA or to construct some modified version. Most municipalities visited by the Consultant have the following departments: Administration and Finance Department, Transport Department, Procurement Department, Local Areas divisions, Technical Department, IT Department, Planning Department, Public Health Department, and Environmental Department. It must be noted, that the newly elected mayors don’t have the clear understanding of the structure of the municipalities and roles of each department. There are numerous issues which need to be addressed when it comes to the assessment of municipalities. This report addresses specific problems and recommendations in a SWOT analysis provided in the Chapters below.

The Table below explains, in brief, the role played by key ministries and departments and key research and development and autonomous organizations functioning at the national level which have a direct role to protect land resources including water resources.

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Role in Natural Resources Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ministry of Planning and International Cooperation</td>
<td>MOPIC guides and coordinates Government socio-economic policies, programs and priorities, and enhances international cooperation aimed at addressing Jordan’s priorities. It is also responsible for, among other projects, the Enhanced Productivity Program (EPP), a major Government initiative in rural poverty reduction and economic growth.</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Role in Natural Resources Management</td>
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<tr>
<td>MOPICT</td>
<td>MOPICT maintains regular channels with UN and with other international agencies’ programs to bring greater coherence to development assistance operations and to enhance their impact and effectiveness. It coordinates with line ministries to prioritize development needs and actions, and to present the position of Government in relation to contributions by international donors and financiers.</td>
</tr>
<tr>
<td>Ministry of Environment</td>
<td>The Ministry of Environment is responsible for planning, promoting and coordinating the environmental protection in the country. In the framework of sustainable development, a number of guidelines have been prepared for major development projects concerning energy, infrastructure, transportation, etc. which take into account impact assessment of the project and suitable measures for conservation of environment.</td>
</tr>
<tr>
<td>Ministry of Agriculture</td>
<td>The Ministry of Agriculture is responsible for the formulation and implementation of National Policies and programs aimed at achieving rapid agricultural growth through optimum utilization of the country’s land, water, soil and plant resources. The Ministry of Agriculture is entrusted with the responsibility for collection and maintenance of a wide range of statistical and economic data relating to agriculture, land use and land degradation, required for development planning, organizing agricultural census.</td>
</tr>
<tr>
<td>Ministry of Water and Irrigation</td>
<td>The Ministry undertakes overall planning for the development of ground water resources, establishment of utilizable resources and formulation of policies for exploitation, overseeing of and support to the country level activities in ground water development. The Ministry formulates the national water resources development perspective and determines the water balance of different basins/sub-basins for possible inter-basin transfers. Another important responsibility is to negotiate with neighboring countries with regard to sharing waters, water resources development projects and the operation of joint projects.</td>
</tr>
<tr>
<td>Jordan Valley Authority</td>
<td>JVA has a mandate to carry out integrated socioeconomic development of the Jordan Valley area, including water development and distribution of irrigation. JV initially was defined as extending from the Northern border of the Hashemite Kingdom of Jordan in the North to the Northern tip of the Dead Sea in the South; the Jordan River to the west and all areas in the Yarmouk and Zarqa basins that lie below the 300m contour line to the East; plus any areas the Cabinet appropriates to JVA. Later, the area was expanded by the Cabinet to include the territory lying between the Northern tip of the Dead Sea in the North and the Northern border of the Aqaba Municipality in the South; and from the 500m contour line to the East and the Kingdom's border to the West.</td>
</tr>
<tr>
<td>Water Authority of Jordan</td>
<td>WAJ Mission is to development and protection of water sources, provision of water and sewerage services to ensure the requirements of citizens, and improvement of infrastructure to preserve environment and public health.</td>
</tr>
<tr>
<td>Ministry of Social Development</td>
<td>Responsible for planning and implementing socio-economic policies, programs and priorities. MOSD plays an important role in addressing the needs of the rural poor</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Role in Natural Resources Management</td>
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</tr>
<tr>
<td>Ministry of Finance</td>
<td>Responsible for allocating ministerial budgets, developing financial legislation</td>
</tr>
<tr>
<td>Ministry of Public Works and Housing</td>
<td>Responsible for developing urban planning regulations. Defines urban plans, issues building permits</td>
</tr>
<tr>
<td>Ministry of Municipal Affairs</td>
<td>The Ministry is taking up the supervisory role over the activities of the Municipalities and the Joint Services Councils (JSC) operating in all over the Kingdom with a total of 93 Municipalities and 22 JSCs.</td>
</tr>
<tr>
<td>Municipalities</td>
<td>In charge of local decision-making and follow-up, physical development within their territorial limits</td>
</tr>
<tr>
<td>National Centre for Agricultural Research and Extension (NCARE)</td>
<td>NCARE is the research center at the Ministry of Agriculture. Although it is functioning under the umbrella and guidance of the ministry of Agriculture, it has its administrative and financial independency. NCARE developed a research strategy to improve rangeland productivity and management in order to provide feed for small ruminants, arrest desertification, and improve soil conservation: and conserve agricultural natural resources through a series of activities.</td>
</tr>
<tr>
<td>The Higher Council for Science and Technology (HCST)</td>
<td>The Higher Council for Science and Technology (HCST) was established in 1987 as a public independent institution acting as a national umbrella for all science and technology (S&amp;T) activities in Jordan. The HCST sponsors and carries out activities and events which enforce and enhance the role of S&amp;T in the socioeconomic development process in Jordan.</td>
</tr>
</tbody>
</table>
| Faculty of Agriculture, University of Jordan         | • Improvement of Agricultural Productivity  
|                                                      |  • Rehabilitation of degraded lands  
|                                                      |  • Monitoring of land degradation                                                            |

A number of line ministries such as the Ministry of Health, Ministry of Education, Ministry of Public Works and Housing, and Ministry of Social Development have gradually assumed responsibilities and extended services originally envisioned for local level provision. Thus these ministries now deliver services as well as finance and regulate them. In addition, municipalities also sometimes relate or communicate with other ministries (Ministry of Tourism and Antiquities, regarding the development of tourism sites in municipal areas, Ministry of Public Works and Housing regarding provision of housing and other construction services including lending and provision of heavy equipment). Some municipalities also have concerns regarding environmental hazards in their localities and have needed to coordinate with the Ministry of Environment. It appears that much of this occurs on an ad hoc basis, and that there is no planned means of continuous, systematic communication and coordination between many of these larger entities.

The following table illustrates the service provider for a number of service areas to local communities. It is clear that most of the higher technical services have been removed from municipalities and given to larger entities.

**Table 3: Distribution of Services by the Current Provider of the Service**

<table>
<thead>
<tr>
<th>Service</th>
<th>Provider</th>
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</table>

30
<table>
<thead>
<tr>
<th>Service</th>
<th>Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>Town and Streets Planning and lighting</td>
<td>Municipalities maintain local roads by themselves if they have the capacity, or by private sector companies through tenders. Ministry of Public Works and Housing maintains non-local bigger roads. Planning is the responsibility of the Higher Planning Council. Lighting of roads is the responsibility of municipalities</td>
</tr>
<tr>
<td>Building Licenses</td>
<td>Municipalities</td>
</tr>
<tr>
<td>Water networks</td>
<td>Water Authority of Jordan (WAJ)</td>
</tr>
<tr>
<td>Electricity and Gas</td>
<td>Electricity provision is the responsibility of National Electric Power Company</td>
</tr>
<tr>
<td>Sewage networks</td>
<td>Water Authority of Jordan (WAJ)</td>
</tr>
<tr>
<td>Public Markets</td>
<td>Municipalities</td>
</tr>
<tr>
<td>Organizing and supervision of Trades and Industries</td>
<td>Municipalities, Ministry of Trade and Industry</td>
</tr>
<tr>
<td>Establishing and organizing means of Overland &amp; Marine Transportation</td>
<td>Municipalities</td>
</tr>
<tr>
<td>Hotels supervision and organizing</td>
<td>Ministry of Tourism</td>
</tr>
<tr>
<td>Public Places</td>
<td>Municipalities</td>
</tr>
<tr>
<td>Public Parks</td>
<td>Municipalities</td>
</tr>
<tr>
<td>Fire Brigade &amp; Fire Prevention</td>
<td>Municipalities</td>
</tr>
<tr>
<td>Flood Precautions</td>
<td>Municipalities</td>
</tr>
<tr>
<td>Relief of Victims</td>
<td>Municipalities/ Civil defense Directorate</td>
</tr>
<tr>
<td>Establish and supervise museums, public libraries, schools, cultural, sports, musical and social clubs.</td>
<td>Municipalities/ Ministry of Education</td>
</tr>
<tr>
<td>Food monitoring</td>
<td>Municipalities/ Ministry of Health</td>
</tr>
<tr>
<td>Examine Carcasses and Establish Slaughter</td>
<td>Ministry of Agriculture/ Ministry of Health/</td>
</tr>
<tr>
<td>Service</td>
<td>Provider</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Houses</td>
<td>Municipalities</td>
</tr>
<tr>
<td>Sanitary Control</td>
<td>Municipalities</td>
</tr>
<tr>
<td>Public Health:</td>
<td>Municipalities/Ministry of Health</td>
</tr>
<tr>
<td>Graveyards</td>
<td>Municipalities</td>
</tr>
<tr>
<td>Precautions against Hazards</td>
<td>Municipalities/Civil Defense</td>
</tr>
<tr>
<td>Beggary</td>
<td>Ministry of Social Affairs</td>
</tr>
<tr>
<td>Employment Offices</td>
<td>Ministry of Labor</td>
</tr>
<tr>
<td>Civil Defense:</td>
<td>Civil Defense Directorate</td>
</tr>
<tr>
<td>Peddlers, Hawkers and Canopies</td>
<td>Municipalities</td>
</tr>
<tr>
<td>Advertisements monitoring</td>
<td>Municipalities</td>
</tr>
<tr>
<td>Demolishing of Old Buildings</td>
<td>Ministry of Public Works/Municipalities</td>
</tr>
<tr>
<td>Supervision and licensing of Dogs supervision and licensing</td>
<td>Municipality/Ministry of Agriculture</td>
</tr>
<tr>
<td>Animals supervision and organizing cattle markets</td>
<td>Municipality</td>
</tr>
<tr>
<td>Passing Municipality annual budget, closing accounts and employees cadre</td>
<td>Municipality</td>
</tr>
<tr>
<td>Disposal with Municipality's Funds</td>
<td>MOMA/Municipalities</td>
</tr>
<tr>
<td>Supervision and licensing of agricultural activities</td>
<td>Municipality/Ministry of Agriculture/Jordan Valley Authority</td>
</tr>
<tr>
<td>Irrigation</td>
<td>Jordan Valley Authority</td>
</tr>
</tbody>
</table>
3.3 Institutionalizing the Groundwater Protection

Jordan does not lack the legal and institutional tools to regulate and manage land resources. Significant numbers of relevant laws and regulations have been issued to cover the authority, directions, responsibilities, obligations and technical aspects. The Jordanian government has also developed multi-sectorial organizational structures at various levels to supervise and control the implementation of those laws and regulations.

However, the developed legal and regulatory frameworks have a number of deficiencies. The following paragraphs examine the weaknesses and constraints of the regulations and agencies, emphasizing basic elements such as consistency, harmonization, clarity and enforceability, with focus on factors that impede the development and protection of groundwater resources.

- **Dispersion of authorities.** The authorization of preparation of plans and strategies related to the protection of water resources is dispersed between various institutions, such as MOE, MOA, Water Authority, etc. Consequently enforcement of punitive measures provided by the corresponding law is also distributed through the number of institutions.

- **Legislation is reactive** rather than proactive, laws and regulations are issued as response to problems, and issuance process is bureaucratic and slow.

- **Overlap of jurisdiction** in areas, such as water management; numerous governmental departments and agencies compete for jurisdiction in high visibility areas; or conversely use this overlap to shun any responsibility where this might be beneficial.

- **Inconsistencies** and ambiguities in different legislations addressing the similar issues that create loopholes for avoiding penalties.

- **Weak law enforcement** due to inadequate capacity of responsible institutions

The identified weaknesses and deficiencies of the national Jordanian institutional and regulatory framework require the institutionalization of the groundwater protection issues through the following:

- **Streamlining of the groundwater protection issues into the planning process.** The dual approach: top-bottom and bottom-top is envisioned. The schematic representation of the process is presented in the diagram below:
Representatives of the local communities are aware about the water management issues and are prepared to implement actions applicable to the specific communities.

Local level politicians are informed about the needs of the specific local communities and are committed to support the proposed actions.

National level politicians are informed about the needs of the local community and about the proposed measures are committed to provide the necessary legislative support for the proposed actions.

The national policies and strategies are integrated into the local development plans.

Pilot projects are implemented on the local community level.

Figure 1: Schematic Diagram of Streamlining of Groundwater Protection Issues into the National Planning Process

- Establishment of a Hazards Reduction and Prevention (HRP) Manager position/unit in the municipalities.

It is envisioned that the HRP Manager will be able to include the necessary measures for protection of groundwater into the local development plans.

3.4 SWOT Analysis

The Consultant has conducted the series of interviews with the representatives of the seven municipalities as mentioned above. During these interviews the representatives of the municipalities were asked to fill the multi-purpose questionnaire (The questionnaire IS presented in the Annex 2).

The objectives of these interviews are as following:

- Evaluation of the level of awareness of the municipal staff;
- Assessment of current capabilities of the municipal staff;
- Assessment of the current processes and procedures in regards to monitoring of the groundwater issues;
- Training needs assessment.
Based on the results of the interviews the SWOT (Strength, Weaknesses, Opportunities and Threats) analysis was prepared. Specifically, SWOT is a basic, straightforward model that assesses what an organization can and cannot do as well as its potential opportunities and threats. The method of SWOT analysis is the separation of information into internal (strengths and weaknesses) and external issues (opportunities and threats). SWOT analysis determines what may assist the organization in accomplishing its objectives, and what obstacles must be overcome or minimized to achieve desired results.

It has been observed that all the municipalities participating in the project are facing the similar problems in terms of the lack of adequately trained personnel, waste disposal issues, lack of awareness, similar potential hazards to groundwater. Therefore, SWOT analysis presented in the Table below is applicable to all seven municipalities.

**Table 4: SWOT Analysis**

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Willingness to improve the livelihood of the communities by the elected municipal officials;</td>
<td>• Lack of knowledge and awareness on potential hazards to groundwater;</td>
</tr>
<tr>
<td>• Precedents on transferring cases of violation of the regulations to the court;</td>
<td>• Lack of adequately trained personnel;</td>
</tr>
<tr>
<td>• Existence of wastewater treatment facilities and landfills in some municipalities;</td>
<td>• Insufficient enforcement of the existing legislation in regards to effluent disposal;</td>
</tr>
<tr>
<td>• Monitoring of the cesspits construction for industrial and commercial establishments;</td>
<td>• Limited financial resources and lack of knowledge on access to finance;</td>
</tr>
<tr>
<td>• Existing Registry for commercial and industrial establishments</td>
<td>• Absence of the developmental plans for municipalities;</td>
</tr>
<tr>
<td></td>
<td>• Absence of the unified information on the establishments within the municipal borders;</td>
</tr>
<tr>
<td></td>
<td>• Inadequate capacity and in some cases absence of facilities for liquid and solid waste disposal</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Mainstreaming of groundwater protection issues into the national policies and strategies;</td>
<td>• Legislative deficiency in regards to the autonomics of municipalities;</td>
</tr>
<tr>
<td>• Existing legislation pertaining to groundwater protection and regulations for effluent and solid waste disposal;</td>
<td>• Low level of acceptance of enforcement measures by communities due to the prevalent tribal structure of the society;</td>
</tr>
<tr>
<td>• Increased public awareness on national level on the health hazards due to the groundwater pollution;</td>
<td>• Low level of comprehension of the issue by the high-level decision makers;</td>
</tr>
<tr>
<td>• Interest and involvement of the international donor institutions in the Jordan Valley;</td>
<td>• Low level of income in the communities’ household;</td>
</tr>
<tr>
<td>• Possibility of inclusion of the groundwater in the developmental plans and budgeting on the national level;</td>
<td>• Lack of communication and coordination between the different governmental institutions and authorities</td>
</tr>
<tr>
<td>• Close geographic location of some municipalities and possibility of establishing the shared facilities for effluent and solid waste disposal</td>
<td></td>
</tr>
</tbody>
</table>
3.5 Establishment of the Groundwater Monitoring Unit

The establishment of establishment of a Hazards Reduction and Prevention (HRP) Manager position/unit takes into consideration the following factors:

- Aligning the functioning of the unit with the long-term goals and objectives of groundwater protection;
- Necessity of institutional strengthening and capacity building of the municipalities and knowledge retention;
- Continuity of the process by developing and implementing pilot projects;
- Sustainability and functionality of the unit;
- Centralized information of the conditions of the groundwater within the municipalities;
- Continuous monitoring of developmental activities and evaluation of their potential impacts on the groundwater resources.

It is envisioned that the HRP Manager should be identified as an independent entity within the organizational structure of the municipalities and therefore should be referred to as a unit rather than just a position. The following alternatives are proposed in regards to location of the unit within the Municipalities:

1. No unit
2. Par-departmental Unit
3. Within the Health Department (due to the unclear status of the Environmental Department, and in some cases absence of such)

The pros and cons of the proposed alternatives are summarized in the Table below:

<table>
<thead>
<tr>
<th>#</th>
<th>Alternative</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
</table>
| 1 | No Unit | | No updated information on the conditions of the groundwater
<p>| | | | No coordinated efforts on the monitoring activities, therefore|</p>
<table>
<thead>
<tr>
<th>#</th>
<th>Alternative</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>possible overlap in initiatives by different departments, and consequently no actions implemented;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Possible degradation of the groundwater quality due to the lack of monitoring of the developmental activities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Inadequate capabilities of the involved municipalities due to the absence of the process of institutional strengthening and capacity building</td>
</tr>
</tbody>
</table>
| 3  | Partial departmental Unit | • Proposed functions and responsibilities of the Unit already exist in the municipalities to some degree  
• HRP Manager will serve as a centralized Focal Point | • Dispersed functionalities within the municipality and relevant directorates of the service ministries  
• Lack of coordination and communication with all involved stakeholders;  
• Unsustainable process of implementation of measures on groundwater protection due to the lack of initiatives and pilot projects |
| 3  | Within Health Department | • HRP Manager will serve as a centralized Focal Point  
• Coordinated activities and initiatives among all involved stakeholders;  
• Centralized information repository and dissemination;  
• Continuous process of institutional strengthening and capacity building;  
• Continuous process of monitoring and evaluation of the status of the groundwater resources | • Possible overlap with the responsibilities and functions of other departments, which could be easily avoided through the implementation of an appropriate coordination and communication framework  
• Lack of line of authority on other critical departments and/or directorates of the line ministries in the area |

Taking into consideration the above-mentioned components, the proposed unit/position should be part of the Health department within the Municipalities.

3.5.1 Responsibilities and Functions of the HRP Unit/Manager

The responsibilities and functions of the proposed unit will include but not limited to:

1. Preparation of the Master Plan of the Groundwater Monitoring. The master plan should include the following components:
   • Coordination framework with all the relevant stakeholders;  
   • Framework for implementation, identifying the milestones and performance indicators;
• Framework for monitoring and evaluation of the progress of the project implementation;
• Identification of problem areas and determine the additional studies required for successful basin groundwater protection strategies;
• Determine the tools and methodology of analysis of the acquired data in accordance with the set goals and objectives of the project;
• Allocation of adequate funding for the project components and identifying the sources of possible future funding

2. The unit should become a focal point for the groundwater resources monitoring, consequently one of the crucial functions of the unit will be coordination with the relevant stakeholders

3. Preparation of the detailed plan and schedule for monitoring and evaluation of status of the groundwater resources

4. Data collection and sampling

5. Establishment of the database of the collected information, data entry

6. Analysis and reporting: all findings should be shared with all the relevant stakeholders and necessary preventive and/or corrective actions proposed

7. Allocation of resources including material and human resources for conducting activities deemed necessary within the framework of the prepared Master Plan.

8. Publications and information dissemination.

3.5.2 Job Description
According to the identified required functions of the HRP Manager/Unit, the following job description is proposed:

Job Title: HRP Manager

Reporting to: Head of Health Unit, Mayor

Qualifications and Skills:

• An Academic Degree in Environmental Sciences with the accumulated relevant experience of conducting field studies and sample collection;
• Good inter-personal and communication skills;
• Proficiency in English and Arabic Languages;
• Excellent computer skills

Duties and Responsibilities:
• Prepare the detailed monitoring and evaluation plans and schedules;
• Identification and implementation of the necessary tools and software for the project management and database;
• Analysis of the collected information;
• Preparation of the reports and presentations on the findings;
• Identification of the required additional studies, preparation of ToRs for the required studies, management of the studies;
• Conduct physical collection of samples in order to monitor the level of pollution at designated sites;
• Coordinate the laboratory testing of the collected samples;
• Collection of information relevant to the project implementation specified in the Master Plan and detailed plans prepared;
• Data entry and analysis;
• Compile the comprehensive database of the international and local and regional donors including the detailed information on funding procedures, contacts, etc.
• Coordinate the communication with the relevant stakeholders;
• Follow-up with the announcements of the donors;
• Apply for funding for the pilot projects necessary for implementation;
• Organize and conduct seminars and workshops for the involved stakeholders for the purpose of information dissemination and ensure the public participation in the project implementation;
• Conduct workshops with the focus groups;
• Preparation of the reports on the conducted activities.

3.5.3 Required Resources

For the efficient work of the proposed Unit, it should be provide with the adequate resources, including materials and equipment, human resources, financial resources. In addition, the capabilities of the Unit personnel, and institutional capacity of the Unit should be the subject of continuous improvement and enhancement.

Human resources:

• Qualified personnel according to the job descriptions proposed above;
• Number of personnel is at least 1 person;
• Capacity Building and Training

Materials and Equipment:

• Office space and office furniture;
• Office supplies and stationery;
• Computers according to the number of personnel employed (provided through PGW project)
• Internet, telephones;
• Software (provided through PGW project);
• IT support and maintenance;
• Vehicle, preferably 4X4 drive for accessibility of remote and/or difficult terrain areas
• Allocated budget and financial resources

The Table below provides the approximate budget for one year of the unit operations:

### Table 6: Anticipated Budget

<table>
<thead>
<tr>
<th>#</th>
<th>Item</th>
<th>Unit</th>
<th>Cost per Unit (JD)</th>
<th>Number of Units</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HRP Manager Salary (including benefits)</td>
<td>month</td>
<td>500</td>
<td>12</td>
<td>6000</td>
</tr>
<tr>
<td>2</td>
<td>Communications</td>
<td>N/A</td>
<td>N/A</td>
<td>12</td>
<td>300</td>
</tr>
<tr>
<td>3</td>
<td>Vehicle/Logistics</td>
<td>month</td>
<td>100</td>
<td>12</td>
<td>1200</td>
</tr>
<tr>
<td>4</td>
<td>Office Supplies</td>
<td>month</td>
<td>20</td>
<td>12</td>
<td>240</td>
</tr>
<tr>
<td>5</td>
<td>Water and Soil Sampling</td>
<td>test</td>
<td>2500</td>
<td>2</td>
<td>5000</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>12740</strong></td>
</tr>
</tbody>
</table>

4 Strategic Master Plan for Groundwater Protection

4.1 Hazard Management Protocols

The procedures listed below are designed to provide proactive systematic approach to for managing the potential environmental consequences and impacts of the identified hazards to the groundwater.

**Planning**: determines impacts of the work conducted throughout the implementation of the Master Plan to control and reduce, where possible, the impacts associated with the identified aspects.
Hazards and their severity are identified by reviewing all developmental activities, and assessing the possibility each of them have for an environmental impact and recognizing that certain environmental aspects are the subject of certain legal or other requirements.

Objectives and targets are set by considering, in part, the legal and other requirements, the views of interested parties, as well as, technological, financial and other operational considerations. This ensures that objectives and targets are robust, that they respond to legitimate concerns.

**Monitoring and Evaluation:** includes defining roles and responsibilities for each task as well as performance indicators and milestones for completion, including timeframes and frequency of monitoring and evaluation through the implementation of the Master Plan.

**Reporting:** Regular reporting on the status of identified hazards and compliance of implementation with the proposed mitigation measures should be provided according to the proposed monitoring schedule.

**Training, Awareness, and Competence:** requires two types of training: general awareness, and competence training. General awareness training for all municipal employees focuses on the importance of the hazards prevention policy, the role of employees, and the potential consequences of failing to provide sufficient care. Competence training is prescribed for employees that work directly with the Hazards Prevention Program and focuses on the possible significant impacts of those aspects, their specific roles and responsibilities, the objectives and targets for those aspects, and the operational controls in place to avert the actualization of the potential impacts.

**Communication:** ensures that management demands effective communications to coordinate staff internally and to liaise with external stakeholders.

**Emergency Preparedness and Response:** despite best efforts there is the possibility of unpredictable accidents and emergencies. It is necessary that measures to be included in the plan to address the environmental consequences of such occurrences. It is expected that such measures work to control and mitigate those possible environmental consequences.

**Corrective actions:** Upon identification of deviation from the recommended mitigation measures and/or non-compliance with regulations and recommendations the action request should be issued and immediate corrective actions implemented.

The special care should be provided for monitoring of the potential hazards identified as Red Alert and Red Line Protocols.

### 4.1.1 Red Alert and Red Line Protocols

The Audit Report prepared at the previous stages of the study has identified potential Hazards for each Municipality. The Identified Hazards has been given the Hazards Index and mapped. Also, Vulnerability and Risk maps were prepared.
The impacts of the development activities are defined as potential due to the fact that the soil and water sampling and testing have not been conducted and are not within the scope of the present study. However, some of the activities might have more pronounced impacts on the groundwater quality. Therefore, the special care and additional planning and monitoring should be given to the categories identified as Red Alert and Red Line Protocols.

In order to prioritize such issues the following criteria is proposed:

1. The scale/area of the activity;
2. The severity or Hazard Index of the activity;
3. Probability of its occurrence;
4. Duration of the activity;
5. Location

The paragraphs below provide the brief description of the proposed criteria:

The scale/area of the activity is an obvious choice for the criterion: the larger the area the larger is the potential impact.

Hazard Index or the severity of the activity: some of the developmental activities although are occupying a rather large area might not have the pronounced impact on the groundwater quality, e.g. graveyards.

Probability of occurrence: some of the activities might have an impact only due to the occurrence of some natural phenomenon such as flooding which is extremely rare in the Jordan Valley.

Long term construction activities including excavation, cut and fill operations for the roads construction will have the more likely impact on the groundwater quality, than a long-term operating workshop, provided that it conducts its operations in compliance with the existing regulations.

The activities located within the high risk areas and in a close proximity to them should be considered as more hazardous than the same type of activities in the areas identified as low risk areas.

The criteria were ranked as presented in Table 7 below.

<table>
<thead>
<tr>
<th>Negative Impact</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible</td>
<td>0</td>
</tr>
<tr>
<td>Minimal</td>
<td>1</td>
</tr>
<tr>
<td>Medium</td>
<td>2</td>
</tr>
<tr>
<td>High</td>
<td>3</td>
</tr>
</tbody>
</table>
The definition of the criteria ranking is presented in the table below:

**Table 8: Categorization of Criteria**

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Negligible</th>
<th>Minimal</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale/area</td>
<td>Less than 100 m²</td>
<td>100 – 500 m²</td>
<td>500 -1000 m²</td>
<td>More than 1000 m²</td>
</tr>
<tr>
<td>Severity/Hazard Index</td>
<td>0 – 320</td>
<td>320 - 640</td>
<td>640 - 960</td>
<td>960 – 1280 and above</td>
</tr>
<tr>
<td>Probability of occurrence</td>
<td>Rare and/or accidental event</td>
<td>Occasional non-compliance with the existing regulations</td>
<td>Regular occurrence such as accumulation of litter and debris</td>
<td>Regular deliberate violation of the existing regulations, such as excavating additional earth bottomed septic tanks instead of disposal of the content of the existing</td>
</tr>
<tr>
<td>Duration</td>
<td>Short-term, such as upgrading of the existing facilities</td>
<td>Prolonged, such as construction activities conducted through phases</td>
<td>Seasonal medium-term operations</td>
<td>Continuous, long-term operations</td>
</tr>
<tr>
<td>Location</td>
<td>Areas identified as no risk areas</td>
<td>Low risk areas</td>
<td>Medium risk areas</td>
<td>High risk areas</td>
</tr>
</tbody>
</table>

It is envisioned that the existing and planned activities will be evaluated according to the matrix presented below:

**Table 9: Matrix for Activities Evaluation**

<table>
<thead>
<tr>
<th>#</th>
<th>Activity</th>
<th>Scale/Area</th>
<th>Hazard index</th>
<th>Probability of Occurrence</th>
<th>Duration</th>
<th>Location</th>
<th>Total</th>
</tr>
</thead>
</table>

Activities that will receive the total mark between 9 and 12 will trigger the **Red Alert Protocol**:

- Monitor on a weekly basis;
- Propose the preventive measures;
- Inform the operator of necessity of implementation of the preventive measure in accordance with the existing regulations;
- Verify compliance with the recommendations

Activities that will receive the total mark between 13 and 15 will trigger **Red Line Protocol**.
• Monitor on a daily basis;
• Propose the corrective measures;
• Inform the operator of necessity of implementation of the corrective measures in accordance with the existing regulations;
• Inform the relevant authorities about the possibility of severe hazardous impacts in case of non-compliance with the recommendation
• Verify implementation of the recommendations

4.2 Master Plan - General Issues
The generic Master Plan for the seven municipalities participating in the project is based on the findings of the Hazards Audit Report. The main goal of the Master Plan is to provide systemic approach to integrated management of the groundwater resources in the area in order to prevent pollution of groundwater.

The objectives of the Master Plan are:

1. Raising awareness on the relationship between the human activities and degradation of quality of the groundwater resources of the local community members and local authorities;
2. Advocate streamlining of the groundwater protection measures into the local development plans and into national planning process;
3. To propose measures aiming at the reduction of hazards to the groundwater from urban, agricultural and industrial activities.

The Master Plan for overarching issues is elaborated in the Table below:
### Table 10: Master Plan – General Issues

**Activity 1:** Awareness Campaign on the relationship between the human activities and degradation of quality of the groundwater resources

**Overall Objective:** Improvement of practices of water use, re-use and protection

**Specific Objectives:**
- Raising awareness on the relationship between the human activities and groundwater resources degradation
- Enhancing knowledge on adequate water use

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Brochures, leaflets, posters</td>
<td>Technical assistance from MoA, MOE, NCARE and donor organizations such as GIZ</td>
<td>Enhanced knowledge groundwater management issues</td>
<td>Low level of acceptance and implementation of necessary measures</td>
<td>10 000 per year per municipality</td>
</tr>
<tr>
<td>Local NGOs and CBOs and associations as representatives of the local community</td>
<td>Media campaign</td>
<td>Financial assistance of governmental institutions and NGOs involved in related activities</td>
<td>Reduction of waste</td>
<td>Difficulty in financial funds acquisition</td>
<td></td>
</tr>
<tr>
<td>Local Schools</td>
<td>Lectures, seminars</td>
<td>Financial assistance of international donor organizations</td>
<td>Adequate use of the water resources</td>
<td>Low consistency in application of acquired knowledge</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Recycling of water for agricultural use</td>
<td>Lack of qualified technical expertise</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Reduction in human groundwater contamination</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Activity 2:** Advocacy campaign for streamlining of the groundwater protection measures into the local development plans and into national planning process

**Overall Objective:** Educate and empower local communities to communicate their needs to all level politicians and to advocate sustainable development in their areas through integrating the proposed groundwater protection issues into the local and national development plans

**Specific Objectives:**
- Obtain support from the Local Community members with adequate knowledge of the community needs and having influence in the local community for lobbying for the proposed measures;

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local communities:</td>
<td>- Discussion: Topics for Discussion:</td>
<td>- Technical assistance from MoA, MOE, NCARE and donor organizations such as GIZ</td>
<td>- Commitment by the Local Authorities to support water conservation in the area through inclusion of proposed actions in the Governorate Master Plans for Development</td>
<td>- Conflict of interest between the governorate developmental priorities and the needs of the local communities</td>
<td>5 000 per year per municipality</td>
</tr>
<tr>
<td>- Respected members of the community</td>
<td>- Priority development needs of the local communities;</td>
<td>- Technical assistance of EcoPeace</td>
<td>- Local Council is aware of the needs of the particular local community and is supporting the streamlining of the groundwater protection issues into the local development plans</td>
<td>- Unwillingness to take active part in supporting the actions due to the political reasons</td>
<td></td>
</tr>
<tr>
<td>- Representatives of governmental institutions, e.g. LDU, directorates of the line ministries, mayors, Local Councils</td>
<td>- Water conservation options applicable to local communities;</td>
<td>- Financial assistance of governmental institutions and NGOs involved in related activities</td>
<td>- Pilot projects aiming at groundwater protection are implemented</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Representatives of non-governmental organizations and institutions, e.g. Water Users Associations, Youth and Women Organizations</td>
<td>- Alternatives for sustainable development in the area;</td>
<td>- Financial assistance of international donor organizations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Development of job and income generating projects taking into consideration the sustainable water management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Policy Flyers, publications</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.3 **Generic Master Plan for Addressing Urban/Residential Hazards**

Residential/urban activities as possible pollution sources, relevant to the study area are as following:

- Residential areas;
- Educational facilities;
- Tourist facilities;
- Medical facilities;
- Road infrastructure;
- Landfills;
- Cemeteries;
- Wastewater treatment plants

The map identifying the urban hazards is presented below:

![Urban Hazards Map](image-url)
Table 11: Master Plan – Urban Hazards

**Activity 1: Establishment of the comprehensive database of urban facilities and conditions of effluent and solid waste disposal**

**Overall Objective:** To provide comprehensive database of residential entities

**Specific Objectives:**
- To provide concise and comprehensive databank of residential entities and the pertaining waste disposal issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality, Use of the existing registry in the municipality</td>
<td>Comprehensive inventory of the urban entities within the municipal borders</td>
<td>Lack of qualified technical expertise, Insufficient existing registry</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
</tbody>
</table>

**Activity 2: Monitoring of urban facilities and conditions of effluent and solid waste disposal**
### Overall Objective: To prevent groundwater pollution from residential effluent and solid waste

### Specific Objectives:
- To ensure the proper and adequate disposal of residential effluent and solid waste
- Enforcement of the existing legislation in waste management

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Local Authorities</td>
<td>• Electronic repository using the available MS software, such as Excel</td>
<td>• Technical assistance from IT department of the Municipality</td>
<td>• Comprehensive inventory of the conditions and practices of the waste disposal within the municipal borders</td>
<td>• Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
<tr>
<td></td>
<td>• Monitoring plans</td>
<td>• Use of the existing registry in the municipality</td>
<td></td>
<td>• Insufficient existing registry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Reports from the relevant authorities on their monitoring of the entities which are not within the jurisdiction of the Municipality, such as Health Directorate</td>
<td>• Reports from relevant directorates of the service ministries</td>
<td></td>
<td>• Lack of coordination with the service ministries directorates</td>
<td></td>
</tr>
</tbody>
</table>

### Activity 3: Establishment of low-cost wastewater treatment facilities in municipalities

### Overall Objective: To prevent groundwater pollution from residential effluent
### Specific Objectives:

- To ensure the proper and adequate disposal of residential effluent

<table>
<thead>
<tr>
<th>Stakeholder/ Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| Local Authorities         | • Studies on the required capacity of the wastewater treatment facilities  
                           • Fundraising  
                           • Supervision of the construction and operations | • Outsourcing the studies to external consultants  
                           • Technical and financial assistance from the donor organization to support resources from the budget  
                           • Public – Private Partnership schemes | • The wastewater treatment facility established and operational | • Lack of financial resources  
                           • Unwillingness of the national authorities to include establishment of such facilities into the national development plans | The costs will be defined upon conclusion of studies on the required capacities of the wastewater treatment plants |

**Activity 4:** Establishment of localized sanitary network in municipalities

**Overall Objective:** To prevent groundwater pollution from residential effluent

### Specific Objectives:

- To ensure the proper and adequate disposal of residential effluent
<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| • Local Authorities      | • Studies on the design of the sewage network  
  • Fundraising  
  • Supervision of the construction and operations | • Outsourcing the studies to external consultants  
  • Technical and financial assistance from the donor organization to support resources from the budget  
  • Public – Private Partnership schemes | • The sewage network is established and operational | • Lack of financial resources  
  • Unwillingness of the national authorities to include establishment of such facilities into the national development plans | The costs will be defined upon conclusion of studies on the design of the sewage network |

**Activity 5: Establishment of local landfills in municipalities**

**Overall Objective:** To prevent groundwater pollution from accumulated solid waste

**Specific Objectives:**

- To ensure the proper and adequate disposal of municipal solid waste

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Local</td>
<td>• Studies on the</td>
<td>• Outsourcing the</td>
<td>• The landfills</td>
<td>• Lack of financial</td>
<td>The costs will be</td>
</tr>
<tr>
<td>Authorities</td>
<td>required capacity of the landfills</td>
<td>studies to external consultants</td>
<td>established and operational resources</td>
<td>defined upon conclusion of studies on the required capacity of the landfills</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>• Fundraising</td>
<td>• Supervision of the construction and operations</td>
<td>• Technical and financial assistance from the donor organization to support resources from the budget</td>
<td>• Unwillingness of the national authorities to include establishment of such facilities into the national development plans</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.4 Generic Master Plan for Addressing Agricultural Hazards
Agricultural activities as possible pollution sources, relevant to the study area are as following:

- Agricultural chemicals, fertilizers and pesticides, spreading/spraying
- Livestock farming and associated manure piles/other animal waste
- Fertilized fields/agricultural areas
- Illegal wells drilling for irrigation purposes

The identified agricultural hazards are presented in the Figure below:

![Figure 3: Agricultural Hazards](image-url)
Table 12: Master Plan – Agricultural Hazards

**Activity 1:** Establishment of the comprehensive database of agricultural facilities, wells, irrigation volumes, and agricultural practices such as use of pesticides and fertilizers within the municipal borders

**Overall Objective:** To provide comprehensive database of agricultural entities

**Specific Objectives:**
- To provide concise and comprehensive databank of agricultural entities and the pertaining issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| • Local Authorities     | • Electronic repository using the available MS software, such as Excel | • Technical assistance from IT department of the Municipality  
• Use of the existing registry in the municipality  
• Coordination with the Agricultural Directorate, WAJ and JVA | • Comprehensive inventory of the agricultural entities within the municipal borders | • Lack of qualified technical expertise  
• Insufficient existing registry | No extra costs to the salary of HRP Manager are anticipated |

**Activity 2:** Monitoring of agricultural entities for employed practices such as irrigation, use of pesticides and fertilizers, wells licensing and drilling
Overall Objective: To prevent groundwater pollution from agricultural run off

Specific Objectives:

- To ensure the proper and adequate agricultural practices
- Prevention of groundwater contamination from salty water intrusion from illegal wells
- Enforcement of existing legislation

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality</td>
<td>Comprehensive inventory of the agricultural conditions and practices within the municipal borders</td>
<td>Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
<tr>
<td></td>
<td>Monitoring plans</td>
<td>Use of the existing registry in the municipality</td>
<td>Reports on agricultural entities and practices</td>
<td>Insufficient existing registry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reports from the relevant authorities on their monitoring of the entities, such as the Agricultural Directorate, WAJ and JVA</td>
<td>Reports from relevant directorates of the service ministries</td>
<td></td>
<td>Lack of coordination with the service ministries directorates</td>
<td></td>
</tr>
</tbody>
</table>

Activity 3: Introduce the alternatives such as Integrated Pest Management and drip irrigation as sustainable agricultural practices

Overall Objective: To prevent groundwater pollution from agricultural run off

Specific Objectives:

- To ensure the proper and adequate agricultural practices
<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| Local Authorities        | • Training for farmers  
                          • Prepare the program of partial farmers’ subsidizing  
                          • Reports from the relevant authorities on their monitoring of the entities, such as the Agricultural Directorate, WAJ and JVA | • Technical assistance from Agricultural Directorate, NCARE, GIZ and other organizations  
                          • Financial assistance from donor organizations  
                          • Public Private Partnership scheme with investors in agricultural sector | • IPM and drip irrigation techniques are deployed  
                          • Training reports | • Lack of qualified technical expertise  
                          • Lack of coordination with the service ministries directorates | No extra costs to the salary of HRP Manager are anticipated |
4.5 **Generic Master Plan for Addressing Industrial Hazards**

Industrial activities as possible pollution sources, relevant to the study area are as following:

- Gas stations/service stations
- Auto repair shops
- Car Washes
- Food processing factories
- Sand and gravel mining/other mining
- Construction sites
- Potash and Bromine Factories
- Olive oil mills

The identified industrial hazards are presented in the Figure below:

![Figure 4: Industrial Hazards](image)
### Table 13: Master Plan – Industrial Hazards

**Activity 1:** Establishment of the comprehensive database of industrial facilities within the municipal borders

**Overall Objective:** To provide comprehensive database of industrial entities

**Specific Objectives:**
- To provide concise and comprehensive databank of industrial entities and the pertaining issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| Local Authorities        | Electronic repository using the available MS software, such as Excel | • Technical assistance from IT department of the Municipality
 • Use of the existing registry in the municipality
 • Coordination with the Agricultural Directorate, WAJ and JVA | • Comprehensive inventory of the industrial entities within the municipal borders | • Lack of qualified technical expertise
 • Insufficient existing registry | No extra costs to the salary of HRP Manager are anticipated |

**Activity 2:** Monitoring of industrial entities for employed practices effluent and solid waste disposal
### Overall Objective: To prevent groundwater pollution from industrial effluent

### Specific Objectives:

- To ensure the proper and adequate disposal practices of industrial waste
- Prevention of groundwater contamination from industrial effluent
- Enforcement of existing legislation

<table>
<thead>
<tr>
<th>Stakeholder/ Target Group</th>
<th>Tools/Methods</th>
</tr>
</thead>
</table>
| • Local Authorities       | • Electronic repository using the available MS software, such as Excel  
• Monitoring plans  
• Reports from the relevant authorities on their monitoring of the entities, responsible for industrial licensing and monitoring |

<table>
<thead>
<tr>
<th>Resources</th>
</tr>
</thead>
</table>
| • Technical assistance from IT department of the Municipality  
• Use of the existing registry in the municipality  
• Reports from relevant directorates of the service ministries |

<table>
<thead>
<tr>
<th>Anticipated Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Comprehensive inventory of the industrial conditions and practices within the municipal borders</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assumptions</th>
</tr>
</thead>
</table>
| • Lack of qualified technical expertise  
• Insufficient existing registry  
• Lack of coordination with the service ministries directorates |

<table>
<thead>
<tr>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
</tbody>
</table>

Activity 3: Raising awareness of the owners on the issues on protecting groundwater

### Overall Objective: To prevent groundwater pollution from industrial effluent

### Specific Objectives:
To ensure the proper and adequate disposal of industrial effluent and solid waste in compliance with the relevant existing legislation

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>• Awareness program</td>
<td>• Technical assistance from Agricultural Directorate, NCARE, GIZ and other organizations</td>
<td>• Reports on the provided seminars and workshops</td>
<td>• Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
<tr>
<td></td>
<td>• Introduction of Corporate Social responsibility (CSR) to business owners</td>
<td>• Financial assistance from donor organizations</td>
<td>• Contribution of business owners to local development</td>
<td>• Lack of coordination with the service ministries directorates</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Financial assistance from donor organizations</td>
<td>• Public Private Partnership scheme with investors in industrial sector</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Public Private Partnership scheme with investors in industrial sector</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The specific Master Plans for each Municipality participating in the project are presented in the Annex 1.

### 4.6 Financial Mechanisms for Implementation of the Master Plan

**Public budget** is the main source of internal financing in Jordan. Budget preparation and examination are done through the GBD an autonomous administrative entity within MOF whose main tasks are:

- preparing Jordan’s annual general budget law;
- proposing budget allocations for implementation of the general policy set by the Cabinet of Ministers;
- assessing government departments’ requests for financial allocations; examining all programs, work and projects;
- verifying that requests for allocations are compatible with economic and financial policies.

Line agencies are the main source of cost estimates for government operations.

Municipalities across Jordan play a pivotal role in local community development and the provision of community services and facilities. Municipal budgets are controlled by MOMA. Municipal budgets are based on the previous two years’ expenditures.

The MoMA is the entity which provides regulatory oversight of the municipal sector, technical assistance and support to the municipalities, except for Greater Amman Municipality. Its current mission statement is to “build capabilities of municipalities and secure developmental infrastructure, and to contribute to triggering the ongoing and continuous development and offer necessary services to the local communities.”

The Ministry of Municipal Affairs (MoMA) is responsible for:

- developing the local administration in the Kingdom through developing policies and raising staff efficiency
- preparing regional organizational plans for towns and cities and assisting the municipalities in carrying out their organizational responsibilities
- assisting the municipalities in budget preparation and approval of the budgets
- ensuring funding for vital projects in municipalities
- assisting municipalities in developing project designs, specifications and plans
- preparing laws and rules for regulating the work of municipalities in an aim to improve efficiency
- supervising and inspecting the operations of municipalities and ensuring conformity with the rules
MoMA must receive and approve the annual budgets of all municipalities. Since 2002, this process is carried out using a computerized and systematized methodology, whereby each municipality prepares its budget according to the guidelines and using the computerized format, and submits to MoMA. According to the Law, the Minister of Municipal Affairs must approve each municipal budget. However, some municipalities report that the MoMA does intervene and make recommendations on the budgets, less regarding capital expenditures and more so regarding operating cost items. For some municipalities with very low capacity, MoMA assists with budget preparation and finalization.

However, due to the distance of MoMA from local communities, decisions which are made by them (as opposed to their review and approval of municipal council decisions) often do not take into account local issues and priorities. Usually MOMA has the final decision in approval or rejection of purchasing decisions and tenders, although the municipalities feel they are the ones that are located locally and are the best to judge on these decisions because of their knowledge of the local context and needs.

Cities and Villages Development Bank (CVDB)

This institution was established in 1985 with the mandate to provide support to projects that include basic public services, assist in their development and mobilize both local and foreign financial resources necessary for their execution. The CVDB performs a financing role and a technical support role. It has three key stated purposes:

- To provide financing for local government to carry out infrastructure projects & self-generating productive projects.
- To assist local governments in defining the priority of their productive projects according to their feasibility.
- To provide training for the municipality personnel.

As a Bank, it manages the deposits of the municipalities – each municipality has at least one account at the Bank. It receives funding from shareholders and deposits from municipalities from locally generated income as well as deposits from the Ministry of Finance for fuel, property and vehicle registration taxes which are collected on behalf of the municipalities and accounted to the relevant municipality.

The Bank provides loans to the municipalities for both capital projects as well as for finance of operating costs. Loans are secured against each municipality's deposits at the Bank. Loans can be long term for infrastructure and profit generating projects (up to 12 years), or short term loans (overdrafts) for up to 1 year. Loan terms vary but are often for 10 years, at rates of 5% (for infrastructure projects) and 6% (for loans which should produce income or cash flow). The Bank also assesses project proposals from municipalities and assists in prioritization. It screens
projects by reviewing the plans for use of loan funds, and evaluates municipality's borrowing capacity.

**Ministry of Planning and International Cooperation (MOPIC)**

MOPIC is the channel through which all international donor funding to Jordan is directed and managed. This Ministry has a Local Development Department which is coordinating the substantial international interest in the development of the municipal sector. This Ministry has been a champion of decentralizing municipal authority as a spur for local development. In its role as coordinator of donor funds, MOPIC sets the broad strategic objectives for the sector in terms of reform and development.

**Ministry of Finance (MoF)**

The Ministry of Finance works with the MoMA and all other Ministries in the preparation of the Government's annual budget. It collects many of the revenues due to municipalities, on their behalf, and transfers funds to their CVDB accounts. However, it charges an administration fee for this. Any municipal (local spending) by the service delivery line ministries (Health, Education, etc) appears in the annual budget of the line ministry, not of the municipality.

**Public-Private Partnership (PPP)** is a contractual agreement formed between public and private-sector partners. PPP is implemented through several mechanisms, such as: Service Contracting, Management Contracting, Lease, Build-Operate-Transfer (BOT) (with/without Concession), Asset Sales (divestiture).

Mechanisms available to municipalities are:

- Supplies and Municipalities Works Regulation No. 55 for the year 1989- Article 42: Service Contracts are permissible under this regulation through RFPs and tenders.
- Municipal Law 14 for the year 2007- Article 40: The municipality council may practice their functions and authorities directly through their municipal staff and personnel or award them in whole or in part to entrepreneurs, concessionaires or contractors for periods not exceeding thirty years.

**ESPP:** The Social Productivity Program (SPP) and the Enhanced Productivity Program (EPP) are two Government initiatives aimed at improving the living conditions of the poor communities and individuals, and enhancing their economic opportunities. One of components of this program is – Small Grants and Direct Intervention. The main objectives of this component are:

- Contribute to the government efforts in poverty and unemployment alleviation.
- Contribute in improving the livelihood standards and increasing income through encouraging the establishment of productive income generating activities in the targeted areas.
- Create job opportunities for the unemployed and less fortunate individuals in the targeted areas
- Create expandable development spots in rural areas that are neglected by the private sector.
- Contribute to the government’s efforts in the immediate practical solutions for constrains with priority development.

The projects are executed through:

- Governmental Institutions: represent different ministries, municipalities and Universities.
- NGO's:
  - Profit NGO's: represent registered cooperatives
  - Non-profit NGO's: represent different charitable and social societies

5 Capacity Building in Municipalities

The personnel of the municipalities involved in the project have received training on GIS mapping and Hazards Identification and Prevention within the course of the current project. However, the level of comprehension of the issues and practical application of the received information needs further enhancement. In addition, some of the issues are necessary to be addressed in order to assist the municipalities to further develop and implement the plans for groundwater protection as identified through the SWOT analysis.

The survey was conducted in order to assess the existing capacities and training needs of the municipal staff. Each municipality has designated a responsible person for filling out the survey questionnaire.

The prepared survey questionnaire was translated into Arabic to ensure the complete understanding of the questions by the participants. The design is based on a balance of open ended questions for assessing importance and close ended questions to measure performance, sequencing the questions to reduce bias.

In order to ensure a maximum response rate and high quality information, the survey was conducted through personal interviews which allowed quite complex questions to be addressed and allowed the interviewer and the respondent to interact and exchange detailed information.

Based on the results of the survey and best practice experience, the following training courses for the municipal staff are recommended, as presented in the Table below:
<table>
<thead>
<tr>
<th>Course Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GIS Principles &amp; Addressing the Hazards Points</td>
<td>Addressing hazards locations and events on interactive maps</td>
</tr>
<tr>
<td>Map Contouring and Analyzing Pollution Hazards</td>
<td>Create pollution distribution map and analyzing its trends</td>
</tr>
<tr>
<td>Hazard (EXPOSE) and its Control measures</td>
<td>Create a detail description for each hazard and its control measures and prevention procedures</td>
</tr>
<tr>
<td>Groundwater standards applications</td>
<td>Dealing with standards to understand the red lines or hot spots</td>
</tr>
<tr>
<td>Wastewater standards and guidelines</td>
<td>Dealing with standards to understand the red lines or hot spots</td>
</tr>
<tr>
<td>Sanitary inspections forms and applications</td>
<td>Basis of evaluation of the compliance with the relevant existing legislation in dealing with the identified hazards</td>
</tr>
<tr>
<td>Emergency planning and measures</td>
<td>For specified events such as unpredictable heavy rains or floods</td>
</tr>
<tr>
<td>Online environmental data bank</td>
<td>Establishing a data bank for each municipality. Data, information and knowledge exchange between the municipalities</td>
</tr>
<tr>
<td>Financial Planning and Access to Finance</td>
<td>• assisting the municipalities in budget preparation</td>
</tr>
<tr>
<td></td>
<td>• ensuring funding for vital projects in municipalities</td>
</tr>
<tr>
<td></td>
<td>• assisting municipalities in developing project designs, specifications and plans</td>
</tr>
</tbody>
</table>
6 Conclusions

In order to provide proactive systematic approach to for managing the potential environmental consequences and impacts of the identified hazards to the groundwater the Hazards Management Protocols, including the Red Line and Red Alert Protocols were established.

It is recommended to establish a Hazard Prevention Manager Position and or Unit in the Municipalities. It is viewed as most beneficial to establish the position within the Health Department of Municipalities, due to the fact that this department already provides some monitoring of the development activities and has established communication channels with the other governmental entities. Thus, the HRP manage might receive the support of the municipality while serving as a focal point of addressing the groundwater pollution issues.

The Master Plan provides recommendations for addressing the different aspects of the groundwater pollution. Most of the suggested measures do not require the major capital investment and could be fulfilled by the HRP Manager.

However, other measures will require the significant investment, such as establishment of the wastewater treatment facilities, establishment of the sanitary networks and landfills. Through the assessment it has been found that the South Ghor Municipality disposes the liquid and solid waste on the ad hoc basis. Therefore, the establishment of such facilities is crucial and urgent task for this municipality.

The potential sources of finance for the implementation of the Master Plan were identified, including the existing mechanisms and schemes.

Also, recommendations for further capacity building of the municipalities has been provided.
7  Annex 1: Specific Master Plans for Municipalities

7.1 Master Plan for Municipality Khaled Ben Waleed
The Master Plan for overarching issues is elaborated in the Table below:

![Figure 5: Khaled Ben Waleed Combined Hazards Map](image_url)
### Activity 1: Awareness Campaign on the relationship between the human activities and degradation of quality of the groundwater resources

**Overall Objective:** Improvement of practices of water use, re-use and protection

**Specific Objectives:**
- Raising awareness on the relationship between the human activities and groundwater resources degradation
- Enhancing knowledge on adequate water use

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Brochures, leaflets, posters, Media campaign, Lectures, seminars</td>
<td>Technical assistance from MoA, MOE, NCARE and donor organizations such as GIZ, Financial assistance of governmental institutions and NGOs involved in related activities, Financial assistance of international donor organizations</td>
<td>Enhanced knowledge groundwater management issues, Reduction of waste, Adequate use of the water resources, Recycling of water for agricultural use, Reduction in human groundwater contamination</td>
<td>Low level of acceptance and implementation of necessary measures, Difficulty in financial funds acquisition, Low consistency in application of acquired knowledge, Lack of qualified technical expertise</td>
<td>10 000</td>
</tr>
<tr>
<td>Local NGOs and CBOs and associations as representatives of the local community</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local Schools</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Activity 2: Advocacy campaign for streamlining of the groundwater protection measures into the local development plans and into national planning process

**Overall Objective:** Educate and empower local communities to communicate their needs to all level politicians and to advocate sustainable development in their areas through integrating the proposed groundwater protection issues into the local and national development plans

**Specific Objectives:**
- Obtain support from the Local Community members with adequate knowledge of the community needs and having influence in the local community for lobbying for the proposed measures;

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local communities:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5 000</td>
</tr>
<tr>
<td>• Respected members of the community</td>
<td>• Discussion: Topics for Discussion:</td>
<td>• Technical assistance from MoA, MOE, NCARE and donor organizations such as GIZ</td>
<td>• Commitment by the Local Authorities to support water conservation in the area through inclusion of proposed actions in the Governorate Master Plans for Development</td>
<td>• Conflict of interest between the governorate developmental priorities and the needs of the local communities</td>
<td></td>
</tr>
<tr>
<td>• Representatives of governmental institutions, e.g. LDU, directorates of the line ministries, mayors, Local Councils</td>
<td>• Priority development needs of the local communities;</td>
<td>• Technical assistance of EcoPeace</td>
<td>• Local Council is aware of the needs of the particular local community and is supporting the streamlining of the groundwater protection issues into the local development plans</td>
<td>• Unwillingness to take active part in supporting the actions due to the political reasons</td>
<td></td>
</tr>
<tr>
<td>• Representatives of non-governmental organizations and institutions, e.g. Water Users Associations, Youth and Women Organizations</td>
<td>• Water conservation options applicable to local communities;</td>
<td>• Financial assistance of governmental institutions and NGOs involved in related activities</td>
<td>• Pilot projects aiming at groundwater protection are implemented</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Alternatives for sustainable development in the area;</td>
<td>• Financial assistance of international donor organizations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Development of job and income generating projects taking into consideration the sustainable water management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Policy Flyers, publications</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7.1.1 Khaled Ben Waleed Municipality Master Plan for Addressing Urban/Residential Hazards

Residential/urban activities as possible pollution sources, relevant to the study area are as following:

- Residential areas;
- Educational facilities;
- Tourist facilities;
- Medical facilities;
- Road infrastructure;
- Landfills;
- Cemeteries;
- Wastewater treatment plants

The map identifying the urban hazards is presented below:

![Figure 6: Urban Hazards Map](image-url)
### Table 16: Master Plan – Urban Hazards

**Overall Objective:** To provide comprehensive database of residential entities

**Specific Objectives:**
- To provide concise and comprehensive databank of residential entities and the pertaining waste disposal issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| • Local Authorities     | • Electronic repository using the available MS software, such as Excel | • Technical assistance from IT department of the Municipality  
• Use of the existing registry in the municipality | • Comprehensive inventory of the urban entities within the municipal borders | • Lack of qualified technical expertise  
• Insufficient existing registry | No extra costs to the salary of HRP Manager are anticipated |

**Activity 1:** Establishment of the comprehensive database of urban facilities and conditions of effluent and solid waste disposal

**Activity 2:** Monitoring of urban facilities and conditions of effluent and solid waste disposal
Overall Objective: To prevent groundwater pollution from residential effluent and solid waste

Specific Objectives:

- To ensure the proper and adequate disposal of residential effluent and solid waste
- Enforcement of the existing legislation in waste management

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality</td>
<td>Comprehensive inventory of the conditions and practices of the waste disposal within the municipal borders</td>
<td>Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
<tr>
<td></td>
<td>Monitoring plans</td>
<td>Use of the existing registry in the municipality</td>
<td></td>
<td>Insufficient existing registry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reports from the relevant authorities on their monitoring of the entities which are not within the jurisdiction of the Municipality, such as Health Directorate</td>
<td>Reports from relevant directorates of the service ministries</td>
<td></td>
<td>Lack of coordination with the service ministries directorates</td>
<td></td>
</tr>
</tbody>
</table>

Activity 3: Establishment of low-cost wastewater treatment facilities

Overall Objective: To prevent groundwater pollution from residential effluent
Specific Objectives:

- To ensure the proper and adequate disposal of residential effluent

### Stakeholder/ Target Group | Tools/Methods | Resources | Anticipated Outcomes | Assumptions | Evaluated costs (JD)
--- | --- | --- | --- | --- | ---
Local Authorities | Studies on the required capacity of the wastewater treatment facilities  
Fundraising  
Supervision of the construction and operations | Outsourcing the studies to external consultants  
Technical and financial assistance from the donor organization to support resources from the budget  
Public – Private Partnership schemes | The wastewater treatment facility established and operational | Lack of financial resources  
Unwillingness of the national authorities to include establishment of such facilities into the national development plans | The costs will be defined upon conclusion of studies on the required capacities of the wastewater treatment plants

**Activity 4:** Establishment of localized sanitary network

**Overall Objective:** To prevent groundwater pollution from residential effluent

**Specific Objectives:**

- To ensure the proper and adequate disposal of residential effluent
<table>
<thead>
<tr>
<th>Stakeholder/ Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| • Local Authorities       | • Studies on the design of the sewage network  
                           • Fundraising  
                           • Supervision of the construction and operations | • Outsourcing the studies to external consultants  
                           • Technical and financial assistance from the donor organization to support resources from the budget  
                           • Public – Private Partnership schemes | • The sewage network is established and operational | • Lack of financial resources  
                           • Unwillingness of the national authorities to include establishment of such facilities into the national development plans | The costs will be defined upon conclusion of studies on the design of the sewage network |
7.1.2 Khaled Ben Waleed Municipality Master Plan for Addressing Agricultural Hazards

Agricultural activities as possible pollution sources, relevant to the study area are as following:

- Agricultural chemicals, fertilizers and pesticides, spreading/spraying
- Livestock farming and associated manure piles/other animal waste
- Fertilized fields/agricultural areas
- Illegal wells drilling for irrigation purposes
### Activity 1: Establishment of the comprehensive database of agricultural facilities, wells, irrigation volumes, and agricultural practices such as use of pesticides and fertilizers within the municipal borders

**Overall Objective:** To provide comprehensive database of agricultural entities

**Specific Objectives:**
- To provide concise and comprehensive databank of agricultural entities and the pertaining issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| Local Authorities        | • Electronic repository using the available MS software, such as Excel  
                          | • Technical assistance from IT department of the Municipality  
                          | • Use of the existing registry in the municipality  
                          | • Coordination with the Agricultural Directorate, WAJ and JVA  
                          | • Comprehensive inventory of the agricultural entities within the municipal borders  
                          | • Lack of qualified technical expertise  
                          | • Insufficient existing registry  
                          | No extra costs to the salary of HRP Manager are anticipated |

### Activity 2: Monitoring of agricultural entities for employed practices such as irrigation, use of pesticides and fertilizers, wells licensing and drilling
### Overall Objective: To prevent groundwater pollution from agricultural run off

### Specific Objectives:
- To ensure the proper and adequate agricultural practices
- Prevention of groundwater contamination from salty water intrusion from illegal wells
- Enforcement of existing legislation

<table>
<thead>
<tr>
<th>Stakeholder/ Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Local Authorities</td>
<td>• Electronic repository using the available MS software, such as Excel</td>
<td>• Technical assistance from IT department of the Municipality</td>
<td>• Comprehensive inventory of the agricultural conditions and practices within the municipal borders</td>
<td>• Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
<tr>
<td></td>
<td>• Monitoring plans</td>
<td>• Use of the existing registry in the municipality</td>
<td>• Reports on agricultural entities and practices</td>
<td>• Insufficient existing registry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Reports from the relevant authorities on their monitoring of the entities, such as the Agricultural Directorate, WAJ and JVA</td>
<td>• Reports from relevant directorates of the service ministries</td>
<td>• Reports on agricultural entities and practices</td>
<td>• Lack of coordination with the service ministries directorates</td>
<td></td>
</tr>
</tbody>
</table>

### Activity 3: Introduce the alternatives such as Integrated Pest Management and drip irrigation as sustainable agricultural practices

### Overall Objective: To prevent groundwater pollution from agricultural run off

### Specific Objectives:
- To ensure the proper and adequate agricultural practices
<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| Local Authorities        | • Training for farmers  
                         • Prepare the program of partial farmers’ subsidizing  
                         • Reports from the relevant authorities on their monitoring of the entities, such as the Agricultural Directorate, WAJ and JVA  
| Technical assistance from Agricultural Directorate, NCARE, GIZ and other organizations  
                         • Financial assistance from donor organizations  
                         • Public Private Partnership scheme with investors in agricultural sector | • IPM and drip irrigation techniques are deployed  
                         • Training reports | • Lack of qualified technical expertise  
                         • Lack of coordination with the service ministries directorates | No extra costs to the salary of HRP Manager are anticipated |
7.1.3 Khaled Ben Waleed Municipality Master Plan for Addressing Industrial Hazards
Industrial activities as possible pollution sources, relevant to the study area are as following:

- Gas stations/service stations
- Auto repair shops
- Car Washes
- Food processing factories
- Sand and gravel mining/other mining
- Construction sites
- Olive oil mills
### Table 18: Master Plan – Industrial Hazards

**Activity 1:** Establishment of the comprehensive database of industrial facilities within the municipal borders

**Overall Objective:** To provide comprehensive database of industrial entities

**Specific Objectives:**
- To provide concise and comprehensive databank of industrial entities and the pertaining issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality • Use of the existing registry in the municipality • Coordination with the Agricultural Directorate, WAJ and JVA</td>
<td>Comprehensive inventory of the industrial entities within the municipal borders</td>
<td>Lack of qualified technical expertise • Insufficient existing registry</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
</tbody>
</table>

**Activity 2:** Monitoring of industrial entities for employed practices effluent and solid waste disposal
### Overall Objective:
To prevent groundwater pollution from industrial effluent

### Specific Objectives:
- To ensure the proper and adequate disposal practices of industrial waste
- Prevention of groundwater contamination from industrial effluent
- Enforcement of existing legislation

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality</td>
<td>Comprehensive inventory of the industrial conditions and practices within the municipal borders</td>
<td>Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
<tr>
<td></td>
<td>Monitoring plans</td>
<td>Use of the existing registry in the municipality</td>
<td></td>
<td>Insufficient existing registry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reports from the relevant authorities on their monitoring of the entities, responsible for industrial licensing and monitoring</td>
<td>Reports from relevant directorates of the service ministries</td>
<td></td>
<td>Lack of coordination with the service ministries directorates</td>
<td></td>
</tr>
</tbody>
</table>

### Activity 3:
Raising awareness of the owners on the issues on protecting groundwater

### Overall Objective:
To prevent groundwater pollution from industrial effluent

### Specific Objectives:
- To ensure the proper and adequate disposal of industrial effluent and solid waste in compliance with the relevant existing legislation

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>• Awareness program</td>
<td>• Technical assistance from Agricultural Directorate, NCARE, GIZ and other organizations</td>
<td>• Reports on the provided seminars and workshops</td>
<td>• Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
<tr>
<td></td>
<td>• Introduction of Corporate Social responsibility (CSR) to business owners</td>
<td>• Financial assistance from donor organizations</td>
<td>• Contribution of business owners to local development</td>
<td>• Lack of coordination with the service ministries directorates</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Technical assistance from Agricultural Directorate, NCARE, GIZ and other organizations</td>
<td>• Public Private Partnership scheme with investors in industrial sector</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Activity 4:** Introduce the concept of separation of grey water for olive mills: reuse of the grey water used for olives washing and disposal of grey water used during processing

**Overall Objective:** To optimize the use of water for olive mills

**Specific Objectives:**
- To ensure the proper and adequate disposal of industrial effluent in compliance with the relevant existing legislation
<table>
<thead>
<tr>
<th>Protecting Ground Water</th>
<th>Strategic Master Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Local Authorities</td>
<td></td>
</tr>
<tr>
<td>• Introduction of Corporate Social responsibility (CSR) to business owners</td>
<td></td>
</tr>
<tr>
<td>• Training on benefits of such concept for olive mills owners</td>
<td></td>
</tr>
<tr>
<td>• Technical assistance from Agricultural Directorate, NCARE, GIZ and other organizations</td>
<td></td>
</tr>
<tr>
<td>• Financial assistance from donor organizations</td>
<td></td>
</tr>
<tr>
<td>• Public Private Partnership scheme with olive mills owners</td>
<td></td>
</tr>
<tr>
<td>• Reports on the provided seminars and workshops</td>
<td></td>
</tr>
<tr>
<td>• Contribution of business owners to local development</td>
<td></td>
</tr>
<tr>
<td>• Lack of qualified technical expertise</td>
<td></td>
</tr>
<tr>
<td>• Lack of coordination with the service ministries directorates</td>
<td></td>
</tr>
</tbody>
</table>

| No extra costs to the salary of HRP Manager are anticipated |
7.2 Moath Ben Jabal Master Plan

The Master Plan for overarching issues is elaborated in the Table below:

![Figure 7: Moath Ben Jabal Combined hazards Map](image)

The Master Plan for overarching issues is elaborated in the Table below:
### Table 19: Master Plan – General Issues

**Activity 1:** Awareness Campaign on the relationship between the human activities and degradation of quality of the groundwater resources

**Overall Objective:** Improvement of practices of water use, re-use and protection

**Specific Objectives:**
- Raising awareness on the relationship between the human activities and groundwater resources degradation
- Enhancing knowledge on adequate water use

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Local Authorities</td>
<td>• Brochures, leaflets, posters</td>
<td>• Technical assistance from MoA, MOE, NCARE and donor organizations such as GIZ</td>
<td>• Enhanced knowledge groundwater management issues</td>
<td>• Low level of acceptance and implementation of necessary measures</td>
<td>10 000</td>
</tr>
<tr>
<td>• Local NGOs and CBOs and associations as representatives of the local community</td>
<td>• Media campaign</td>
<td>• Financial assistance of governmental institutions and NGOs involved in related activities</td>
<td>• Reduction of waste</td>
<td>• Difficulty in financial funds acquisition</td>
<td></td>
</tr>
<tr>
<td>• Local Schools</td>
<td>• Lectures, seminars</td>
<td>• Financial assistance of international donor organizations</td>
<td>• Adequate use of the water resources</td>
<td>• Low consistency in application of acquired knowledge</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Recycling of water for agricultural use</td>
<td>• Lack of qualified technical expertise</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Reduction in human groundwater contamination</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Activity 2:** Advocacy campaign for streamlining of the groundwater protection measures into the local development plans and into national planning process

**Overall Objective:** Educate and empower local communities to communicate their needs to all level politicians and to advocate sustainable development in their areas through integrating the proposed groundwater protection issues into the local and national development plans

**Specific Objectives:**
- Obtain support from the Local Community members with adequate knowledge of the community needs and having influence in the local community for lobbying for the proposed measures;

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| Local communities:       | • Discussion: Topics for Discussion:  
                          • Priority development needs of the local communities;  
                          • Water conservation options applicable to local communities;  
                          • Alternatives for sustainable development in the area;  
                          • Development of job and income generating projects taking into consideration the sustainable water management  
                          • Policy Flyers, publications  
                          • Technical assistance from MoA, MOE, NCARE and donor organizations such as GIZ  
                          • Technical assistance of EcoPeace  
                          • Financial assistance of governmental institutions and NGOs involved in related activities  
                          • Financial assistance of international donor organizations  
                          • Commitment by the Local Authorities to support water conservation in the area through inclusion of proposed actions in the Governorate Master Plans for Development  
                          • Local Council is aware of the needs of the particular local community and is supporting the streamlining of the groundwater protection issues into the local development plans  
                          • Pilot projects aiming at groundwater protection are implemented | • Conflict of interest between the governorate developmental priorities and the needs of the local communities  
                          • Unwillingness to take active part in supporting the actions due to the political reasons | 5 000 |
7.2.1 Moath Ben Jabal Municipality Master Plan for Addressing Urban/Residential Hazards

Residential/urban activities as possible pollution sources, relevant to the study area are as following:

- Residential areas;
- Educational facilities;
- Tourist facilities;
- Medical facilities;
- Road infrastructure;
- Cemeteries
**Table 20: Master Plan – Urban Hazards**

**Activity 1:** Establishment of the comprehensive database of urban facilities and conditions of effluent and solid waste disposal

**Overall Objective:** To provide comprehensive database of residential entities

**Specific Objectives:**
- To provide concise and comprehensive databank of residential entities and the pertaining waste disposal issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Local Authorities</td>
<td>• Electronic repository using the available MS software, such as Excel</td>
<td>• Technical assistance from IT department of the Municipality • Use of the existing registry in the municipality</td>
<td>• Comprehensive inventory of the urban entities within the municipal borders</td>
<td>• Lack of qualified technical expertise • Insufficient existing registry</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
</tbody>
</table>

**Activity 2:** Monitoring of urban facilities and conditions of effluent and solid waste disposal
**Overall Objective:** To prevent groundwater pollution from residential effluent and solid waste

**Specific Objectives:**

- To ensure the proper and adequate disposal of residential effluent and solid waste
- Enforcement of the existing legislation in waste management

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| Local Authorities        | • Electronic repository using the available MS software, such as Excel  
• Monitoring plans  
• Reports from the relevant authorities on their monitoring of the entities which are not within the jurisdiction of the Municipality, such as Health Directorate  
• Technical assistance from IT department of the Municipality  
• Use of the existing registry in the municipality  
• Reports from relevant directorates of the service ministries | • Comprehensive inventory of the conditions and practices of the waste disposal within the municipal borders | • Lack of qualified technical expertise  
• Insufficient existing registry  
• Lack of coordination with the service ministries directorates | No extra costs to the salary of HRP Manager are anticipated |

**Activity 3:** Establishment of low-cost wastewater treatment facilities

**Overall Objective:** To prevent groundwater pollution from residential effluent
## Specific Objectives:
- To ensure the proper and adequate disposal of residential effluent

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| Local Authorities        | - Studies on the required capacity of the wastewater treatment facilities  
                           - Fundraising  
                           - Supervision of the construction and operations | - Outsourcing the studies to external consultants  
                                                              - Technical and financial assistance from the donor organization to support resources from the budget  
                                                              - Public – Private Partnership schemes | - The wastewater treatment facility established and operational | - Lack of financial resources  
                                                              - Unwillingness of the national authorities to include establishment of such facilities into the national development plans | The costs will be defined upon conclusion of studies on the required capacities of the wastewater treatment plants |

**Activity 4:** Establishment of localized sanitary network

**Overall Objective:** To prevent groundwater pollution from residential effluent

**Specific Objectives:**
- To ensure the proper and adequate disposal of residential effluent
## Stakeholder/Target Group

### Tools/Methods
- Local Authorities
  - Studies on the design of the sewage network
  - Fundraising
  - Supervision of the construction and operations

### Resources
- Outsourcing the studies to external consultants
- Technical and financial assistance from the donor organization to support resources from the budget
- Public – Private Partnership schemes

### Anticipated Outcomes
- The sewage network is established and operational

### Assumptions
- Lack of financial resources
- Unwillingness of the national authorities to include establishment of such facilities into the national development plans

### Evaluated costs (JD)
- The costs will be defined upon conclusion of studies on the design of the sewage network

---

### Activity 5: Establishment of local landfill

**Overall Objective:** To prevent groundwater pollution from accumulated solid waste

**Specific Objectives:**
- To ensure the proper and adequate disposal of municipal solid waste

### Stakeholder/Target Group

<table>
<thead>
<tr>
<th>Local</th>
</tr>
</thead>
</table>

### Tools/Methods
- Studies on the

### Resources
- Outsourcing the

### Anticipated Outcomes
- The landfills

### Assumptions
- Lack of financial

### Evaluated costs (JD)
- The costs will be
<table>
<thead>
<tr>
<th>Authorities</th>
<th>required capacity of the landfills</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Fundraising</td>
<td></td>
</tr>
<tr>
<td>• Supervision of the construction and operations</td>
<td></td>
</tr>
<tr>
<td>Studies to external consultants</td>
<td></td>
</tr>
<tr>
<td>• Technical and financial assistance from the donor organization to support resources from the budget</td>
<td></td>
</tr>
<tr>
<td>• Public – Private Partnership schemes</td>
<td></td>
</tr>
<tr>
<td>Established and operational resources</td>
<td></td>
</tr>
<tr>
<td>• Unwillingness of the national authorities to include establishment of such facilities into the national development plans</td>
<td></td>
</tr>
<tr>
<td>Defined upon conclusion of studies on the required capacity of the landfill</td>
<td></td>
</tr>
</tbody>
</table>
7.2.2 Moath Ben Jabal Master Plan for Addressing Agricultural Hazards

Agricultural activities as possible pollution sources, relevant to the study area are as following:

- Agricultural chemicals, fertilizers and pesticides, spreading/spraying
- Livestock farming and associated manure piles/other animal waste
- Fertilized fields/agricultural areas
- Illegal wells drilling for irrigation purposes
**Activity 1:** Establishment of the comprehensive database of agricultural facilities, wells, irrigation volumes, and agricultural practices such as use of pesticides and fertilizers within the municipal borders

**Overall Objective:** To provide comprehensive database of agricultural entities

**Specific Objectives:**
- To provide concise and comprehensive databank of agricultural entities and the pertaining issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality, Use of the existing registry in the municipality, Coordination with the Agricultural Directorate, WAJ and JVA</td>
<td>Comprehensive inventory of the agricultural entities within the municipal borders</td>
<td>Lack of qualified technical expertise, Insufficient existing registry</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
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</tbody>
</table>

**Activity 2:** Monitoring of agricultural entities for employed practices such as irrigation, use of pesticides and fertilizers, wells licensing and drilling
**Overall Objective:** To prevent groundwater pollution from agricultural run off

**Specific Objectives:**
- To ensure the proper and adequate agricultural practices
- Prevention of groundwater contamination from salty water intrusion from illegal wells
- Enforcement of existing legislation

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
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<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality</td>
<td>Comprehensive inventory of the agricultural conditions and practices within the municipal borders</td>
<td>Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
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<td></td>
<td>Monitoring plans</td>
<td>Use of the existing registry in the municipality</td>
<td>Reports on agricultural entities and practices</td>
<td>Insufficient existing registry</td>
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<td></td>
<td>Reports from the relevant authorities on their monitoring of the entities, such as the Agricultural Directorate, WAJ and JVA</td>
<td>Reports from relevant directorates of the service ministries</td>
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<td>Lack of coordination with the service ministries directorates</td>
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</tbody>
</table>

**Activity 3:** Introduce the alternatives such as Integrated Pest Management and drip irrigation as sustainable agricultural practices

**Overall Objective:** To prevent groundwater pollution from agricultural run off

**Specific Objectives:**
- To ensure the proper and adequate agricultural practices
<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Training for farmers</td>
<td>Technical assistance from Agricultural Directorate, NCARE, GIZ and other organizations</td>
<td>IPM and drip irrigation techniques are deployed</td>
<td>Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
<tr>
<td></td>
<td>Prepare the program of partial farmers’ subsidizing</td>
<td>Financial assistance from donor organizations</td>
<td>Training reports</td>
<td>Lack of coordination with the service ministries directorates</td>
<td></td>
</tr>
</tbody>
</table>
7.2.3 Moath Ben Jabal Master Plan for Addressing Industrial Hazards

Industrial activities as possible pollution sources, relevant to the study area are as following:

- Gas stations/service stations
- Auto repair shops
- Car Washes
- Sand and gravel mining/other mining
- Construction sites
Table 22: Master Plan – Industrial Hazards

**Activity 1:** Establishment of the comprehensive database of industrial facilities within the municipal borders

**Overall Objective:** To provide comprehensive database of industrial entities

**Specific Objectives:**
- To provide concise and comprehensive databank of industrial entities and the pertaining issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
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<th>Evaluated costs (JD)</th>
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<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality, Use of the existing registry in the municipality, Coordination with the Agricultural Directorate, WAJ and JVA</td>
<td>Comprehensive inventory of the industrial entities within the municipal borders</td>
<td>Lack of qualified technical expertise, Insufficient existing registry</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
</tbody>
</table>

**Activity 2:** Monitoring of industrial entities for employed practices effluent and solid waste disposal
**Overall Objective:** To prevent groundwater pollution from industrial effluent

**Specific Objectives:**
- To ensure the proper and adequate disposal practices of industrial waste
- Prevention of groundwater contamination from industrial effluent
- Enforcement of existing legislation

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| • Local Authorities      | • Electronic repository using the available MS software, such as Excel  
• Monitoring plans  
• Reports from the relevant authorities on their monitoring of the entities, responsible for industrial licensing and monitoring | • Technical assistance from IT department of the Municipality  
• Use of the existing registry in the municipality  
• Reports from relevant directorates of the service ministries | • Comprehensive inventory of the industrial conditions and practices within the municipal borders | • Lack of qualified technical expertise  
• Insufficient existing registry  
• Lack of coordination with the service ministries directorates | No extra costs to the salary of HRP Manager are anticipated |

**Activity 3:** Raising awareness of the owners on the issues on protecting groundwater

**Overall Objective:** To prevent groundwater pollution from industrial effluent

**Specific Objectives:**
• To ensure the proper and adequate disposal of industrial effluent and solid waste in compliance with the relevant existing legislation

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
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</thead>
</table>
| Local Authorities        | • Awareness program  
                          | • Introduction of Corporate Social responsibility (CSR) to business owners  
                          | • Technical assistance from Agricultural Directorate, NCARE, GIZ and other organizations  
                          | • Financial assistance from donor organizations  
                          | • Public Private Partnership scheme with investors in industrial sector  
                          | • Reports on the provided seminars and workshops  
                          | • Contribution of business owners to local development  
                          | • Lack of qualified technical expertise  
                          | • Lack of coordination with the service ministries directorates  
                          | No extra costs to the salary of HRP Manager are anticipated |
7.3 Tabqet Fahel Master Plan

![Tabqet Fahel Combined Hazards Map]

Figure 8: Tabqet Fahel Combined Hazards Map

The Master Plan for overarching issues is elaborated in the Table below:
Table 23: Master Plan – General Issues

Activity 1: Awareness Campaign on the relationship between the human activities and degradation of quality of the groundwater resources

Overall Objective: Improvement of practices of water use, re-use and protection

Specific Objectives:
- Raising awareness on the relationship between the human activities and groundwater resources degradation
- Enhancing knowledge on adequate water use

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
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</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Brochures, leaflets, posters, Media campaign, Lectures, seminars</td>
<td>Technical assistance from MoA, MOE, NCARE and donor organizations such as GIZ, Financial assistance of governmental institutions and NGOs involved in related activities, Financial assistance of international donor organizations</td>
<td>Enhanced knowledge groundwater management issues, Reduction of waste, Adequate use of the water resources, Recycling of water for agricultural use, Reduction in human groundwater contamination</td>
<td>Low level of acceptance and implementation of necessary measures, Difficulty in financial funds acquisition, Low consistency in application of acquired knowledge, Lack of qualified technical expertise</td>
<td>10 000</td>
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<td>Local NGOs and CBOs and associations as representatives of the local community</td>
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<td>Local Schools</td>
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Activity 2: Advocacy campaign for streamlining of the groundwater protection measures into the local development plans and into national planning process

Overall Objective: Educate and empower local communities to communicate their needs to all level politicians and to advocate sustainable development in their areas through integrating the proposed groundwater protection issues into the local and national development plans

Specific Objectives:
Obtain support from the Local Community members with adequate knowledge of the community needs and having influence in the local community for lobbying for the proposed measures;

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
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7.3.1 Tabqet Fahel Municipality Master Plan for Addressing Urban/Residential Hazards

Residential/urban activities as possible pollution sources, relevant to the study area are as following:

- Residential areas;
- Educational facilities;
- Tourist facilities;
- Medical facilities;
- Road infrastructure;
- Cemeteries
Activity 1: Establishment of the comprehensive database of urban facilities and conditions of effluent and solid waste disposal

Overall Objective: To provide comprehensive database of residential entities

Specific Objectives:
- To provide concise and comprehensive databank of residential entities and the pertaining waste disposal issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality</td>
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<tr>
<td></td>
<td></td>
<td>Use of the existing registry in the municipality</td>
<td>Comprehensive inventory of the urban entities within the municipal borders</td>
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<td>Lack of qualified technical expertise</td>
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<td>No extra costs to the salary of HRP Manager are anticipated</td>
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</table>

Activity 2: Monitoring of urban facilities and conditions of effluent and solid waste disposal
**Overall Objective:** To prevent groundwater pollution from residential effluent and solid waste

**Specific Objectives:**
- To ensure the proper and adequate disposal of residential effluent and solid waste
- Enforcement of the existing legislation in waste management

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>• Electronic repository using the available MS software, such as Excel</td>
<td>• Technical assistance from IT department of the Municipality</td>
<td>• Comprehensive inventory of the conditions and practices of the waste disposal</td>
<td>• Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
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<tr>
<td></td>
<td>• Monitoring plans</td>
<td>• Use of the existing registry in the municipality</td>
<td>within the municipal borders</td>
<td>• Insufficient existing registry</td>
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<td></td>
<td>• Reports from the relevant authorities on their monitoring of the entities</td>
<td>• Reports from relevant directorates of the service ministries</td>
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<td>• Lack of coordination with the service ministries directorates</td>
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<td>which are not within the jurisdiction of the Municipality, such as Health</td>
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**Activity 3:** Establishment of low-cost wastewater treatment facilities

**Overall Objective:** To prevent groundwater pollution from residential effluent
### Specific Objectives:
- To ensure the proper and adequate disposal of residential effluent

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| Local Authorities        | • Studies on the required capacity of the wastewater treatment facilities  
                         | • Fundraising  
                         | • Supervision of the construction and operations  
                         | • Outsourcing the studies to external consultants  
                         | • Technical and financial assistance from the donor organization to support resources from the budget  
                         | • Public – Private Partnership schemes  
                         | • The wastewater treatment facility established and operational  
                         | • Lack of financial resources  
                         | • Unwillingness of the national authorities to include establishment of such facilities into the national development plans  
                         | The costs will be defined upon conclusion of studies on the required capacities of the wastewater treatment plants |

**Activity 4:** Establishment of localized sanitary network

**Overall Objective:** To prevent groundwater pollution from residential effluent

**Specific Objectives:**
- To ensure the proper and adequate disposal of residential effluent
### Stakeholder/Target Group
- Local Authorities

### Tools/Methods
- Studies on the design of the sewage network
- Fundraising
- Supervision of the construction and operations

### Resources
- Outsourcing the studies to external consultants
- Technical and financial assistance from the donor organization to support resources from the budget
- Public – Private Partnership schemes

### Anticipated Outcomes
- The sewage network is established and operational

### Assumptions
- Lack of financial resources
- Unwillingness of the national authorities to include establishment of such facilities into the national development plans

### Evaluated costs (JD)
The costs will be defined upon conclusion of studies on the design of the sewage network

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## Activity 5: Establishment of local landfill

### Overall Objective: To prevent groundwater pollution from accumulated solid waste

### Specific Objectives:
- To ensure the proper and adequate disposal of municipal solid waste

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<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
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<td>• Technical and financial assistance from the donor organization to support resources from the budget</td>
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<td></td>
<td>• Public – Private Partnership schemes</td>
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<td>established and operational resources</td>
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<td></td>
<td>• Unwillingness of the national authorities to include establishment of such facilities into the national development plans</td>
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<tr>
<td>defined upon conclusion of studies on the required capacity of the landfill</td>
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</tbody>
</table>
7.3.2 Tabqet Fahel Master Plan for Addressing Agricultural Hazards

Agricultural activities as possible pollution sources, relevant to the study area are as following:

- Agricultural chemicals, fertilizers and pesticides, spreading/spraying
- Livestock farming and associated manure piles/other animal waste
- Fertilized fields/agricultural areas
- Illegal wells drilling for irrigation purposes
Table 25: Master Plan – Agricultural Hazards

**Activity 1:** Establishment of the comprehensive database of agricultural facilities, wells, irrigation volumes, and agricultural practices such as use of pesticides and fertilizers within the municipal borders

**Overall Objective:** To provide comprehensive database of agricultural entities

**Specific Objectives:**
- To provide concise and comprehensive databank of agricultural entities and the pertaining issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| Local Authorities        | • Electronic repository using the available MS software, such as Excel | • Technical assistance from IT department of the Municipality  
• Use of the existing registry in the municipality  
• Coordination with the Agricultural Directorate, WAJ and JVA | • Comprehensive inventory of the agricultural entities within the municipal borders  
• Lack of qualified technical expertise  
• Insufficient existing registry | | No extra costs to the salary of HRP Manager are anticipated |
Overall Objective: To prevent groundwater pollution from agricultural run off

Specific Objectives:

- To ensure the proper and adequate agricultural practices
- Prevention of groundwater contamination from salty water intrusion from illegal wells
- Enforcement of existing legislation

<table>
<thead>
<tr>
<th>Stakeholder/ Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality</td>
<td>Comprehensive inventory of the agricultural conditions and practices within the municipal borders</td>
<td>Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
<tr>
<td></td>
<td>Monitoring plans</td>
<td>Use of the existing registry in the municipality</td>
<td>Reports on agricultural entities and practices</td>
<td>Insufficient existing registry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reports from the relevant authorities on their monitoring of the entities, such as the Agricultural Directorate, WAJ and JVA</td>
<td>Reports from relevant directorates of the service ministries</td>
<td></td>
<td>Lack of coordination with the service ministries directorates</td>
<td></td>
</tr>
</tbody>
</table>

Activity 3: Introduce the alternatives such as Integrated Pest Management and drip irrigation as sustainable agricultural practices

Overall Objective: To prevent groundwater pollution from agricultural run off

Specific Objectives:

- To ensure the proper and adequate agricultural practices
<table>
<thead>
<tr>
<th>Stakeholder/ Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| Local Authorities         | - Training for farmers  
|                           | - Prepare the program of partial farmers’ subsidizing  
|                           | - Reports from the relevant authorities on their monitoring of the entities, such as the Agricultural Directorate, WAJ and JVA | - Technical assistance from Agricultural Directorate, NCARE, GIZ and other organizations  
|                           |                           | - Financial assistance from donor organizations  
|                           |                           | - Public Private Partnership scheme with investors in agricultural sector | - IPM and drip irrigation techniques are deployed  
|                           |                           | - Training reports | - Lack of qualified technical expertise  
|                           |                           |                           | - Lack of coordination with the service ministries directorates | No extra costs to the salary of HRP Manager are anticipated |
7.3.3 Tabqet Fahel Master Plan for Addressing Industrial Hazards
Industrial activities as possible pollution sources, relevant to the study area are as following:

- Gas stations/service stations
- Auto repair shops
- Car Washes
- Sand and gravel mining/other mining
- Construction sites
### Table 26: Master Plan – Industrial Hazards

**Activity 1:** Establishment of the comprehensive database of industrial facilities within the municipal borders

**Overall Objective:** To provide comprehensive database of industrial entities

**Specific Objectives:**
- To provide concise and comprehensive databank of industrial entities and the pertaining issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality, Use of the existing registry in the municipality, Coordination with the Agricultural Directorate, WAJ and JVA</td>
<td>Comprehensive inventory of the industrial entities within the municipal borders</td>
<td>Lack of qualified technical expertise, Insufficient existing registry</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
</tbody>
</table>

**Activity 2:** Monitoring of industrial entities for employed practices effluent and solid waste disposal
Overall Objective: To prevent groundwater pollution from industrial effluent

Specific Objectives:

- To ensure the proper and adequate disposal practices of industrial waste
- Prevention of groundwater contamination from industrial effluent
- Enforcement of existing legislation

<table>
<thead>
<tr>
<th>Stakeholder/ Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality</td>
<td>Comprehensive inventory of the industrial conditions and practices within the municipal borders</td>
<td>Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
<tr>
<td></td>
<td>Monitoring plans</td>
<td>Use of the existing registry in the municipality</td>
<td></td>
<td>Insufficient existing registry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reports from the relevant authorities on their monitoring of the entities, responsible for industrial licensing and monitoring</td>
<td>Reports from relevant directorates of the service ministries</td>
<td></td>
<td>Lack of coordination with the service ministries directorates</td>
<td></td>
</tr>
</tbody>
</table>

Activity 3: Raising awareness of the owners on the issues on protecting groundwater

Overall Objective: To prevent groundwater pollution from industrial effluent

Specific Objectives:
**To ensure the proper and adequate disposal of industrial effluent and solid waste in compliance with the relevant existing legislation**

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Awareness program</td>
<td>Technical assistance from Agricultural Directorate, NCARE, GIZ and other organizations</td>
<td>Reports on the provided seminars and workshops</td>
<td>Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
<tr>
<td></td>
<td>Introduction of Corporate Social responsibility (CSR) to business owners</td>
<td>Financial assistance from donor organizations</td>
<td>Contribution of business owners to local development</td>
<td>Lack of coordination with the service ministeries directorates</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Public Private Partnership scheme with investors in industrial sector</td>
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</tr>
</tbody>
</table>
7.4 Sharhabil Bin Hassna Municipality Master Plan

Figure 9: Sharhabil Bin Hassna Combined Hazards Map

The Master Plan for overarching issues is elaborated in the Table below:
### Table 27: Master Plan – General Issues

**Activity 1:** Awareness Campaign on the relationship between the human activities and degradation of quality of the groundwater resources

**Overall Objective:** Improvement of practices of water use, re-use and protection

**Specific Objectives:**
- Raising awareness on the relationship between the human activities and groundwater resources degradation
- Enhancing knowledge on adequate water use

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Brochures, leaflets, posters</td>
<td>Technical assistance from MoA, MOE, NCARE and donor organizations such as GIZ</td>
<td>Enhanced knowledge groundwater management issues</td>
<td>Low level of acceptance and implementation of necessary measures</td>
<td>10 000</td>
</tr>
<tr>
<td>Local NGOs and CBOs and associations as representatives of the local community</td>
<td>Media campaign</td>
<td>Financial assistance of governmental institutions and NGOs involved in related activities</td>
<td>Reduction of waste</td>
<td>Difficulty in financial funds acquisition</td>
<td></td>
</tr>
<tr>
<td>Local Schools</td>
<td>Lectures, seminars</td>
<td>Financial assistance of international donor organizations</td>
<td>Adequate use of the water resources</td>
<td>Low consistency in application of acquired knowledge</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Recycling of water for agricultural use</td>
<td>Lack of qualified technical expertise</td>
<td></td>
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<tr>
<td></td>
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<td></td>
<td>Reduction in human groundwater contamination</td>
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</tbody>
</table>

**Activity 2:** Advocacy campaign for streamlining of the groundwater protection measures into the local development plans and into national planning process

**Overall Objective:** Educate and empower local communities to communicate their needs to all level politicians and to advocate sustainable development in their areas through integrating the proposed groundwater protection issues into the local and national development plans

**Specific Objectives:**
- Obtain support from the Local Community members with adequate knowledge of the community needs and having influence in the local community for lobbying for the proposed measures;

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
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<th>Anticipated Outcomes</th>
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<th>Evaluated costs (JD)</th>
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<tbody>
<tr>
<td>Local communities:</td>
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</tr>
<tr>
<td>- Respected members of</td>
<td>Discussion:</td>
<td>Technical assistance from MoA, MOE, NCARE and donor organizations such as GIZ</td>
<td>Commitment by the Local Authorities to support water conservation in the area through inclusion of proposed actions in the Governorate Master Plans for Development</td>
<td>Conflict of interest between the governorate developmental priorities and the needs of the local communities</td>
<td>5 000</td>
</tr>
<tr>
<td>community</td>
<td>Topics for Discussion: Priority development needs of the local communities; Water conservation options applicable to local communities; Alternatives for sustainable development in the area; Development of job and income generating projects taking into consideration the sustainable water management Policy Flyers, publications</td>
<td>Technical assistance of governmental institutions and NGOs involved in related activities Financial assistance of international donor organizations</td>
<td>Unwillingness to take active part in supporting the actions due to the political reasons</td>
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<td>- Representatives of</td>
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<td>governmental institutions, e.g. LDU, directorates of the line ministries, mayors, Local Councils</td>
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<td>- Representatives of</td>
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<td>non-governmental</td>
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<td>organizations and</td>
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<td>institutions, e.g.</td>
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<td>Water Users Associations, Youth and Women Organizations</td>
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<td>- Discussion:</td>
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<td>Topics for Discussion:</td>
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<td>Priority development</td>
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<td>needs of the local</td>
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<td>communities; Water</td>
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<td>conservation options</td>
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<td>applicable to local</td>
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<td>communities; Alternatives</td>
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<td>for sustainable</td>
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<td>development in the area;</td>
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<td>Development of job and</td>
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<td>income generating</td>
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<td>projects taking into</td>
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<td>consideration the</td>
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<td>sustainable water</td>
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<td>management Policy Flyers, publications</td>
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7.4.1 Sharhabil Bin Hassna Municipality Master Plan for Addressing Urban/Residential Hazards

Residential/urban activities as possible pollution sources, relevant to the study area are as following:

- Residential areas;
- Educational facilities;
- Tourist facilities;
- Medical facilities;
- Road infrastructure;
- Cemeteries
Activity 1: Establishment of the comprehensive database of urban facilities and conditions of effluent and solid waste disposal

**Overall Objective:** To provide comprehensive database of residential entities

**Specific Objectives:**
- To provide concise and comprehensive databank of residential entities and the pertaining waste disposal issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| Local Authorities        | Electronic repository using the available MS software, such as Excel | Technical assistance from IT department of the Municipality  
Use of the existing registry in the municipality | Comprehensive inventory of the urban entities within the municipal borders | Lack of qualified technical expertise  
Insufficient existing registry | No extra costs to the salary of HRP Manager are anticipated |

Activity 2: Monitoring of urban facilities and conditions of effluent and solid waste disposal
### Overall Objective:
To prevent groundwater pollution from residential effluent and solid waste

### Specific Objectives:
- To ensure the proper and adequate disposal of residential effluent and solid waste
- Enforcement of the existing legislation in waste management

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<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
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</thead>
</table>
| Local Authorities        | - Electronic repository using the available MS software, such as Excel  
                           - Monitoring plans  
                           - Reports from the relevant authorities on their monitoring of the entities which are not within the jurisdiction of the Municipality, such as Health Directorate | - Technical assistance from IT department of the Municipality  
                           - Use of the existing registry in the municipality  
                           - Reports from relevant directorates of the service ministries | - Comprehensive inventory of the conditions and practices of the waste disposal within the municipal borders | - Lack of qualified technical expertise  
                           - Insufficient existing registry  
                           - Lack of coordination with the service ministries directorates | No extra costs to the salary of HRP Manager are anticipated |

### Activity 3: Establishment of low-cost wastewater treatment facilities

### Overall Objective:
To prevent groundwater pollution from residential effluent
### Specific Objectives:

- To ensure the proper and adequate disposal of residential effluent

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<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| Local Authorities        | • Studies on the required capacity of the wastewater treatment facilities  
|                          | • Fundraising  
|                          | • Supervision of the construction and operations | • Outsourcing the studies to external consultants  
|                          |                          | • Technical and financial assistance from the donor organization to support resources from the budget  
|                          |                          | • Public – Private Partnership schemes | • The wastewater treatment facility established and operational | • Lack of financial resources  
|                          |                          |                          |                          | • Unwillingness of the national authorities to include establishment of such facilities into the national development plans | The costs will be defined upon conclusion of studies on the required capacities of the wastewater treatment plants |

### Activity 4: Establishment of localized sanitary network

### Overall Objective: To prevent groundwater pollution from residential effluent

### Specific Objectives:

- To ensure the proper and adequate disposal of residential effluent
## Stakeholder/Target Group

<table>
<thead>
<tr>
<th>Tool/Method</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Studies on the design of the sewage network, Fundraising, Supervision of the construction and operations</td>
<td>Outsourcing the studies to external consultants, Technical and financial assistance from the donor organization to support resources from the budget, Public – Private Partnership schemes</td>
<td>The sewage network is established and operational</td>
<td>Lack of financial resources, Unwillingness of the national authorities to include establishment of such facilities into the national development plans</td>
</tr>
</tbody>
</table>

## Activity 5: Establishment of local landfill

**Overall Objective:** To prevent groundwater pollution from accumulated solid waste

**Specific Objectives:**
- To ensure the proper and adequate disposal of municipal solid waste

<table>
<thead>
<tr>
<th>Tool/Method</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>Studies on the</td>
<td>Outsourcing the</td>
<td>The landfills</td>
<td>Lack of financial</td>
</tr>
<tr>
<td>Authorities</td>
<td>required capacity of the landfills</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>• Fundraising</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>• Supervision of the construction and operations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>studies to external consultants</td>
<td>• Technical and financial assistance from the donor organization to support resources from the budget</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>established and operational</td>
<td>• Unwillingness of the national authorities to include establishment of such facilities into the national development plans</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>resources</td>
<td>defined upon conclusion of studies on the required capacity of the landfill</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
7.4.2 Sharhabil Bin Hassna Master Plan for Addressing Agricultural Hazards

Agricultural activities as possible pollution sources, relevant to the study area are as following:

- Agricultural chemicals, fertilizers and pesticides, spreading/spraying
- Livestock farming and associated manure piles/other animal waste
- Fertilized fields/agricultural areas
- Illegal wells drilling for irrigation purposes
Table 29: Master Plan – Agricultural Hazards

Activity 1: Establishment of the comprehensive database of agricultural facilities, wells, irrigation volumes, and agricultural practices such as use of pesticides and fertilizers within the municipal borders

Overall Objective: To provide comprehensive database of agricultural entities

Specific Objectives:
- To provide concise and comprehensive databank of agricultural entities and the pertaining issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality</td>
<td>Comprehensive inventory of the agricultural entities within the municipal borders</td>
<td>Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Use of the existing registry in the municipality</td>
<td></td>
<td>Insufficient existing registry</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coordination with the Agricultural Directorate, WAJ and JVA</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Activity 2: Monitoring of agricultural entities for employed practices such as irrigation, use of pesticides and fertilizers, wells licensing and drilling
<table>
<thead>
<tr>
<th>Overall Objective: To prevent groundwater pollution from agricultural run off</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specific Objectives:</strong></td>
</tr>
<tr>
<td>- To ensure the proper and adequate agricultural practices</td>
</tr>
<tr>
<td>- Prevention of groundwater contamination from salty water intrusion from illegal wells</td>
</tr>
<tr>
<td>- Enforcement of existing legislation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Local Authorities</td>
<td>- Electronic repository using the available MS software, such as Excel &lt;br&gt; - Monitoring plans &lt;br&gt; - Reports from the relevant authorities on their monitoring of the entities, such as the Agricultural Directorate, WAJ and JVA</td>
<td>- Technical assistance from IT department of the Municipality &lt;br&gt;- Use of the existing registry in the municipality &lt;br&gt;- Reports from relevant directorates of the service ministries</td>
<td>- Comprehensive inventory of the agricultural conditions and practices within the municipal borders &lt;br&gt;- Reports on agricultural entities and practices</td>
<td>- Lack of qualified technical expertise &lt;br&gt;- Insufficient existing registry &lt;br&gt;- Lack of coordination with the service ministries directorates</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
</tbody>
</table>

**Activity 3:** Introduce the alternatives such as Integrated Pest Management and drip irrigation as sustainable agricultural practices

**Overall Objective:** To prevent groundwater pollution from agricultural run off

**Specific Objectives:**

- To ensure the proper and adequate agricultural practices
<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| • Local Authorities      | • Training for farmers  
                          • Prepare the program of partial farmers’ subsidizing  
                          • Reports from the relevant authorities on their monitoring of the entities, such as the Agricultural Directorate, WAJ and JVA | • Technical assistance from Agricultural Directorate, NCARE, GIZ and other organizations  
                          • Financial assistance from donor organizations  
                          • Public Private Partnership scheme with investors in agricultural sector | • IPM and drip irrigation techniques are deployed  
                          • Training reports | • Lack of qualified technical expertise  
                          • Lack of coordination with the service ministries directorates | No extra costs to the salary of HRP Manager are anticipated |
7.4.3 Sharhabil Bin Hassna Master Plan for Addressing Industrial Hazards

Industrial activities as possible pollution sources, relevant to the study area are as following:

- Gas stations/service stations
- Auto repair shops
- Car Washes
- Sand and gravel mining/other mining
- Animal Slaughter Houses
- Construction sites
# Table 30: Master Plan – Industrial Hazards

**Activity 1:** Establishment of the comprehensive database of industrial facilities within the municipal borders

**Overall Objective:** To provide comprehensive database of industrial entities

**Specific Objectives:**
- To provide concise and comprehensive databank of industrial entities and the pertaining issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality, Use of the existing registry in the municipality, Coordination with the Agricultural Directorate, WAJ and JVA</td>
<td>Comprehensive inventory of the industrial entities within the municipal borders</td>
<td>Lack of qualified technical expertise, Insufficient existing registry</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
</tbody>
</table>

**Activity 2:** Monitoring of industrial entities for employed practices effluent and solid waste disposal
**Overall Objective:** To prevent groundwater pollution from industrial effluent

**Specific Objectives:**
- To ensure the proper and adequate disposal practices of industrial waste
- Prevention of groundwater contamination from industrial effluent
- Enforcement of existing legislation

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality</td>
<td>Comprehensive inventory of the industrial conditions and practices within the municipal borders</td>
<td>Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
<tr>
<td></td>
<td>Monitoring plans</td>
<td>Use of the existing registry in the municipality</td>
<td></td>
<td>Insufficient existing registry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reports from the relevant authorities on their monitoring of the entities, responsible for industrial licensing and monitoring</td>
<td>Reports from relevant directorates of the service ministries</td>
<td></td>
<td>Lack of coordination with the service ministries directorates</td>
<td></td>
</tr>
</tbody>
</table>

**Activity 3:** Raising awareness of the owners on the issues on protecting groundwater

**Overall Objective:** To prevent groundwater pollution from industrial effluent

**Specific Objectives:**
To ensure the proper and adequate disposal of industrial effluent and solid waste in compliance with the relevant existing legislation

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| Local Authorities        | • Awareness program  
                        | • Introduction of Corporate Social responsibility (CSR) to business owners | • Technical assistance from Agricultural Directorate, NCARE, GIZ and other organizations  
                        | • Financial assistance from donor organizations  
                        | • Public Private Partnership scheme with investors in industrial sector | • Reports on the provided seminars and workshops  
                        | • Contribution of business owners to local development | • Lack of qualified technical expertise  
                        | | | • Lack of coordination with the service ministries directorates | No extra costs to the salary of HRP Manager are anticipated |
7.5 Deir Alla Municipality Master Plan

![Hazard Map]

Figure 10: Deir Alla Municipality Combined Hazards Map

The Master Plan for overarching issues is elaborated in the Table below:
### Table 31: Master Plan – General Issues

**Activity 1:** Awareness Campaign on the relationship between the human activities and degradation of quality of the groundwater resources  

**Overall Objective:** Improvement of practices of water use, re-use and protection

**Specific Objectives:**
- Raising awareness on the relationship between the human activities and groundwater resources degradation
- Enhancing knowledge on adequate water use

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| • Local Authorities  
• Local NGOs and CBOs and associations as representatives of the local community  
• Local Schools | • Brochures, leaflets, posters  
• Media campaign  
• Lectures, seminars | • Technical assistance from MoA, MOE, NCARE and donor organizations such as GIZ  
• Financial assistance of governmental institutions and NGOs involved in related activities  
• Financial assistance of international donor organizations | • Enhanced knowledge groundwater management issues  
• Reduction of waste  
• Adequate use of the water resources  
• Recycling of water for agricultural use  
• Reduction in human groundwater contamination | • Low level of acceptance and implementation of necessary measures  
• Difficulty in financial funds acquisition  
• Low consistency in application of acquired knowledge  
• Lack of qualified technical expertise | 10 000 |

**Activity 2:** Advocacy campaign for streamlining of the groundwater protection measures into the local development plans and into national planning process

**Overall Objective:** Educate and empower local communities to communicate their needs to all level politicians and to advocate sustainable development in their areas through integrating the proposed groundwater protection issues into the local and national development plans

**Specific Objectives:**
Obtain support from the Local Community members with adequate knowledge of the community needs and having influence in the local community for lobbying for the proposed measures;

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local communities:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Respected members of the community</td>
<td>• Discussion: Topics for Discussion:</td>
<td>• Technical assistance from MoA, MOE, NCARE and donor organizations such as GIZ</td>
<td>• Commitment by the Local Authorities to support water conservation in the area through inclusion of proposed actions in the Governorate Master Plans for Development</td>
<td>• Conflict of interest between the governorate developmental priorities and the needs of the local communities</td>
<td>5 000</td>
</tr>
<tr>
<td>• Representatives of governmental institutions, e.g. LDU, directorates of the line ministries, mayors, Local Councils</td>
<td>• Priority development needs of the local communities;</td>
<td>• Technical assistance of EcoPeace</td>
<td>• Local Council is aware of the needs of the particular local community and is supporting the streamlining of the groundwater protection issues into the local development plans</td>
<td>• Unwillingness to take active part in supporting the actions due to the political reasons</td>
<td></td>
</tr>
<tr>
<td>• Representatives of non-governmental organizations and institutions, e.g. Water Users Associations, Youth and Women Organizations</td>
<td>• Water conservation options applicable to local communities;</td>
<td>• Financial assistance of governmental institutions and NGOs involved in related activities</td>
<td>• Pilot projects aiming at groundwater protection are implemented</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Alternatives for sustainable development in the area;</td>
<td>• Financial assistance of international donor organizations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Development of job and income generating projects taking into consideration the sustainable water management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Policy Flyers, publications</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7.5.1 Deir Alla Municipality Master Plan for Addressing Urban/Residential Hazards

Residential/urban activities as possible pollution sources, relevant to the study area are as following:

- Residential areas;
- Educational facilities;
- Tourist facilities;
- Medical facilities;
- Road infrastructure;
- Cemeteries
## Table 32: Master Plan – Urban Hazards

**Activity 1:** Establishment of the comprehensive database of urban facilities and conditions of effluent and solid waste disposal

**Overall Objective:** To provide comprehensive database of residential entities

**Specific Objectives:**
- To provide concise and comprehensive databank of residential entities and the pertaining waste disposal issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality • Use of the existing registry in the municipality</td>
<td>Comprehensive inventory of the urban entities within the municipal borders</td>
<td>Lack of qualified technical expertise • Insufficient existing registry</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
</tbody>
</table>

**Activity 2:** Monitoring of urban facilities and conditions of effluent and solid waste disposal
Overall Objective: To prevent groundwater pollution from residential effluent and solid waste

Specific Objectives:

- To ensure the proper and adequate disposal of residential effluent and solid waste
- Enforcement of the existing legislation in waste management

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality</td>
<td>Comprehensive inventory of the conditions and practices of the waste disposal within the municipal borders</td>
<td>Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
<tr>
<td></td>
<td>Monitoring plans</td>
<td>Use of the existing registry in the municipality</td>
<td></td>
<td>Insufficient existing registry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reports from the relevant authorities on their monitoring of the entities which are not within the jurisdiction of the Municipality, such as Health Directorate</td>
<td>Reports from relevant directorates of the service ministries</td>
<td></td>
<td>Lack of coordination with the service ministries directorates</td>
<td></td>
</tr>
</tbody>
</table>

Activity 3: Establishment of localized sanitary network

Overall Objective: To prevent groundwater pollution from residential effluent
Specific Objectives:

- To ensure the proper and adequate disposal of residential effluent

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>• Studies on the design of the sewage network</td>
<td>• Outsourcing the studies to external consultants</td>
<td>• The sewage network is established and operational</td>
<td>• Lack of financial resources</td>
<td>The costs will be defined upon conclusion of studies on the design of the sewage network</td>
</tr>
<tr>
<td></td>
<td>• Fundraising</td>
<td>• Technical and financial assistance from the donor organization to support resources from the budget</td>
<td></td>
<td>• Unwillingness of the national authorities to include establishment of such facilities into the national development plans</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Supervision of the construction and operations</td>
<td>• Public – Private Partnership schemes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7.5.2 Deir Alla Master Plan for Addressing Agricultural Hazards
Agricultural activities as possible pollution sources, relevant to the study area are as following:

- Agricultural chemicals, fertilizers and pesticides, spreading/spraying
- Livestock farming and associated manure piles/other animal waste
- Fertilized fields/agricultural areas
- Illegal wells drilling for irrigation purposes
Table 33: Master Plan – Agricultural Hazards

**Activity 1:** Establishment of the comprehensive database of agricultural facilities, wells, irrigation volumes, and agricultural practices such as use of pesticides and fertilizers within the municipal borders

**Overall Objective:** To provide comprehensive database of agricultural entities

**Specific Objectives:**
- To provide concise and comprehensive databank of agricultural entities and the pertaining issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality, Use of the existing registry in the municipality, Coordination with the Agricultural Directorate, WAJ and JVA</td>
<td>Comprehensive inventory of the agricultural entities within the municipal borders</td>
<td>Lack of qualified technical expertise, Insufficient existing registry</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
</tbody>
</table>

**Activity 2:** Monitoring of agricultural entities for employed practices such as irrigation, use of pesticides and fertilizers, wells licensing and drilling
**Overall Objective:** To prevent groundwater pollution from agricultural run off

**Specific Objectives:**
- To ensure the proper and adequate agricultural practices
- Prevention of groundwater contamination from salty water intrusion from illegal wells
- Enforcement of existing legislation

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality</td>
<td>Comprehensive inventory of the agricultural conditions and practices within the municipal borders</td>
<td>Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
<tr>
<td></td>
<td>Monitoring plans</td>
<td>Use of the existing registry in the municipality</td>
<td>Reports from agricultural entities and practices</td>
<td>Insufficient existing registry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reports from the relevant authorities on their monitoring of the entities, such as the Agricultural Directorate, WAJ and JVA</td>
<td>Reports from relevant directorates of the service ministries</td>
<td>Lack of coordination with the service ministries directorates</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Activity 3:** Introduce the alternatives such as Integrated Pest Management and drip irrigation as sustainable agricultural practices

**Overall Objective:** To prevent groundwater pollution from agricultural run off

**Specific Objectives:**
- To ensure the proper and adequate agricultural practices
<table>
<thead>
<tr>
<th>Stakeholder/ Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| Local Authorities         | Training for farmers  
                        | Prepare the program of partial farmers’ subsidizing  
                        | Reports from the relevant authorities on their monitoring of the entities, such as the Agricultural Directorate, WAJ and JVA | IPM and drip irrigation techniques are deployed  
                        | Training reports | Lack of qualified technical expertise  
                        | Lack of coordination with the service ministries directorates | No extra costs to the salary of HRP Manager are anticipated |

- Technical assistance from Agricultural Directorate, NCARE, GIZ and other organizations  
- Financial assistance from donor organizations  
- Public Private Partnership scheme with investors in agricultural sector
7.5.3 Deir Alla Municipality Master Plan for Addressing Industrial Hazards

Industrial activities as possible pollution sources, relevant to the study area are as following:

- Gas stations/service stations
- Auto repair shops
- Car Washes
- Sand and gravel mining/other mining
- Animal Slaughter Houses
- Construction sites
Table 34: Master Plan – Industrial Hazards

Activity 1: Establishment of the comprehensive database of industrial facilities within the municipal borders

Overall Objective: To provide comprehensive database of industrial entities

Specific Objectives:
- To provide concise and comprehensive databank of industrial entities and the pertaining issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality, Use of the existing registry in the municipality, Coordination with the Agricultural Directorate, WAJ and JVA</td>
<td>Comprehensive inventory of the industrial entities within the municipal borders</td>
<td>Lack of qualified technical expertise, Insufficient existing registry</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
</tbody>
</table>

Activity 2: Monitoring of industrial entities for employed practices effluent and solid waste disposal
### Overall Objective: To prevent groundwater pollution from industrial effluent

### Specific Objectives:
- To ensure the proper and adequate disposal practices of industrial waste
- Prevention of groundwater contamination from industrial effluent
- Enforcement of existing legislation

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| • Local Authorities      | • Electronic repository using the available MS software, such as Excel  
                          • Monitoring plans  
                          • Reports from the relevant authorities on their monitoring of the entities, responsible for industrial licensing and monitoring | • Technical assistance from IT department of the Municipality  
                          • Use of the existing registry in the municipality  
                          • Reports from relevant directorates of the service ministries | • Comprehensive inventory of the industrial conditions and practices within the municipal borders | • Lack of qualified technical expertise  
                          • Insufficient existing registry  
                          • Lack of coordination with the service ministries directorates | No extra costs to the salary of HRP Manager are anticipated |

**Activity 3:** Raising awareness of the owners on the issues on protecting groundwater

**Overall Objective:** To prevent groundwater pollution from industrial effluent

**Specific Objectives:**
To ensure the proper and adequate disposal of industrial effluent and solid waste in compliance with the relevant existing legislation

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Awareness program</td>
<td>Technical assistance from Agricultural Directorate, NCARE, GIZ and other organizations</td>
<td>Reports on the provided seminars and workshops</td>
<td>Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
<tr>
<td></td>
<td>Introduction of Corporate Social responsibility (CSR) to business owners</td>
<td>Financial assistance from donor organizations</td>
<td>Contribution of business owners to local development</td>
<td>Lack of coordination with the service ministries directorates</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Public Private Partnership scheme with investors in industrial sector</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7.6 Middle Shouneh Municipality Master Plan

![Middle Shouneh Combined Hazards Map](image)

**Figure 11: Middle Shouneh Combined Hazards Map**

The Master Plan for overarching issues is elaborated in the Table below:
Table 35: Master Plan – General Issues

Activity 1: Awareness Campaign on the relationship between the human activities and degradation of quality of the groundwater resources

Overall Objective: Improvement of practices of water use, re-use and protection

Specific Objectives:
- Raising awareness on the relationship between the human activities and groundwater resources degradation
- Enhancing knowledge on adequate water use

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local NGOs and CBOs and associations as representatives of the local community</td>
<td>Brochures, leaflets, posters; Media campaign; Lectures, seminars</td>
<td>Technical assistance from MoA, MOE, NCARE and donor organizations such as GIZ; Financial assistance of governmental institutions and NGOs involved in related activities; Financial assistance of international donor organizations</td>
<td>Enhanced knowledge groundwater management issues; Reduction of waste; Adequate use of the water resources; Recycling of water for agricultural use; Reduction in human groundwater contamination</td>
<td>Low level of acceptance and implementation of necessary measures; Difficulty in financial funds acquisition; Low consistency in application of acquired knowledge; Lack of qualified technical expertise</td>
<td>10 000</td>
</tr>
<tr>
<td>Local Schools</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Activity 2: Advocacy campaign for streamlining of the groundwater protection measures into the local development plans and into national planning process

Overall Objective: Educate and empower local communities to communicate their needs to all level politicians and to advocate sustainable development in their areas through integrating the proposed groundwater protection issues into the local and national development plans

Specific Objectives:
- Obtain support from the Local Community members with adequate knowledge of the community needs and having influence in the local community for lobbying for the proposed measures;

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local communities:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5000</td>
</tr>
<tr>
<td>- Respected members of the community</td>
<td>• Discussion: Topics for Discussion:</td>
<td>• Technical assistance from MoA, MOE, NCARE and donor organizations such as GIZ</td>
<td>• Commitment by the Local Authorities to support water conservation in the area through inclusion of proposed actions in the Governorate Master Plans for Development</td>
<td>• Conflict of interest between the governorate developmental priorities and the needs of the local communities</td>
<td></td>
</tr>
<tr>
<td>- Representatives of governmental institutions, e.g. LDU, directorates of the line ministries, mayors, Local Councils</td>
<td>• Priority development needs of the local communities;</td>
<td>• Technical assistance of EcoPeace</td>
<td>• Local Council is aware of the needs of the particular local community and is supporting the streamlining of the groundwater protection issues into the local development plans</td>
<td>• Unwillingness to take active part in supporting the actions due to the political reasons</td>
<td></td>
</tr>
<tr>
<td>- Representatives of non-governmental organizations and institutions, e.g. Water Users Associations, Youth and Women Organizations</td>
<td>• Water conservation options applicable to local communities;</td>
<td>• Financial assistance of governmental institutions and NGOs involved in related activities</td>
<td>• Pilot projects aiming at groundwater protection are implemented</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Alternatives for sustainable development in the area;</td>
<td>• Financial assistance of international donor organizations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Development of job and income generating projects taking into consideration the sustainable water management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Policy Flyers, publications</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7.6.1 Middle Shouneh Municipality Master Plan for Addressing Urban/Residential Hazards

Residential/urban activities as possible pollution sources, relevant to the study area are as following:

- Residential areas;
- Educational facilities;
- Tourist facilities;
- Medical facilities;
- Road infrastructure;
- Cemeteries
Table 36: Master Plan – Urban Hazards

**Activity 1:** Establishment of the comprehensive database of urban facilities and conditions of effluent and solid waste disposal

**Overall Objective:** To provide comprehensive database of residential entities

**Specific Objectives:**
- To provide concise and comprehensive databank of residential entities and the pertaining waste disposal issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality, Use of the existing registry in the municipality</td>
<td>Comprehensive inventory of the urban entities within the municipal borders</td>
<td>Lack of qualified technical expertise, Insufficient existing registry</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
</tbody>
</table>

**Activity 2:** Monitoring of urban facilities and conditions of effluent and solid waste disposal
### Overall Objective: To prevent groundwater pollution from residential effluent and solid waste

### Specific Objectives:
- To ensure the proper and adequate disposal of residential effluent and solid waste
- Enforcement of the existing legislation in waste management

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality</td>
<td>Comprehensive inventory of the conditions and practices of the waste disposal within the municipal borders</td>
<td>Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
</tbody>
</table>

### Activity 3: Establishment of low-cost wastewater treatment facilities

**Overall Objective:** To prevent groundwater pollution from residential effluent
Specific Objectives:

- To ensure the proper and adequate disposal of residential effluent

<table>
<thead>
<tr>
<th>Stakeholder/ Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| Local Authorities         | - Studies on the required capacity of the wastewater treatment facilities  
                           - Fundraising  
                           - Supervision of the construction and operations | - Outsourcing the studies to external consultants  
                           - Technical and financial assistance from the donor organization to support resources from the budget  
                           - Public – Private Partnership schemes | - The wastewater treatment facility established and operational | - Lack of financial resources  
                           - Unwillingness of the national authorities to include establishment of such facilities into the national development plans | The costs will be defined upon conclusion of studies on the required capacities of the wastewater treatment plants |

**Activity 4:** Establishment of localized sanitary network

**Overall Objective:** To prevent groundwater pollution from residential effluent

**Specific Objectives:**

- To ensure the proper and adequate disposal of residential effluent
### Activity 5: Establishment of local landfill

**Overall Objective:** To prevent groundwater pollution from accumulated solid waste

**Specific Objectives:**
- To ensure the proper and adequate disposal of municipal solid waste

<table>
<thead>
<tr>
<th>Stakeholder/ Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Studies on the design of the sewage network</td>
<td>Outsourcing the studies to external consultants</td>
<td>The sewage network is established and operational</td>
<td>Lack of financial resources</td>
<td>The costs will be defined upon conclusion of studies on the design of the sewage network</td>
</tr>
<tr>
<td></td>
<td>Fundraising</td>
<td>Technical and financial assistance from the donor organization to support resources from the budget</td>
<td></td>
<td>Unwillingness of the national authorities to include establishment of such facilities into the national development plans</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supervision of the construction and operations</td>
<td>Public – Private Partnership schemes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The costs will be defined upon conclusion of studies on the design of the sewage network.
<table>
<thead>
<tr>
<th>Authorities</th>
<th>required capacity of the landfills</th>
<th>studies to external consultants</th>
<th>established and operational resources</th>
<th>defined upon conclusion of studies on the required capacity of the landfill</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Fundraising</td>
<td>• Technical and financial assistance from the donor organization to support resources from the budget</td>
<td>• Unwillingness of the national authorities to include establishment of such facilities into the national development plans</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Supervision of the construction and operations</td>
<td>• Public – Private Partnership schemes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

 Authorities required capacity of the landfills

- Fundraising
- Supervision of the construction and operations

Studies to external consultants

- Technical and financial assistance from the donor organization to support resources from the budget
- Public – Private Partnership schemes

Established and operational resources

- Unwillingness of the national authorities to include establishment of such facilities into the national development plans

Defined upon conclusion of studies on the required capacity of the landfill.
7.6.2 Middle Shouneh Municipality Master Plan for Addressing Agricultural Hazards

Agricultural activities as possible pollution sources, relevant to the study area are as following:

- Agricultural chemicals, fertilizers and pesticides, spreading/spraying
- Livestock farming and associated manure piles/other animal waste
- Fertilized fields/agricultural areas
- Illegal wells drilling for irrigation purposes
Table 37: Master Plan – Agricultural Hazards

Activity 1: Establishment of the comprehensive database of agricultural facilities, wells, irrigation volumes, and agricultural practices such as use of pesticides and fertilizers within the municipal borders

Overall Objective: To provide comprehensive database of agricultural entities

Specific Objectives:
- To provide concise and comprehensive databank of agricultural entities and the pertaining issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality, Use of the existing registry in the municipality, Coordination with the Agricultural Directorate, WAJ and JVA</td>
<td>Comprehensive inventory of the agricultural entities within the municipal borders</td>
<td>Lack of qualified technical expertise, Insufficient existing registry</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
</tbody>
</table>

Activity 2: Monitoring of agricultural entities for employed practices such as irrigation, use of pesticides and fertilizers, wells licensing and drilling
Overall Objective: To prevent groundwater pollution from agricultural run off

Specific Objectives:
- To ensure the proper and adequate agricultural practices
- Prevention of groundwater contamination from salty water intrusion from illegal wells
- Enforcement of existing legislation

<table>
<thead>
<tr>
<th>Stakeholder/ Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality</td>
<td>Comprehensive inventory of the agricultural conditions and practices within the municipal borders</td>
<td>Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
<tr>
<td></td>
<td>Monitoring plans</td>
<td>Use of the existing registry in the municipality</td>
<td></td>
<td>Insufficient existing registry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reports from the relevant authorities on their monitoring of the entities, such as the Agricultural Directorate, WAJ and JVA</td>
<td>Reports from relevant directorates of the service ministries</td>
<td></td>
<td>Lack of coordination with the service ministries directorates</td>
<td></td>
</tr>
</tbody>
</table>

Activity 3: Introduce the alternatives such as Integrated Pest Management and drip irrigation as sustainable agricultural practices

Overall Objective: To prevent groundwater pollution from agricultural run off

Specific Objectives:
- To ensure the proper and adequate agricultural practices
<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| Local Authorities        | - Training for farmers  
- Prepare the program of partial farmers’ subsidizing  
- Reports from the relevant authorities on their monitoring of the entities, such as the Agricultural Directorate, WAJ and JVA | - Technical assistance from Agricultural Directorate, NCARE, GIZ and other organizations  
- Financial assistance from donor organizations  
- Public Private Partnership scheme with investors in agricultural sector | - IPM and drip irrigation techniques are deployed  
- Training reports | - Lack of qualified technical expertise  
- Lack of coordination with the service ministries directorates | No extra costs to the salary of HRP Manager are anticipated |
7.6.3 Middle Shouneh Municipality Master Plan for Addressing Industrial Hazards
Industrial activities as possible pollution sources, relevant to the study area are as following:

- Gas stations/service stations
- Auto repair shops
- Car Washes
- Sand and gravel mining/other mining
- Construction sites
Table 38: Master Plan – Industrial Hazards

Activity 1: Establishment of the comprehensive database of industrial facilities within the municipal borders

Overall Objective: To provide comprehensive database of industrial entities

Specific Objectives:
- To provide concise and comprehensive databank of industrial entities and the pertaining issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality, Use of the existing registry in the municipality, Coordination with the Agricultural Directorate, WAJ and JVA</td>
<td>Comprehensive inventory of the industrial entities within the municipal borders</td>
<td>Lack of qualified technical expertise, Insufficient existing registry</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
</tbody>
</table>

Activity 2: Monitoring of industrial entities for employed practices effluent and solid waste disposal
**Overall Objective:** To prevent groundwater pollution from industrial effluent

**Specific Objectives:**
- To ensure the proper and adequate disposal practices of industrial waste
- Prevention of groundwater contamination from industrial effluent
- Enforcement of existing legislation

<table>
<thead>
<tr>
<th>Stakeholder/ Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| Local Authorities         | Electronic repository using the available MS software, such as Excel  
 | Monitoring plans  
 | Reports from the relevant authorities on their monitoring of the entities, responsible for industrial licensing and monitoring | Technical assistance from IT department of the Municipality  
 | Use of the existing registry in the municipality  
 | Reports from relevant directorates of the service ministries | Comprehensive inventory of the industrial conditions and practices within the municipal borders | Lack of qualified technical expertise  
 | Insufficient existing registry  
 | Lack of coordination with the service ministries directorates | No extra costs to the salary of HRP Manager are anticipated |

**Activity 3:** Raising awareness of the owners on the issues on protecting groundwater

**Overall Objective:** To prevent groundwater pollution from industrial effluent

**Specific Objectives:**
To ensure the proper and adequate disposal of industrial effluent and solid waste in compliance with the relevant existing legislation

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>• Awareness program</td>
<td>• Technical assistance from Agricultural Directorate, NCARE, GIZ and other organizations</td>
<td>• Reports on the provided seminars and workshops</td>
<td>• Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
<tr>
<td></td>
<td>• Introduction of Corporate Social responsibility (CSR) to business owners</td>
<td>• Financial assistance from donor organizations</td>
<td>• Contribution of business owners to local development</td>
<td>• Lack of coordination with the service ministries directorates</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Financial assistance from donor organizations</td>
<td>• Public Private Partnership scheme with investors in industrial sector</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Public Private Partnership scheme with investors in industrial sector</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7.7 South Ghor Municipality Master Plan

Figure 12: South Ghor Municipality Combined Hazards Map

The Master Plan for overarching issues is elaborated in the Table below:
### Activity 1: Awareness Campaign on the relationship between the human activities and degradation of quality of the groundwater resources

**Overall Objective:** Improvement of practices of water use, re-use and protection

**Specific Objectives:**
- Raising awareness on the relationship between the human activities and groundwater resources degradation
- Enhancing knowledge on adequate water use

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Brochures, leaflets, posters</td>
<td>Technical assistance from MoA, MOE, NCARE and donor organizations such as GIZ</td>
<td>Enhanced knowledge groundwater management issues</td>
<td>Low level of acceptance and implementation of necessary measures</td>
<td>10 000</td>
</tr>
<tr>
<td>Local NGOs and CBOs</td>
<td>Media campaign</td>
<td>Financial assistance of governmental institutions and NGOs involved in related activities</td>
<td>Reduction of waste</td>
<td>Difficulty in financial funds acquisition</td>
<td></td>
</tr>
<tr>
<td>as representatives of the local community</td>
<td>Lectures, seminars</td>
<td>Financial assistance of international donor organizations</td>
<td>Adequate use of the water resources</td>
<td>Low consistency in application of acquired knowledge</td>
<td></td>
</tr>
<tr>
<td>Local Schools</td>
<td></td>
<td></td>
<td>Recycling of water for agricultural use</td>
<td>Lack of qualified technical expertise</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Reduction in human groundwater contamination</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Activity 2: Advocacy campaign for streamlining of the groundwater protection measures into the local development plans and into national planning process

**Overall Objective:** Educate and empower local communities to communicate their needs to all level politicians and to advocate sustainable development in their areas through integrating the proposed groundwater protection issues into the local and national development plans

**Specific Objectives:**
Obtain support from the Local Community members with adequate knowledge of the community needs and having influence in the local community for lobbying for the proposed measures;

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local communities:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5 000</td>
</tr>
<tr>
<td>• Respected members of the community</td>
<td>• Discussion: Topics for Discussion:</td>
<td>• Technical assistance from MoA, MOE, NCARE and donor organizations such as GIZ</td>
<td>• Commitment by the Local Authorities to support water conservation in the area through inclusion of proposed actions in the Governorate Master Plans for Development</td>
<td>• Conflict of interest between the governorate developmental priorities and the needs of the local communities</td>
<td></td>
</tr>
<tr>
<td>• Representatives of governmental institutions, e.g. LDU, directorates of the line ministries, mayors, Local Councils</td>
<td>• Priority development needs of the local communities;</td>
<td>• Technical assistance of EcoPeace</td>
<td>• Local Council is aware of the needs of the particular local community and is supporting the streamlining of the groundwater protection issues into the local development plans</td>
<td>• Unwillingness to take active part in supporting the actions due to the political reasons</td>
<td></td>
</tr>
<tr>
<td>• Representatives of non-governmental organizations and institutions, e.g. Water Users Associations, Youth and Women Organizations</td>
<td>• Water conservation options applicable to local communities;</td>
<td>• Financial assistance of governmental institutions and NGOs involved in related activities</td>
<td>• Pilot projects aiming at groundwater protection are implemented</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Alternatives for sustainable development in the area;</td>
<td>• Financial assistance of international donor organizations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Development of job and income generating projects taking into consideration the sustainable water management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Policy Flyers, publications</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7.7.1 South Ghor Municipality Master Plan for Addressing Urban/Residential Hazards

Residential/urban activities as possible pollution sources, relevant to the study area are as following:

- Residential areas;
- Educational facilities;
- Tourist facilities;
- Medical facilities;
- Road infrastructure;
- Cemeteries
Table 40: Master Plan – Urban Hazards

**Activity 1:** Establishment of the comprehensive database of urban facilities and conditions of effluent and solid waste disposal

**Overall Objective:** To provide comprehensive database of residential entities

**Specific Objectives:**
- To provide concise and comprehensive databank of residential entities and the pertaining waste disposal issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Local Authorities</td>
<td>• Electronic repository using the available MS software, such as Excel</td>
<td>• Technical assistance from IT department of the Municipality • Use of the existing registry in the municipality</td>
<td>• Comprehensive inventory of the urban entities within the municipal borders</td>
<td>• Lack of qualified technical expertise • Insufficient existing registry</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
</tbody>
</table>

**Activity 2:** Monitoring of urban facilities and conditions of effluent and solid waste disposal
**Overall Objective:** To prevent groundwater pollution from residential effluent and solid waste

**Specific Objectives:**

- To ensure the proper and adequate disposal of residential effluent and solid waste
- Enforcement of the existing legislation in waste management

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality</td>
<td>Comprehensive inventory of the conditions and practices of the waste disposal within the municipal borders</td>
<td>Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
<tr>
<td></td>
<td>Monitoring plans</td>
<td>Use of the existing registry in the municipality</td>
<td></td>
<td>Insufficient existing registry</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reports from the relevant authorities on their monitoring of the entities which are not within the jurisdiction of the Municipality, such as Health Directorate</td>
<td></td>
<td>Lack of coordination with the service ministries directorates</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reports from relevant directorates of the service ministries</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Activity 3:** Establishment of low-cost wastewater treatment facilities

**Overall Objective:** To prevent groundwater pollution from residential effluent
## Specific Objectives:

- To ensure the proper and adequate disposal of residential effluent

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| Local Authorities        | - Studies on the required capacity of the wastewater treatment facilities  
    - Fundraising  
    - Supervision of the construction and operations | - Outsourcing the studies to external consultants  
    - Technical and financial assistance from the donor organization to support resources from the budget  
    - Public – Private Partnership schemes | - The wastewater treatment facility established and operational | - Lack of financial resources  
    - Unwillingness of the national authorities to include establishment of such facilities into the national development plans | The costs will be defined upon conclusion of studies on the required capacities of the wastewater treatment plants |

### Activity 4: Establishment of localized sanitary network

### Overall Objective: To prevent groundwater pollution from residential effluent

### Specific Objectives:

- To ensure the proper and adequate disposal of residential effluent
<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>• Studies on the design of the sewage network</td>
<td>• Outsourcing the studies to external consultants</td>
<td>• The sewage network is established and operational</td>
<td>• Lack of financial resources</td>
<td>The costs will be defined upon conclusion of studies on the design of the sewage network</td>
</tr>
<tr>
<td></td>
<td>• Fundraising</td>
<td>• Technical and financial assistance from the donor organization to support resources from the budget</td>
<td></td>
<td>• Unwillingness of the national authorities to include establishment of such facilities into the national development plans</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Supervision of the construction and operations</td>
<td>• Public – Private Partnership schemes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Activity 5: Establishment of local landfill**

**Overall Objective:** To prevent groundwater pollution from accumulated solid waste

**Specific Objectives:**
- To ensure the proper and adequate disposal of municipal solid waste

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>• Studies on the</td>
<td>• Outsourcing the</td>
<td>• The landfill</td>
<td>• Lack of financial</td>
<td>The costs will be</td>
</tr>
<tr>
<td></td>
<td>design of the landfill</td>
<td></td>
<td></td>
<td></td>
<td>defined</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Authorities</th>
<th>required capacity of the landfills</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Fundraising</td>
</tr>
<tr>
<td></td>
<td>• Supervision of the construction and operations</td>
</tr>
<tr>
<td></td>
<td>studies to external consultants</td>
</tr>
<tr>
<td></td>
<td>• Technical and financial assistance from the donor organization to support resources from the budget</td>
</tr>
<tr>
<td></td>
<td>• Public – Private Partnership schemes</td>
</tr>
<tr>
<td></td>
<td>established and operational</td>
</tr>
<tr>
<td></td>
<td>• Unwillingness of the national authorities to include establishment of such facilities into the national development plans</td>
</tr>
<tr>
<td></td>
<td>defined upon conclusion of studies on the required capacity of the landfill</td>
</tr>
</tbody>
</table>
7.7.2 South Ghor Municipality Master Plan for Addressing Agricultural Hazards

Agricultural activities as possible pollution sources, relevant to the study area are as following:

- Agricultural chemicals, fertilizers and pesticides, spreading/spraying
- Livestock farming and associated manure piles/other animal waste
- Fertilized fields/agricultural areas
- Illegal wells drilling for irrigation purposes
Table 41: Master Plan – Agricultural Hazards

**Activity 1:** Establishment of the comprehensive database of agricultural facilities, wells, irrigation volumes, and agricultural practices such as use of pesticides and fertilizers within the municipal borders

**Overall Objective:** To provide comprehensive database of agricultural entities

**Specific Objectives:**
- To provide concise and comprehensive databank of agricultural entities and the pertaining issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Elktronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality, Use of the existing registry in the municipality, Coordination with the Agricultural Directorate, WAJ and JVA</td>
<td>Comprehensive inventory of the agricultural entities within the municipal borders</td>
<td>Lack of qualified technical expertise, Insufficient existing registry</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
</tbody>
</table>

**Activity 2:** Monitoring of agricultural entities for employed practices such as irrigation, use of pesticides and fertilizers, wells licensing and drilling
**Overall Objective:** To prevent groundwater pollution from agricultural run off

**Specific Objectives:**
- To ensure the proper and adequate agricultural practices
- Prevention of groundwater contamination from salty water intrusion from illegal wells
- Enforcement of existing legislation

<table>
<thead>
<tr>
<th>Stakeholder/ Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>Electronic repository using the available MS software, such as Excel</td>
<td>Technical assistance from IT department of the Municipality</td>
<td>Comprehensive inventory of the agricultural conditions and practices within the municipal borders</td>
<td>Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
<tr>
<td></td>
<td>Monitoring plans</td>
<td>Use of the existing registry in the municipality</td>
<td>Reports from relevant directorates of the service ministries</td>
<td>Insufficient existing registry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reports from the relevant authorities on their monitoring of the entities, such as the Agricultural Directorate, WAJ and JVA</td>
<td>Reports from relevant directorates of the service ministries</td>
<td>Reports on agricultural entities and practices</td>
<td>Lack of coordination with the service ministries directorates</td>
<td></td>
</tr>
</tbody>
</table>

**Activity 3:** Introduce the alternatives such as Integrated Pest Management and drip irrigation as sustainable agricultural practices

**Overall Objective:** To prevent groundwater pollution from agricultural run off

**Specific Objectives:**
- To ensure the proper and adequate agricultural practices
<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| Local Authorities        | - Training for farmers  
                           | - Prepare the program of partial farmers’ subsidizing  
                           | - Reports from the relevant authorities on their monitoring of the entities, such as the Agricultural Directorate, WAJ and JVA  
                           | - Technical assistance from Agricultural Directorate, NCARE, GIZ and other organizations  
                           | - Financial assistance from donor organizations  
                           | - Public Private Partnership scheme with investors in agricultural sector  
                           | - IPM and drip irrigation techniques are deployed  
                           | - Training reports  
                           | - Lack of qualified technical expertise  
                           | - Lack of coordination with the service ministries directorates  
                           | No extra costs to the salary of HRP Manager are anticipated  


7.7.3 South Ghor Municipality Master Plan for Addressing Industrial Hazards

Industrial activities as possible pollution sources, relevant to the study area are as following:

- Gas stations/service stations
- Auto repair shops
- Car Washes
- Bromine and Potash Factories
- Construction sites
Table 42: Master Plan – Industrial Hazards

Activity 1: Establishment of the comprehensive database of industrial facilities within the municipal borders

Overall Objective: To provide comprehensive database of industrial entities

Specific Objectives:
- To provide concise and comprehensive databank of industrial entities and the pertaining issues
- To use the database as a source for the preparation of monitoring plans

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| ● Local Authorities     | ● Electronic repository using the available MS software, such as Excel | ● Technical assistance from IT department of the Municipality  
● Use of the existing registry in the municipality  
● Coordination with the Agricultural Directorate, WAJ and JVA | ● Comprehensive inventory of the industrial entities within the municipal borders | ● Lack of qualified technical expertise  
● Insufficient existing registry | No extra costs to the salary of HRP Manager are anticipated |

Activity 2: Monitoring of industrial entities for employed practices effluent and solid waste disposal
### Overall Objective:
To prevent groundwater pollution from industrial effluent

### Specific Objectives:
- To ensure the proper and adequate disposal practices of industrial waste
- Prevention of groundwater contamination from industrial effluent
- Enforcement of existing legislation

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Authorities</td>
<td>• Electronic repository using the available MS software, such as Excel</td>
<td>• Technical assistance from IT department of the Municipality</td>
<td>• Comprehensive inventory of the industrial conditions and practices within the municipal borders</td>
<td>• Lack of qualified technical expertise</td>
<td>No extra costs to the salary of HRP Manager are anticipated</td>
</tr>
<tr>
<td></td>
<td>• Monitoring plans</td>
<td>• Use of the existing registry in the municipality</td>
<td></td>
<td>• Insufficient existing registry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Reports from the relevant authorities on their monitoring of the entities, responsible for industrial licensing and monitoring</td>
<td>• Reports from relevant directorates of the service ministries</td>
<td></td>
<td>• Lack of coordination with the service ministries directorates</td>
<td></td>
</tr>
</tbody>
</table>

### Activity 3: Raising awareness of the owners on the issues on protecting groundwater

### Overall Objective:
To prevent groundwater pollution from industrial effluent

### Specific Objectives:
To ensure the proper and adequate disposal of industrial effluent and solid waste in compliance with the relevant existing legislation

<table>
<thead>
<tr>
<th>Stakeholder/Target Group</th>
<th>Tools/Methods</th>
<th>Resources</th>
<th>Anticipated Outcomes</th>
<th>Assumptions</th>
<th>Evaluated costs (JD)</th>
</tr>
</thead>
</table>
| Local Authorities        | • Awareness program  
                          | • Introduction of Corporate Social responsibility (CSR) to business owners  
                          | • Technical assistance from Agricultural Directorate, NCARE, GIZ and other organizations  
                          | • Financial assistance from donor organizations  
                          | • Public Private Partnership scheme with investors in industrial sector | • Lack of qualified technical expertise  
                          | • Contribution of business owners to local development | • Lack of coordination with the service ministries directorates | No extra costs to the salary of HRP Manager are anticipated |
## Annex 2: Questionnaire

### Protecting Ground Water: Survey Questionnaire

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>1. Personal Info</strong></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Name</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Name of Municipality</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Position/Job Title</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Member of NGO or any other association</td>
<td>Yes, No, If Yes, please specify</td>
</tr>
<tr>
<td>5</td>
<td>Contact Info</td>
<td>Phone #</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E-mail</td>
</tr>
<tr>
<td>2</td>
<td><strong>2. Monitoring and Enforcement</strong></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Is there a database of all the establishments within the municipal borders, such as residential, industrial and agricultural?</td>
<td>Yes, No</td>
</tr>
<tr>
<td>7</td>
<td>Which unit within the municipality is responsible for updating the database of the establishments?</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Are there any building regulations and specifications that the municipality follows while licensing of any kind of establishment?</td>
<td>Yes, No, If yes, please specify</td>
</tr>
<tr>
<td>9</td>
<td>Is there any kind of monitoring during the construction activities?</td>
<td>Yes, No, If yes, please specify how often</td>
</tr>
<tr>
<td>10</td>
<td>Is there any kind of monitoring of pumping out the cesspits of the residencies within the municipal borders?</td>
<td>Yes, No, If yes, please specify how often</td>
</tr>
<tr>
<td>#</td>
<td>Question</td>
<td>Response</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>Which unit provides monitoring of the residential cesspits condition?</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>The disposal of the residential effluent is:</td>
<td>At the landfill</td>
</tr>
<tr>
<td>3</td>
<td>Is the pumping and disposal of the residential effluent subsidized in any way by the municipality?</td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td>Does the municipality provide monitoring of the use of fertilizers and pesticides in the agricultural establishments within the municipal borders?</td>
<td>Yes</td>
</tr>
<tr>
<td>5</td>
<td>Does the municipality provide monitoring of the effluent disposal in industrial establishments within the municipal borders?</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>Does the municipality provide monitoring of the wells condition and licensing?</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>What enforcement measures are applied by the municipality in case of the violation of the regulations of the effluent disposal?</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>The collected solid waste is disposed:</td>
<td>At the landfill (specify)</td>
</tr>
</tbody>
</table>

### 3. Main Environmental Issues

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
</table>

### What do you consider to be the most significant environmental issues in your area

<table>
<thead>
<tr>
<th>Issue</th>
<th>194</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air pollution</td>
<td></td>
</tr>
<tr>
<td>Soil/ Groundwater contamination from inadequate solid waste disposal</td>
<td></td>
</tr>
<tr>
<td>Soil/ Groundwater contamination from inadequate liquid waste disposal</td>
<td></td>
</tr>
<tr>
<td>Human Induced soil degradation</td>
<td></td>
</tr>
<tr>
<td>Natural soil degradation</td>
<td></td>
</tr>
<tr>
<td>Depletion of water resources due to over abstraction</td>
<td></td>
</tr>
<tr>
<td>Depletion of other natural resources due to excessive use</td>
<td></td>
</tr>
<tr>
<td>Other (please specify)</td>
<td></td>
</tr>
</tbody>
</table>

### What do you consider to be the most significant hazards to the groundwater in your area

<table>
<thead>
<tr>
<th>Hazard</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial activities</td>
<td></td>
</tr>
<tr>
<td>Unauthorized disposal of the residential effluent</td>
<td></td>
</tr>
<tr>
<td>Unauthorized disposal of the solid waste</td>
<td></td>
</tr>
<tr>
<td>Uncontrolled use of fertilizers and pesticides</td>
<td></td>
</tr>
<tr>
<td>Use of polluted water for irrigation</td>
<td></td>
</tr>
<tr>
<td>Unauthorized well drilling</td>
<td></td>
</tr>
<tr>
<td>Other (please specify)</td>
<td></td>
</tr>
</tbody>
</table>

### 3. Capacity Building

<table>
<thead>
<tr>
<th>Question</th>
<th>211</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you consider the capacity of the municipality in dealing with the groundwater pollution issues to be adequate?</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Please provide the justification</td>
</tr>
<tr>
<td>Have you had any previous training related to groundwater protection issues?</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>If Yes, please specify</td>
</tr>
</tbody>
</table>

### 2. Which training courses do you consider to be the priority for building up the capacity of the municipal staff in dealing with the groundwater protection issues?

- GIS Principles & addressing the Hazards Points
- Map Contouring and Analyzing Pollution hazards
- Hazard (EXPOSE) and its Control measures
- Groundwater standards applications
- Wastewater standards and guidelines
- Sanitary inspections forms and applications
- Emergency planning
- Handling customers complaints
- Online environmental data bank
- Data, information and knowledge exchange
- Other (please specify)

### 4. Financial Issues

| 2.4 | Is there a budget line for dealing with the groundwater pollution? | Yes | No | No need |
| 2.5 | Do you think it is necessary to allocate the budget for the establishment of the monitoring unit in the municipality? | Yes | No | It already exists | No need (please provide justification) |
| 2.6 | Do you think it is necessary to borrow from the financial institutions? | Yes | No | If yes, please specify which institutions you would apply to |
| 2.7 | What is the basis for determining the maximum amount you could borrow from the financial institutions or others? |

| 2 | Have you received any | Yes | No | If Yes please specify |
8. training related to financial services/management/planning?

29. Who provided the training?

30. Would you like to receive training related to financial management?

Yes  No  Not interested

31. Which training courses would you be interested in?

Financial Management
Access to finance
Financial institutions and their modalities
Financial planning
Other

5. Suggestions and Recommendations


