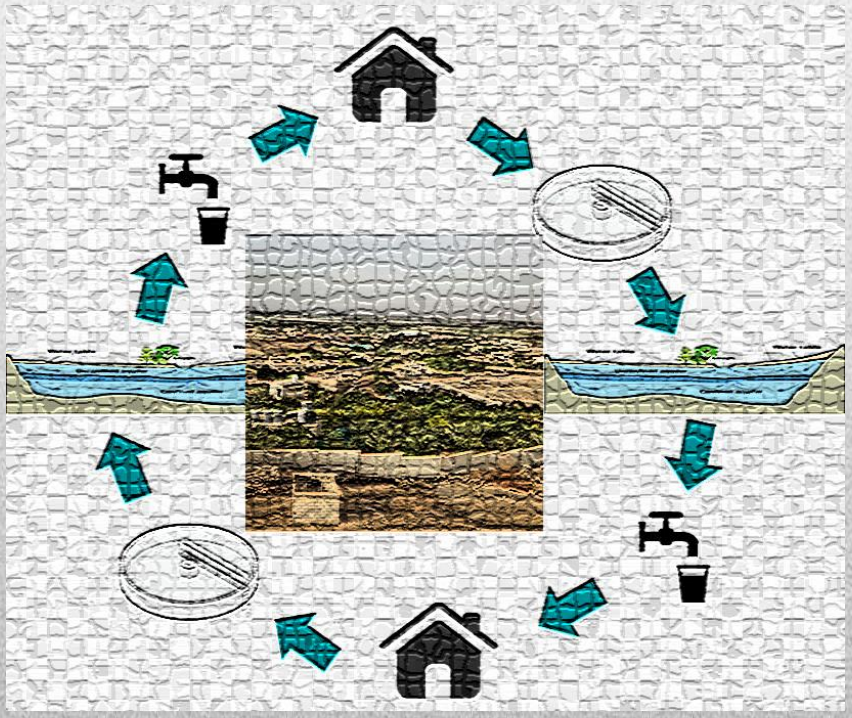
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)
&
ENVIRONMENTAL RISK MANAGEMENT AND MONITORING PLAN (ESMMP)



Conducted, on behalf of UN Habitat, for the full project proposal to be submitted to the Adaptation Fund, titled '*Increasing resilience of both displaced persons and host communities to climate change-related water challenges in Jordan and Lebanon*.'

This assessment document focuses on the proposed concrete adaptation measures in Jordan

UN HABITAT FOR A BETTER URBAN FUTURE | CLIMATE ACTION SUMMIT 2019

A RACE WE CAN WIN

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List of Abbreviations

AF	Adaptation Fund
AF's ESP	Adaptation Fund Environmental & Social Policy
CC	Climate Change
CEDAW	Convention on the Elimination of All Forms of Discrimination Against Women
DOS	Department of Statistics
EE	Executing Entity
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Risks Management & Monitoring Plan
ESMP	Environmental and Social Management Plan
GoJ	Government of Jordan
HFDJB	The Hashemite Fund For Development of Jordan Badia
ILO	International Labour Organization
JNCW	Jordan National Commission for Women
JOHUD	Jordanian Hashemite Fund for Human Development
JUST	Jordan University for Science and Technology
JVA	Jordan Valley Authority
MCM	Million Cubic Meters
MIE	Multilateral Implementing Entity
MoEnv	Ministry of Environment
MPWH	Ministry of Public Works and Housing
MWI	Ministry of Water and Irrigation
NARC	National Agricultural Research Center
RSCN	Royal Society for the Conservation of Nature
WAJ	Water Authority of Jordan
WSD	Water Saving Devices
WWTP	Wastewater Treatment Plant
YWC	Yarmouk Water Company

EXECUTIVE SUMMARY

This report contains an Environmental and Social Impact Assessment (ESIA) and Environmental and Social Risks Management & Monitoring Plan (ESMMP) for the Jordan part of the full project proposal to be submitted to the Adaptation Fund (AF) titled '*Increasing the resilience of both displaced persons and host communities to climate change-related water challenges in Jordan and Lebanon*.'

In accordance with the AF's Environmental and Social Policy (ESP) regarding ESIAs, all proposed projects/programmes shall undertake a screening of environmental and social risks and demonstrate compliance with the environmental and social principles as outlined in the ESP. For projects/programmes that have the potential to cause environmental or social harm, an environmental and social assessment shall be prepared, that identifies any environmental or social risks. According to the said AF's ESP, the proposal should state the category in which the screening process has classified the project/programme. Projects/programmes likely to have significant adverse environmental or social impacts that are for example diverse, widespread, or irreversible should be categorized as Category A projects/programmes. Projects/programmes with potential adverse impacts that are less adverse than Category A projects/programmes, because for example they are fewer in number, smaller in scale, less widespread, reversible or easily mitigated should be categorized as Category B. Those projects/programmes with no adverse environmental or social impacts should be categorized as Category C.

According to the above AF's classification system of projects and the incumbent screening process, the interventions (activities) of the Jordan part of this project have been classified as a "***Category C***" or according to the Jordan's EIA Regulations, particularly the EIA By-Law No. 37 of the Year (2005), as a "***Category III***", which imply that the proposed interventions in Jordan are having no considerable risks or adverse impacts, thus not requiring full EIAs. This is due to the fact that all of the construction activities and installations of this project are not substantial and will be constructed or installed in already built and operating facilities, such as fully-functioning WWTPs, which at the time of original construction have been subjected to MoEnv's incumbent EIA regulations and supervision. The same justification is valid for the other interventions in Jordan of this proposal, which are listed below:

I. Rainwater harvesting from roof tops in mosques, schools, municipal buildings and households;
II. Grey water systems treatment and reuse in schools;
III. The application of sustainable agriculture practices through permaculture at the JUST Faculty of Agriculture's premises.

As all of the above sub-projects' interventions fall as well under Category C according to the AF's classification or Category III for Jordan's Ministry of Environment EIA Regulation's classification with no significant environmental or social impacts that, if existed, can be minimized or mitigated through the application of the Environmental and Social Risks Management & Monitoring Plan (ESMMP) proposed.

Thus, this report has been developed in line with both the Government of Jordan (GoJ) and AF's requirements, policies and regulations. Hence, all proposed (concrete) project activities have been screened against potential environmental and social risks and impacts. Where potential environmental and social risks/impacts were identified, impacts have been assessed accordingly. An ESMMP has been developed to manage the potential risks (including avoiding and mitigating these risks with assignment of roles and responsibilities).

The ultimate conclusion of this ESIA is that all potential environmental and social project risks are either minor to moderate and can be mitigated through monitoring and best management practices articulated in the ESMMPs. No unidentified sub-project risks exist. However, if they were to arise due to unforeseen reasons or conditions in the future through any significant proposed changes in the project during implementation, then these shall be made available for effective and timely public consultation with directly affected communities and assessed for impacts and mitigation measures accordingly including the option of conducting ad-hoc standalone EIA case-by-case, if needed.

INTRODUCTION

Purpose

The purpose of the report ESIA-ESMMP is to respond to both the GoJ and AF's requirements related to developing a project (proposal), which require environmental and social risks and impact screening of the proposed project's activities and the project as a whole at the blue-print level with the purpose to avoid or mitigate any identified risks and impacts. Although as per GoJ's EIA regulations, impact assessment are not required for the proposed project activities, but this has been done anyways to comply to AF's policies.

Approach and methodology

The methodology used to develop and implement the ESIA-ESMMP for the proposed project is in compliance with policies and guidelines preset forth below:

- Environmental and Social Policy and Gender Policy (approved in November 2013; revised in March 2016)/Climate Change Adaptation Fund;
- Environment Protection Law number 6 of the Year 2017/ particularly the *EIA By-Law No. 37 of the Year (2005)/* Ministry of Environment, Jordan (MoEnv). Refer to **Error! Reference source not found.**4) to view other relevant laws and regulations.

The process in short included, but not limited to:

1. Based on project activities identified during the concept note phase of the project development and preparation, feasibility assessments were conducted with the purpose to further select and detail concrete and cost-effective feasible proposed project activities (with inputs from key stakeholders and beneficiary groups – through baseline assessments and stakeholder consultations) in order to conduct the risks screening and impact assessments;
2. Conducting environmental and social risks screening as well as articulating management and monitoring plans for any identified potential risks of feasible proposed project activities per proposed intervention. Risks screening sheets have been completed per each project's activity (i.e. sub-project) and specific needs and concerns identified and discussed with both official stakeholders and beneficiary/vulnerable groups – through consultations.
3. Based on the outcomes of the above an ESMMP was developed.;
4. Approval of the report/assessment by the GoJ on (date January …, 2020)

Project background: the water sector in Jordan, rapid urbanization and potential impacts of climate change

Jordan is one of the countries in the Middle East expected to be amongst the most severely affected countries by the impact of climate change due to the vulnerability of its natural resources and infrastructure. Moreover, its water resources are overexploited (with dramatically declining groundwater levels), which threatens the sustainable supply to the population, industry and agriculture. Water management is also supply-based and, despite significant improvements in water-supply infrastructure, a critical and serious supply-demand imbalance remains in place.

The competing demand on the limited available fresh water quantities in Jordan is ever increasing and this is compounded by the presence of Syrian nationals flooded the country after the conflict started in Syria in 2011.[1] The expanding population and the climatic and topographical conditions of the country have caused enormous pressure on the limited water resources and created a severe water supply-demand imbalance. Water scarcity is an important constraint to Jordan's economic growth and development.

Jordan's water resources consist primarily of surface and groundwater. Groundwater resources are a main source of water in Jordan and is distributed to 12 basins while the surface water basins comprises 15 intermittent flow-based basins. They are, with their limited water quantities and vulnerable quality, the only available water resource for some areas of Jordan.

Despite this limited water availability, Jordan utilizes more than 100% of its renewable water resources and it exploits the groundwater resources to more than the recharge annual rates.

The main groundwater resource in northern Jordan is the Amman-Zarqa basin, which provides water for irrigation and drinking purposes and was exceeding the recharge limit to the aquifer (197% is the abstraction from the safe yield of 87.5 MCM) even before the Syrian crises. The Amman-Zarqa basin underlies a large area of Jordan's northern governorates, where most of the intervention sites of proposed activities in this proposal are located, including the area where the Za'atari refugee camp, the largest place of Syrian DP in Jordan, is situated.

In 2015 the volume of water supplied via the water distribution network to the whole of Jordan reached 441 MCM to serve about 9.42 million inhabitants (the total population in 2015 was 9.53 million out of them are 0.11 million living in camps, who are not supplied by the water distribution network). This is equivalent to about 46.8 CM per person.

Responding to a drop in annual per capita share of water by 16 per cent over the past seven years, the government has launched a 10-year water strategy to bridge a growing gap between supply and demand. Demand for water in Jordan has risen by 21 per cent since the Syrian crisis started, according to official figures. The 2016-2025 National Water Strategy, announced on January 2016, indicated that not only has the average per capita share dropped from 147 to 123 cubic meters per year since the start of the Syrian crisis (world average is close to 7,000), but the cost recovery of operation and maintenance in the water sector has also dropped from 110 per cent in 2010 to 70 per cent in 2014. The drop in both water share and cost recovery is due to the influx of Syrian refugees

[1] By end of 2015, there were 1.3 million Syrians in Jordan, from which 655,000 are registered refugees.

into the Kingdom and a rise in the cost of electricity used in water pumping by 220 per cent, according to the strategy[2].

On the other hand, the average annual water supply per person for the northern governorates (Yarmouk Water Company-YWC) is about 32.1 CM, where 85.1 MCM were supplied to serve about 2.733 million inhabitants (about 305,000 subscribers), with about 70% Operation and Maintenance cost recovery ratio.

The *National Climate Change Policy: Sector Strategic Guidance Framework of the Hashemite Kingdom of Jordan (2013-2020)* and the Third National Communication Report to the UNFCCC in November 2014, have put forward scenarios for the period 2011–2099, which revealed an obvious increase in temperature from 1 – 4 °C and a decrease in precipitation ranges from 15 – 60 % in the majority of the studied sites, which results in increased harvest risks. Extreme events (i.e. flash floods, intense rain, snowstorms, drought etc.) are predicted to be more frequent.

Climate change leads to unprecedented impacts on lives and livelihoods as well as natural resources, particularly water sector in arid regions such as where Jordan is located, and can have negative effects on both the local coping capacity and the environment in areas impacted. Prior to the enactment of the *Climate Change Policy of Jordan* (2013-2020), which included a dedicated chapter for the potential impacts of climate change on the water sector and proposed adaptation measures to the sector, the GoJ has developed a comprehensive water strategy entitled "*Water for Life*" for the period 2008 to 2022. The Strategy was updated in 2012. It mainly focuses on effective water demand management, effective water supply operations, and institutional reform. The updated Strategy has climate change as part of its vision and as one of its principles. Jordan has already identified a list of no-regret measures that are required urgently to address the water sector problems in the short and medium term. Several specific adaptation measures in the water sector have been identified within the main areas mentioned above in several legal documents and studies.

Since the crisis, about 496,000 Syrian nationals settled in host communities in the northern governorates of the country (233,000 from which are registered refugees). Not included in these figures are about 80,000 refugees hosted in the Za´atari camp. This total Syrian population (including those living in camps) adds a significant 21.1% to the existing Jordanian population in the northern governorates. In view of the increasing cost of supplied water and the provision of water and wastewater services, Water Authority of Jordan (WAJ) is facing an increased deficit that reached about 204 MJD ($291 million) in 2015.

Treated wastewater is considered an essential element in the Kingdom's water strategy. The treated wastewater is vital to the water resources equation, as well as a challenge to the underlying water quality and health issues. In northern Jordan and especially close to the Syrian refugee camps areas, two main wastewater treatment plants are available; Al-Mafraq WWTP and Al-Akaider WWTP with 6,950 m^3/day and 4,000 m^3/day design flow, respectively. The two WWTPs utilize stabilization ponds techniques, Al-Mafraq is already exceeding its full capacity and Al-Akaider is now operating at nearly full capacity.

Jordan's population and Syrian crisis

[2] https://www.jordantimes.com/news/local/annual-water-capita-share-dropped-16-start-syrian-crisis%E2%80%99

Jordan carried out the latest census in November 2015, where the total Jordan's population recorded 9.53 million (Table 1) formulating an increase of about 87% from 5.1 million in 2004. Since 2011, when the Syrian crises started, Jordan had a significant increase in its population due to the influx of Syrian refugees, where about 1.265 million Syrians moved to Jordan. By end of 2015, Syrians formulated about 13.3% of total population and about 19.1% of Jordanian population. A summary of the northern governorates' population of Jordan in 2015 where most of the Syrian refugees reside in host communities in relation to the whole population of Jordan is shown below.

Table 1 Population of Syrians in the selected governorates of the project in Jordan in 2015

Governorate	Total	Jordanians	Others	Syrians
Irbid	1,770,158	1,316,618	110,061	343,479
Mafraq	549,948	314,164	27,881	207,903
JORDAN	9,531,712	6,613,587	1,652,611	1,265,514

Source: (DOS, 2015)

The average per capita water supply per refugee in 2015	46.8 CM

Proposed project summary

In Jordan, the to-be-submitted to AF's CC project will be implemented in the northern part of Jordan at the most northern governorates of Irbid and Mafraq focusing on the following adaptation measures:

- Roof-top rainwater harvesting from rooftops of schools, Mosques, municipal buildings, selected households including installation of water saving devices (WSD) in the Governorates of Irbid and Mafraq;
- Grey water treatment and reuse in municipal buildings, schools and mosques;
- Enhancing the treated effluent quality and storage capacities of Mafraq, Al Me'arad and Al Akaidar Wastewater Treatment Plants (WWTPs) and supporting farmers reusing the treated effluent from these WWTPs in irrigation;
- Permaculture at farm level at Jordan University for Science and Technology's (JUST) Faculty of Agriculture.

METHODOLOGY, BASELINE AND GENERAL ENVIRONMENTAL AND SOCIAL COMMITMENT

Most of the interventions recommended in the Jordan part of the proposed Adaptation Fund Project respond to the 2019-2020 Regional Refugee and Resilience Plan (3RP) and are in line with the Jordan Third National Communication (TNC) Report to UNFCCC (2014) aiming at supplementing irrigated and rain fed agriculture, which can be socio-economic, cost-effective climate change adaptation measure in farming systems, especially where irrigated agriculture is not feasible. For example, supplemental irrigation (the watering of rain fed crops with

small amounts when rainfall fails to provide sufficient moisture) has proven to be a drought-proof strategy in most areas.

An increase of available water can be achieved through treated wastewater reuse for supplementary irrigation, rainwater harvesting on-farm and at public buildings, using grey water management systems at public buildings, and the viable application of permaculture as a demonstration to agriculture and veterinary students at a university farm (mimicking urban home style garden) level.

The United Nations Human Settlements Programme (UN-Habitat), as Multilateral Implementing Entity (MIE) for this proposed CCAF project in Jordan, will have the responsibility to ensure compliance with the Adaptation Fund's Environmental and Social Policy (ESP) and Gender Policy (GP). It will manage this by coordinating the timely delivery of relevant materials and reports to the Ministry of Environment (MoEnv) and ensuring that activities are screened. The MIE also commits to ensuring that relevant baseline training will be provided to Executing Entities (EEs) at project inception stage, and during implementation. Also will commit this through project monitoring, evaluation, reporting, gender, stakeholder integration and governance processes and potential new environmental or social risks will be detected in a timely manner so that these can be mitigated and managed accordingly.

Community livelihoods and socio-economic benefits have been at the core of the focus areas of the CC adaptation measures of the TNC to the UNFCCC in November 2014. The ESMMP in this report has been developed to ensure that the project activities do not result in any adverse social or environmental impacts and that any unintended adverse impacts are avoided, and that, where this is not the case, they are timely detected and appropriately mitigated.

In accordance with Articles 5 and 30 of the Jordanian Environmental Law # 6 FY 2017, the EIA by-Law number (37) for 2005 governs Environmental Impact Assessment of projects. The By-Law provides direction for conducting environmental impact assessments for all types of projects including the main issues to be covered by an EIA, reporting procedures, and the approval process. "Every institution, company, plant or any party that, after the enforcement of the provisions of this law, exercising an activity which has a negative impact on the environment, shall be obliged to prepare a study of the environmental impact assessment for its projects, and refer same to the Ministry in order to make the necessary resolution in this effect".

Environmental and social risks of the WWTPs whose existing treatment will be enhanced so that their treated effluent quality, will be further enhanced to meet the current effluent standard # 893/2007. These three selected WWTPs have been constructed years ago and have had EIAs done for them and prior to construction in accordance to the EIA By-Law # 37. They have been adequately risks assessed by the MoEnv's regulations and the potential risks and issues related to the proposed interventions were identified and mitigated as part of their EIA originally at the time of their construction. In relation to this project, issues of environmental and social concern were discussed and addressed during the public and private stakeholder's consultation sessions under this ESMMP where the proposed intervention is through replacement of old equipment and spare parts to enhance treatability but no new considerable infrastructure interventions will take place under this project .

Managing these risks was addressed in the consultation sessions with key stakeholders and technical experts because managing these risks is an integral part to the success of this project activities and achieving the desired outcomes of adaptation to climate change. This was done by evaluating these potential risks against the prevailing

National Environmental Law and EIA Regulation and the 15 Environmental and Social Principles (Principles) of the AF's ESP and the AF Gender Policy.

The summary of Vaseline of theses WWTP is posted below:

1. Al Akaider WWTP:

- Receives septage from unserved communities with no sewer systems in Northern Governorates
- in addition to sludge from Al Za'atari WWTP
- Transported by tankers
- Design capacity of 4,000 m3/day and biological design load of 6000 kg/day BOD5.
- The WWTP treatment method is natural waste stabilization ponds (WSP) (lagoons) located within area of 623,3831 Dunums
- In 2014 it was reported that the total flow in average was 2861 m3 per day 2F 3.
- In year 2014 the WAJ report gave the figure of flow of 3,232 m3 per day. YWC staff confirmed that the flow received in September 2016 was 2,200 m3 per day. The flow received by the WWTP is not properly registered as WMI could not find logs to show list of trucks which discharge into the WWTP.
- the WWTP is under-loaded hydraulically, but overloaded biologically and in need for rehabilitation in order to improve effluent quality (Using the average BOD5 concentration of Amman and Zarqa cesspool sepatge concentration is 2300 mg/l, which shows clearly that the WWTP is biologically overloaded.
- Currently there are five reuse agreements with farmers which only utilizes 500 m3/day of the treated effluent.
- The effluent is mainly used for irrigating olive trees but most of the surrounding farms are reluctant to use the effluent as the quality of the effluent does not meet the standards from the cropping patterns.
- If this proposal is successful and funds are secured then the WWTP will be retrofitted with provisions for enhancing the treated effluent which would then encourage the surrounding farmers and the current ones to use the treated effluent for crops allowed by the treated effluent standard JS 83/2006 and would result in employment opportunities for Syrian refugees working as farmer labour or in ancillary services and Jordanian farmers from the local community resulting in socio economic enhancements and cc resilience for these social groups
- The plant is in need for maintenance as well as provision of toilets and wash facilities for plant workers
- The plant operates under Zero discharge to prevent effluent from going to Wadi Arab Dam which is shared with Syria

The Immediate and short-term plan are (to be implemented within 6-12 months):

- rehabilitation of distribution piping system and manholes
- desludging of anaerobic ponds if needed
- fixing the septage receiving station, and the manholes splitting the flow between the two trains
- clearing all ponds dikes from vegetation and grown trees
- enforcing the staffing capability and lab capacity of the WWTP
- capacity building and providing safety equipment
- providing piped portable water to the administration building
- implement management's improvements.

The long-term plan (to be implemented within 2-5 years)

- Expand the WWTP capacity to cope with projected coming 10 years' load
- Construction of screens at the inlet of the splitting the flow between the two trains
- Recirculate the final effluent to be used as wash-down water with ample pressure, hose, and spray nozzle for convenient cleaning of the septage receiving station and haul trucks. The recirculation pipes to have outlets near each of A's Ponds, F's pond, and M's ponds for spraying scum on the surface of the A's ponds, cleaning and breaking any scum mats or for improving any upsets in the F and M ponds' operation
- Major long term's suggestion is to build a pumping station, to pump surplus irrigation water to nearest environmentally sound discharge destination to eliminate discharge the RW to Syrian Territories and possibility of reaching Yarmouk river water.

- Another alternative is build earth reservoir to store agriculture surplus RW during rainy season.

2. Mafraq WWTP:-

- In addition to upgrading the plant by USAID, wastewater effluent reuse was part of the upgrade design and implementation system.
- The ww effluent reuse system implements an effluent reuse scheme that contribute to the country's water conservation strategy, climate change adaptation and farmers' poverty alleviation.
- Upgrading history:
  - In 2001, CH2M HILL prepared a Concept Design as well as an Environmental Assessment (EA) for the upgrade of Mafraq WWTP and reuse application.
  - Four years later (2015), the treatment process was changed into a low-cost/low-technology concept by Stearns and Wheeler.
  - In 2007, the Jordanian firm Engicon was assigned the task of providing the detailed design services, as well as updating of the EIA to accommodate the new design concept. The plant upgrade and ancillary construction system was completed in 2017.
- It is intended to treat projected sewage flows up to the year 2025.
- It is natural/Mechanical system
- New design capacity 5400 m3/day
- The upgraded WWTP replaced the old WWTP and is located on the same site. Land adjacent to the existing WWTP was acquired with the aim of utilizing the treated effluent for irrigation making the total land area of the facility reach 1,270 dunums.
- The upgraded WWTP meets effluent standards consistent with JS 893/2006 for restricted agricultural reuse and wadi (valley) discharge.
- The reuse scheme that has been developed for the Mafraq WWTP has both short-term and long-term objectives. In the immediate future, the new reuse scheme would maximize use of the treated effluent, protect groundwater resources from contamination due to the cleaner effluent produced and generate revenue to partially offset the plant's operational costs.
- The reuse scheme would contribute to limiting extraction of groundwater resources and would also benefit soils and crops in the Mafraq area. If the reuse scheme is successful and sustainable.
- Space has been reserved for a lined water reuse storage pond with a size of 90,000 m3 and a water reuse pumping station. According to the proposed reuse scheme, which requires an additional 820 dunums of land to be irrigated, the following is expected:

- No effluent discharge into the wadi during the summer.
- No effluent discharge during winter except for seasonal emergency cases.
- This storage is designed to eliminate the need for winter discharge of the treated wastewater until the year 2015.
- Minimizing emergency wadi discharge of excess effluent during winter months.
  - In designing a reuse scheme, special attention is given to plan a reasonable balance between the amount of water needed for irrigation and the amount of the effluent water available. The latter is nearly steady all the year round, while the irrigation demand is variable depending on the time of the year, the crops grown and the amount and intensity of rainfall.
  - It was recommended to increase the planted areas in winter season to efficiently consume the excess in effluent water due to low crop water demand, in addition to storage of excess water during winter season to assist minimize the shortage during summer months.
  - Treated effluent is enough to cover the irrigation demand of the currently available land until the period between 2015 and 2020. After that time, the excess shall be sold to new future users. Some of these users were identified by Engicon and in the CH2M HILL study. Details of this investigation are discussed below.
  - The total irrigation water shortage during the target year 2025 will be 98,853 m^3 while the total water **surplus** will be 655,695 m^3.
  - Constructing a 90,000 m^3 storage pond will therefore cover most of the irrigation water shortage during the summer season.
  - Extra area during winter (dunum) 820

- It is recommended for this adaptation project to reuse the excess effluent water during winter season to plant an additional area with winter crops. The additional area that can be planted during the winter season, in year 2025, as shown in the table should be about 820 dunums. It is recommended to sell this water to private farms in the region to grow winter field crops such as barely, starting 2015 to 2020, when excess effluent generation starts. The plant's effluent meets the Jordanian Standards 893/2006.

❖ PROJECT ALTERNATIVES AND REUSE SCENARIOS

- The main alternative to the proposed project is the no-action alternative. The treatment process alternatives, as well as reuse options, have already been studied, analyzed, and discussed in the previous EA prepared by CH2M HILL in 2001, such that the final selection was made in the Conceptual Design done in 2005. A summary of CH2M HILL Reuse Report 2001, in addition to updated information gathered by Engicon, is presented in this section.

▪ Scenario 1 – Optimizing Agricultural Reuse Benefits

- This scenario, proposed by CH2M HILL and presented on **Error! Reference source not found.**, would consist of the following additional elements to those common elements mentioned above:
- A storage facility that would accommodate a reasonable amount of water (a facility adjacent to the existing WWTP) and would capture a portion of the excess winter water and reuse it in the summer when agricultural demand is the highest.
- A first priority reuse system that would include:
  - ❖ a pumping station,
  - ❖ pipeline, and
  - ❖ distribution system to convey treated effluent to offsite agricultural users.
- A second priority system that would tie into the existing Wadi Abayd discharge pipeline and outflow structure. Excess winter water not used for agricultural demand or for storage would be discharged to the wadi.
- Scenario 1 (Figure 2) was found feasible and was carried forward in the 2001 study.

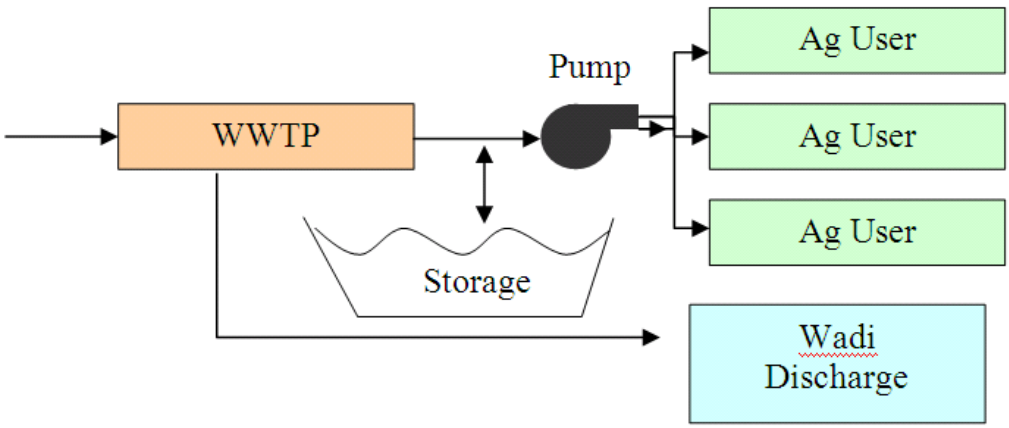

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FIGURE 1 SCENARIO 1 – OPTIMIZATION OF AGRICULTURAL BENEFITS

▪ Scenario 2 – Optimizing Operational Simplicity

- Another CH2M HILL scenario, presented in **Error! Reference source not found.**, consisted of the following additional elements to those common elements mentioned previously:
- A storage facility that would accommodate the entire excess effluent not used by reuse demand. This option would require the maximum amount of storage for any scenario.
- There would be no wadi discharge in this scenario.
- The reuse system would include a pumping station, pipeline, and distribution system to convey treated effluent to a dedicated reuse site. With a dedicated reuse site, land would always be available for treated effluent reuse.
- Scenario 2 (Figure 2) was found feasible and was carried forward in the study prepared in 2001.

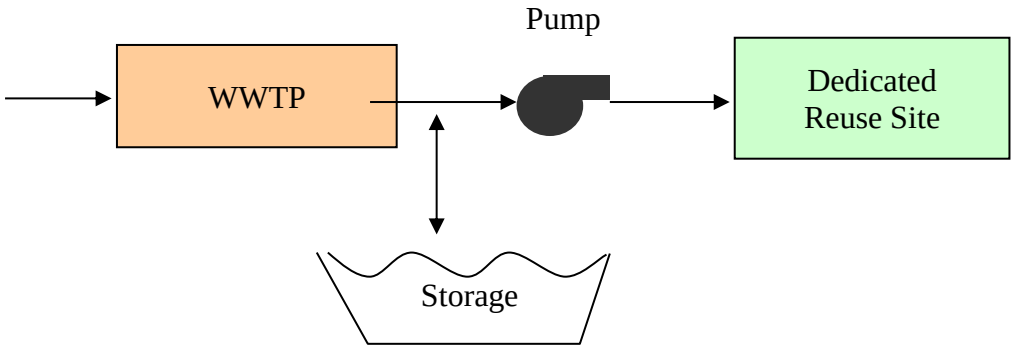

FIGURE 2 SCENARIO 2 – OPTIMIZATION OF OPERATIONAL SIMPLICITY

- **Scenario 3 – Incidental Agricultural Reuse**

- This scenario, presented in Figure 3 and detailed in CH2M HILL study would consist of the following additional elements to those common elements mentioned previously:
- A first priority reuse system that would use a pumping station, pipelines, and distribution system to convey treated effluent to agricultural users.
- A second priority system that would tie into the existing Wadi Abayd discharge pipeline and outflow structure. Any excess treated effluent would be discharged to the wadi.
- There is no storage provided in this scenario.

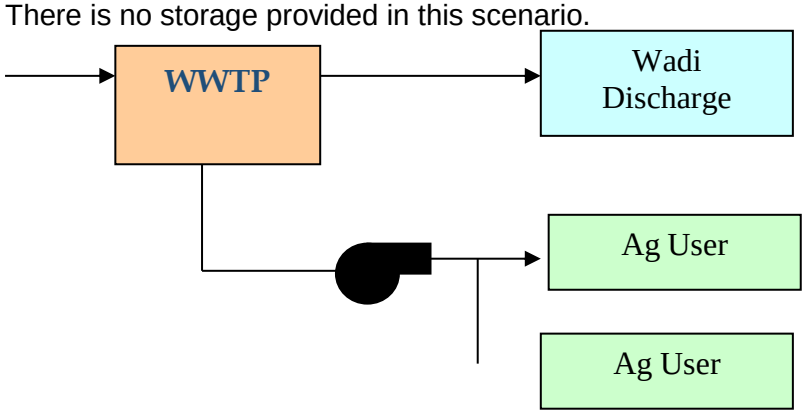

FIGURE 3 SCENARIO 3 – INCIDENTAL AGRICULTURAL REUSE

Potential Users of Mafraq WWTP Effluent

- **Agriculture**

- Water is the limiting factor for agriculture in the Mafraq. If drip irrigation is to be used, it would require filtration, so that the drip emitters would not be plugged. The cost of filtration may be justified for orchard crops but may not be economically feasible for livestock feed.
- Using treated effluent for growing livestock feed (fodder) is widely acceptable among farmers in the area, especially with economic incentives of lower cost water.

- Agricultural reuse is the most acceptable and sustainable means of beneficially using the treated effluent in Mafraq area.
- Crops such as olives, berseem, wheat, and sorghum are economically viable, have established markets in the Mafraq area, use treated effluent during the year, and can be irrigated with treated effluent according to JS 893/2006.
- During the winter months when agricultural crop demand is low, storage is feasible in lined ponds at the reuse farms level for use in the summer months and as a supplement for winter irrigation when rain fall is low.
- With proper management, irrigation within the acquired lands will utilize the full quantity of the treated effluent. Excess started emerging in the period 2015 and 2020.
- Fodder production will be of great benefit to the economy of the area which strongly relies on livestock breeding, as an income generation activity and adaptation measure.

- Locating new re-users for the excess effluent, when it is available, will likely not be a burden on the WWTP operator due to the good level of acceptance expressed by the different parties. However, users should be chosen in a way that demonstrates its benefits to the local residents.

Based on the major findings as described above, CH2M HILL recommended a reuse system that would be a combination of Scenarios 1 and 2 and would have the following components at build-out in year 2025:

- The system would have 90,000 m3 in active storage in a lined pond, located at the WWTP site.
- The system would have wadi discharge for winter flows when agricultural demand is low.
- The system would have a dedicated reuse site(s) owned by the entity responsible for the WWTP, and leased to tenant farmers for growing agricultural crops. It is proposed that land adjacent to the WWTP be leased for agricultural use in connection with the reuse scheme.
- Approximately 106 ha of irrigated land would be required to come under production at dedicated site(s). For every 20 ha of irrigated land 24 ha of land would need to be obtained. It is recommended that 24 ha be developed at a time, as WWTP flows increase.
- To ensure zero discharge to the wadi, storage of excess water may be done during the winter season. The storage pond should be lined. Another good management practice is to increase the area of irrigated lands in winter months, thereby increasing utilization of treated effluent water.
- No further land acquisition will be necessary to utilize the excess effluent after the period 2015 and 2020, as several and potential users have been identified. In addition, water can be sold to neighboring farms.
- There is an already establishing water reuse that ensures the best allocation of the reclaimed water produced by the treatment plant.

Mafraq WWTP needs for Enhanced WW Effluent Treatment

- Supply and install 10 DO meters with analogue signal output 4-20 mA and lay signal cables to main PLC room through galvanized conduits, and supply and install 1 zelic schnider PLC (smart relay) with analogue input complying with DO meter signal and with communication port complying with the main PLC to control operation of each aeration tank in accordance to the DO meter reading and the needs of the process in addition to modify SCADA program to show DO meter reading and give operator the choice to control according to DO (auto) or on/off command (manual) JOD 42,000 for 4 units
- Supply and install a 4 KW motor for service water compressor, the motor specification shall include the capability to work 4 times per hour JOD 500 for 2 units
- Supply and install two 5.6 kw motors for aeration tanks surface aerators JOD 1300 for 2 units
- Central wall and mixers with divides for Denitrification tank JOD 87,750 for 12 units
- Reconfigure 2 lagoons into a SBR JOD 780,000 for 24 units
- Add two bridges at the sludge tank and lifting device JOD 48,750 for 12 units

3. Al-Me'rad/West Jerash WWTP

- located in Jerash Governorate, southwest of the Gaza Camp approximately 58 km from Amman
- USAID conducted a Situation Analysis (SA) whose objectives are to improve the treatment plant (TP or WWTP) efficiency and to produce treated water of high quality such that it can be reused locally, as reclaimed water (RW) for agriculture, and/or be discharged to a wadi and ultimately reach King Talal Dam. Where it gets mixed with collected rain water for irrigation in the Jordan Valley.
- The primary challenges facing the WWTP at this time are as follows:
  - Un-operational equipment (Screens, blowers, mixers, instruments etc.)
  - Insufficient number of qualified, trained operators and un-skilled workers.
  - Unjustified High cost of treatment
- The TP is currently under-loaded biologically and hydraulically, though influent BOD_5 concentration consistently exceeds the design values.
- the out-of-operation units could be put back into operation within a brief timeframe.
- This SA report suggests an immediate, short-term action plan as well as long-term plans for rehabilitation, renovation and expansion.

- The immediate requirement is:
  - deals with maintenance of process systems,

- minimizing the cost of wastewater treatment and
- reducing the annual expenditures.

– The short-term plan deals with:
  - process units' corrections/repairing and
  - managerial improvements
  - The short-term plan deals with capacity building and operational problem solving
  - These will include some capital expenditures to address required rehabilitation and upgrades of several pieces of process equipment with enforcement of the Jordanian by-law for reuse of the reclaimed water.

– The medium -term plan deals with:
  - returning processes units into service, and
  - rehabilitating the existing facilities.
  - Operational savings which could generated from these measures may offset some or all of the correction's expenditures.

Final effluent reuse arrangements

– After disinfection, the effluent flows to an irrigation holding tank where local users with pumping systems use the water for irrigation. Although this arrangement is convenient for local agricultural users, and is employed at various other Jordanian WWTPs, it also shares the same, commonplace challenges. Pumps of different type, capacity, head, and condition are used, often with leaking connections and corroded components.
– Electrical service is connected in a disorganized manner which increases risk of electrocution to laborers and operators in the vicinity. The pumps' arrangement of using irrigation RW for irrigation need to examined for minimizing the risk of electrocution and improve the power consumption by improving the pumps' efficiency.
– Not used water is sent to irrigation is discharged to the Zarqa River.

The importance of using reclaimed wastewater for irrigation purposes at AL Mearad WEWTP:
- Reducing the pressure on fresh water for drinking purposes by allocating treated effluent for restricted agricultural irrigation
- Increase the amount of water allocated for irrigation (15% treated water)
- Protecting the environment and public health
- Protecting water resources from pollution
- Increasing national socio-economic income and providing hard currency from the sale of produce irrigated with reclaimed water
- Partial coverage of the Kingdom's needs for animal feed and agricultural products
- Providing job opportunities for both local communities and Syrian refugees living in these host communities and encouraging teamwork and community service.
- Minimize the use of and need for chemical fertilizers due to nutrients readily available in reclaimed water.

Challenges and Obstacles:
- Farmers are unwilling to use treated water unless it complies with the JS 893/2006.
- Availability and competition over treated wastewater where the treatment plant is n compliance with the national standard
- Capability to supply treated water to farms through irrigation networks and ancillary infrastructure.

Proposed solutions:
Plant WW Operation and Reuse Details:
- Design hydraulic load is 10000 m3/day .
- Average current (2019) hydraulic load is 3580 m3/day
- Available reclaimed water for reuse 3222 m3/day.
- Utilized quantity for reuse 1960 m3/day.

- Surplus not utilized 1262 m3/day.

As it can be noticed from the above data that around 50% of the treated reclaimed water is not utilized while at the same time YWC has many requested from farmers to provide their farm lands with reclaimed water due to YWC lack of resources (infrastructure) to supply the farms with their needs for reclaimed water. The major reason behind this problem is due to the absence of effluent storage tank to store the treated wastewater at night .

Requirements:

1. The WWT Plant needs to construct a storage tank with a capacity of 2000 m3 with all needed infrastructure to store and deliver the treated reclaimed water which is treated at night to meet up farmers' demands.
2. To encourage farmers and land owners to substitute fresh and drinking water by reclaimed water in irrigation. Also the reclaimed water quality and sustainability needs to be improved by the provision of the needed spare parts required for comprehensive and workable successful operation of the waste water treatment plant.
3. The plant has 60 donums planted with olive trees that also need an irrigation network

The tables below shows the potential risks due to WWTPs' retrofitting and how they will be corrected/or prevented, their correlation with AF Environmental and Social Principles (ESPs), and the proposed mitigation measures to comply with the ESPs and national requirements. An ESIA accredited consultant (by MoEnv, USAID, WB and EBRD) assessed the proposed interventions of the concept note, consulted with both the national and donor agencies, Syrian refugees and Jordanians (youth, marginalized groups, NGOs) using risk assessment tools in the consultations, extracted feedback and prepared this document.

The consultant was supported by MoEnv (both the Secretary General and the CC Unit) for guidance and a team from (UN-HABITAT) as MIE and donor/lenders such as GIZ, USAID and UNICEF. The cost of undertaking this assessment was borne by (UN-HABITAT) through the project formulation grant. Stakeholder consultations were held in an open and transparent manner with appropriate social and gender sensitive consideration for issues (i.e. holding separate gender meetings and where the language of discussion was in Arabic (the native language in Jordan, with signatures and registrations of issues of concern documented in Arabic then translated for this ESMMP production purposes).

Environmental and social risks were screened, rated and their mitigation measures were adequately and addressed through monitoring and management plans/responsibilities and the frequency of actions documented to ensure that once funds are secured no changes in subprojects design becomes required.

The consultant ensured adequate coverage in the consultation process with all stakeholders that may be affected or may interact with the project including regulatory authorities, non-governmental organizations (NGOs), Syrian refugees and local Jordanian host communities (youth, men & women), marginalized groups, indigenous people *(Jordan does not have internationally recognized indigenous people but has beduins roaming the desert areas of Jordan chasing rangelands and water for their livestock)*. Additionally, the arrangements for the consultations were undertaken in close coordination with the MoEnv, Ministry of Water and Irrigation (MWI), and Ministry of Local Administration, and those entities who will be responsible for executing the ESMMP process.

EMPOWERMENT OF SYRIAN REFUGEES AND JORDANIANS IN HOST COMMUNITIES

During the community engagement and participatory planning processes that are described throughout the project, local communities (Syrian Refugees and Jordanian local Host Communities) have been and will be empowered to detect report and where possible participate in mitigating environmental and social risks, as set out in the AF's ESP and GP and the project's ESMMP. Processes to build local community capacity to do this will be integrated in the technical capacity building plan's activities that are envisaged during the early stages of each project component. This was and will be essential in ensuring that targeted stakeholders understand the CC adaptation intentions of the project. In addition, that they can contribute to the implementation of sub-component activities accordingly, know their rights and be aware of the recourse in the event they have a grievance and the redress mechanism in the event they have a certain grievance they may want to raise or any risk-related issues that cause their concerns. A grievance and redress mechanism for the project in Jordan is outlined in detail at the end of this document.

PUBLIC CONSULTATION PROCESS

Various community and official stakeholder consultation sessions were held around the northern governorates of Jordan aimed at explaining what is climate change, how to adapt to CC in a country like Jordan, discuss social and environmental potential issues, community and individual needs to adapt to CC , and the possible adaptation measures tools and funds. This was done through the following program:

- Opening session: An explanation on what is climate change, its impacts and adaptation measures, full description of the related project components and activities was presented to all concerned stakeholders;
- The proposed project was outlined by a UN-Habitat representative & the ESSMP team leader/appointed consultant, and NEEs.
- The sub-projects' sites, activities, advantages, and their relation to climate change adaptation were presented;
- The representatives of the local communities (Syrian refugees and Jordanian local host communities) including women, youth and Bedouins had the opportunity to speak about their interests, needs and concerns, and were given the opportunity to give recommendations. Refer to

اقعةد فنية

ذهه الوثيقة إلزامية الطتبقيد

Technical Regulation

This document is mandatory

هايملا ــ يمها الصرف لاصيحد لامنزلية لامستصلحة

Water – Reclaimed domestic wastewater

فاوــلجم قــسسؤم ةرادإ سيــفصاوملا ةمــييياقملاو تلــمقر هتسلجب س ٢٠٠٦/٦ قعنمللــخيراتب ةد ٢٠٠٦/١١/١٣ لعى اعتامد لاوماصفة القياسية قرــم ٢٠٠٦/٨٩٣ اقكعدة فينة لإازمية التطبيق واعبتاهرا سارية وعفملال نم يراتــخ ٢٠٠٧/٣/١٧ لوخملا تايحلاصلا ًادانتسا كلذوــة كــةداملا بجومب ه (٨) قفــقر (ب) فصاوملا نوناق نمــتا مقر سييياقملاو ٢٢/٢٠٠٠.

ؤمسسة المواصفات والمقاييس

لاممكة الأردنية هلااشمية

JS 893:2006

أ ق م ٢٠٠٦/٨٩٣

Third edition

صلإادار الثاثل

وماصفة قياسية أردنية

هايملا ــ يمها الصرف لاصيح لامنزلية لامستصلحة

Water – Reclaimed domestic wastewater

ؤمسسة المواصفات والمقاييس

المملكة الأردنية الهاشمية

لمحاتويات

لجلداول

لماقدةم

ؤمسقس لماواصفات ندرلأا ني سييقتلا تمينطولا تقيطها يه تمينمدرلأا سييلقلاو، دلدعإ متيح ثيح لماواصتلف لقياسية

ـح ناجلالا مذه نوكتو .تمينف ناجل للاخ نم تمينمدرلأا لك لذو ـعوضوم تمينعلا تميسيئرلا تلهجلا ينلئم عاضعأ نمةلكشمةدا تقفصاولما لجأ نم، تقفصاولما مذه لوح تلظحلاو يأرلا ءلدبإ ني قلحا تقفصاولما عوضوم تمينعلا تلهجلا عيمجل نوكيو، يئلهنلا عورشلما ميمعت متر تف علنئآ، فصاولما لعجاًيعسنلكملإا ردق تيلوللا تلفصاوملل تمئاوم تمينمدرلأا تما زإالة العوائق الفينة من أمام التجارة وتسهيل انسياب السلع بين الدول.

يقتلا تيريدلم نيفلا لمعلا لي للدلاًقفو تمينمدرلأا تميسايقلا تلفصاولما تغايصو تلكيه متتسي ١-٢/٢٠٠٥، لجلاغ ٢: وقعلد هيكلة وصيغلة المواصتلف القياسية لأاردينة.

علنبوً ساردب تمدلعلا مليلاو مليملل تمئالدلا تمينفلا تمنجلالا تلماع تدقف لك لذ ىلعـسايقلا تقفصاولما لي دعتو تمينمدرلأا تمية ٢٠٠٢/٨٩٣ **مايلاب** تصالخا ـــ ينمدرأ تمينف تدعاقك لهادلمتعاب تلصوأو **تحلصتسلا تميلترلا ي حصلا فرصلا مايمة**

٢٠٠٦،/٨٩٣ تدلملاًدانتسا لك لذو (٥) لمنب)أ (قرقف (١) تقلاو تلفصاولما نوناق نمقر سييلم ٢٢ كنسة ٢٠٠٠.

مايلدا ـــ ةحلصتسلما ةيلترلما يحصلا فرصلا هايم

١ – ا لا

تختص ذهه المواصفة القياسية لأاردينة بالاشتراطتا الواجب تورفاه في مياه الرصف الحصي المستصلحة والخارجة نيبلا هجولأا بسح اهملدختسا ةداعإ وأ اهفيرصت نكيم تيلاو يحصلا فرصلا هايم ةجلاعم تاطحم نمــه في نمض لماواصفة القياسية لأاردينة.

٢ – ةيسيبقتلا عجارلما

عبطلا ةبطت ةخرؤلما ةلاحلإا ةلاح في ثئبولا هذه ةيبطتل اهنع ءانغتسلاا نكيم لا ةيلاتلا ةيعجرلما ةئاثولــلا ةةروكذلم طقف،)تلايدعت يأ ةنمضتم (ماندأ ةروكذلما ةيعجرلما ةقيثولا نم ةعبط رخآ ةبطتف ةخرؤلما يرغ ةلاحلإا ةلاح في امأ، الفيدرالية لاعماً بأن مكتبة مؤسقس المواصتاف والملقييس تحتوي على فهارس للمواصتاف السارية المعفلو في الوقت الحضر.

– كتاب الطرق القياسية حفلص المياه والمياه اللعدمة الصادر عن الجمعية لأامريكية للحصة الماعة ولجامعية اهثولت ةباقرو مايلا ثاحبلأ ةيكيرملأا، ٢٠٠١.

٣ – فيراعتلاو تاحلطصلما

غلأراض ذهه المواصفة تستدخم المصلطحتا والتاعرفي الواردة دأناه:

١-٣

نلدنمش لىإ اهفيرصتب حومسلما ةلئاسلا ةيعانصلا تافلخلا نمضتت دق تيلاو ةيلترلا **يحصلا فرصلا هايم** تابكم لارصف الحصي الماعة وفق تعليمتا الربط الصادقر عن الجهتا الرسمية لمياه الناتجة عن سلاالتعمالات

يحصلا فرصلا هايم ةجلاعم تاطحم ٣-٢

لمنأشت المعدة لماعةلج مياه الرصف الصحي والتي تتضمن المطتا الكلبيرة والصغيرة

٣-٣

طحتا معالجة مياه الصرف الحصي في التمجعتا اسلكانةي الصغيرة

المطتا المعد□ة لماعةلج مياه الرصف الصحي والتي تنقل إليها المياه بواسقط الصهاريج ذتا الولن البرتاقلي

٣–٤

لمياه لماستصلحة

يماه الرصف الحصي الماعةلج والمنوي سلاتدخماها حسب ما هو وارد في ذهه المواصفة القياسية لأاردينة ما لم تختلط بمياه من صمادر أخرى

٣–٥

لماسطتاحا الخضراء

نتلا تـاياغلا ةصحخلا يرغو ةيقيسنتلاو ةيلامجلا ضارغلأل ةصحصخلا تـاحاسلــمز

ةيكيناكيلما ةلجاعلما ةمظنأ ٣–٦

لأانظمة التي تستدخم الطرق الآلية لماعةلج المياه كنظما الحمأة المنشطة ونظما لأاقراص اليبولويجة الدواقر والمحشرتـا لليبولويجة وغيراه

٣–٧

نأظمة لماعالةج القيعيبط

لأانظمة التي تعالج المياه طيبعياً بواسقط البرك ليتخارية التوهية أو اللاهوايئة أو ربك الإنضاج أو يرغاه

٣–٨

لاتهطير

معلية التخلص أو خفض أعداد الميكروبتـا المرمضة أو الدالة على التولث الممكن تواجداه بالمياه من خلال سلاتدخما ناذ وأ رولكلا لثم تـارهطمـصـ ةلمستعم تـارهطم ةيأ وأ نوزولأا وأ ةيجسفنبلا قوف ةعشلأا وأ رولكلا ميسكأ يبن لجاهتـا الرسمية المختصة

٣–٩

لمحاالميص الصنعاقي

الماصيل التي تستدخم للغيتـا صنعاية مثل شأجار لأاخشاب والزتيون

٣–١٠

لمحاالميص اقلحلقي

الماصيل التي زترع بمساحتـا واسعة وتمصد رمة واحدة سنوياً وتتضمن:

٣–١٠–١

لمحاالميص العلقيف

الماصيل التي زترع من أجل الحصلو على بموعها الحيوي (السياقن ولجاذور) سلاتدخماها في تغذية الحيوانتـا مثل لابرسيم والذةر العلفية وحشيشة الوسدان والفصة ولحالبان وغيراه

٣-١٠-٢

المحاصيل الحبوب

وتشمل جميع المحاصيل التي تزرع لحبوبها الغنية بالنشويات والتي تستخدم في تغذية الإنسان والحيوان وتشمل القمح والشعير والشوفان والذرة الرفيعة (البيضاء) وغيرها

٣-١٠-٣

المحاصيل البذور الزيتية

المحاصيل التي تزرع بقصد الحصول على بذورها بعد تجفيفها مثل العدس والحلبة والترمس وغيرها

٣-١٠-٤

المحاصيل الألياف

المحاصيل التي تزرع بقصد الحصول على أليافها مثل القطن والكتان وغيرها

٣-١٠-٥

المحاصيل الزيت

المحاصيل التي تزرع بقصد استخراج الزيت منها مثل السمسم وفول الصويا والزيتون وغيرها

٣-١٠-٦

المحاصيل السكر

المحاصيل التي تزرع بقصد الحصول على مادة السكر منها مثل الشمندر السكري وقصب السكر وغيرها

٣-١١ الخضار الورقية

البقدونس والكزبرة والخس والسبانخ والملوخية والأرضي شوكي وغيرها

٣-١٢ الخضار الثمرية

تشمل الخضار التالية: الباذنجان والكوسا والخيار والفقوس والفلفل والملفوف والبصل والجزر والفجل والخس والبقدونس والنعنع والجرجير والكزبرة والبقلة وكذلك الفراولة والبطيخ والشمام وقصب السكر وغيرها

٣-١٣ الأزهار والنباتات الزينية

الورد والقرنفل والجاردينيا والأبصال وغيرها

٤ – قرصتخلا تاحلطصلاو زومرلا

لأغراض هذه المواصفة تحمل المصطلحات المختصرة المذكورة دأناه الرموز التالية.

صلاطلح خلاتصر	لارمز
Aluminium	Al
Arsenic	As
Beryllium	Be
Bicarbonate	HCO_3
Biological Oxygen Demand (Five Day)	BOD_5
Boron	B
Cadmium	Cd
Calcuim	Ca
Chemical Oxygen Demand	COD
Chloride	Cl
Chromium	Cr
Cobalt	Co
Colony Forming Unit	CFU
Copper	Cu
Cyanide	CN
Dissolved Oxygen	DO
Escherichia Coli	*E.coli*
Fat, Oil and Grease	FOG
Fluorine	F
Iron	Fe
Lead	Pb
Lithium	Li
Magnesium	Mg
Manganese	Mn
Mercury	Hg
Methylene Blue Active Substance	MBAS
Molybdenum	Mo
Most probable number	MPN
Negative logarithm of H^+ concentration	pH
Nickel	Ni
Nitrate	NO3
Phosphate	P (as PO_4)
Residual Chlorine	RCl_2
Selenium	Se

صلماطلح خلماتصر	لارمز
Sodium	Na
Sodium Adsorption Ratio	SAR
Sulphate	SO_4
Total Dissolved Solids	TDS
Total Nitrogen	T-N
Total Suspended Solids	TSS
Vanadium	V
Zinc	Zn

٥ – ةماعلا تاطارتشلاا

٥–١ ينسيئر ينئزج لىإ ةحلصتسلما مايلما ةفصاولما مسقت:

أ) المياه المستصلحة للغيتا الطحر لىإ السيلو أو لأاودية أو المطسحتا المايئة.

شلااتراطتا ولخاوص الموضحة لكل زجء وحسب سلااتدخما النهائي ب) المياه المستصلحة للغيتا إاعدة سلااتعملا.

٥–٢ ةحلصتسلما مايلما ةيعون قباطت نأ بيج

لماخطط له.

٥–٣ هطلاخ قيرط نع ةحلصتسلما مايلما فيفتج مدع بيجيقنت مايإ ةلجاعلا ةطح عقوم في لة ☐يقتح فعمق

شلااتراطتا الواردة في ذهه المواصفة القياسية لأاردينة.

٥–٤ ثم (ةينردلأا ةيسايقلا ةفصاولما هذه في ةركذلما ضارغلأا يرغل ةحلصتسلما مايلما مادختسا لاح فيعأ لل لا

لالتبريد أو الإطافء) عتتلم مواصتاف أو إرشادتا قياسية خاةص بكل ساتعملا وبعد إجراء الدراستا اللازمة على أن

وتوطير محطتا تنقية ماعلةج المياه العادمة السعي دوامً ؤيخذ البعد الصحي والبيئي بعين لااعتبار من قبل الجةه المستدخمة.

ثملأا مادختسلاا ةيغب ةينردلأا ةيسايقلا ةفصاولما هذه فيل **٥–٥** ليغشت ىلع ةمئاقلا ةصاخلاو ةيمسرلا ةينعلما تاهلجا ىلع

تلحسين نوعية المياه الماعلةج لماعيير ربما تفوق تلك الواردة

للمياه المستصلحة والحافظ على البيئة.

٥–٦ لا ةيناكسلا تاعمجتلا في يحصلا فرصلا مايم ةلجاعم تاطمح نم ةحلصتسلما مايلما مادختسا لاح فيةيرغصـ،

يجب أن لا تؤثر سلباً على نوعية صمادر المياه الجوفية والطسحية والبيئة.

٦ – ةيسايقلا تاطارتشلاا

٦–١ ةيئالما تاحطسلا وأ ةيدولأا وأ لويسلا لىإ حرطلا تاياغل ةحلصتسلما مايلما

٦–١–١ فلوتت امدنع ةيئالما تاحطسلا وأ ةيدولأا وأ لويسلا لىإ ةحلصتسلما مايلما حرطبح مسيتيعون قـم ـاهـع

لودلجا في ةدراولا يرياعلماو صاولخا ١ ةبقعلا جياخ لىإ ةيدؤلما ةيدولأا لىإ حرطلا عنيمو.

الجدول ١ - متطلبات المياه المعالجة وأولويات استخدامها لري الحدائق العامة

المعايير	الرمز	الحد المسموح به مغ/ل (باستثناء المشار إليها)
الأكسجين المستهلك حيوياً	BOD_5	٦٠ (أ)
الأكسجين المستهلك كيماوياً	COD	١٥٠ (ب)
الأكسجين الذائب	DO	> ١
المواد العالقة الكلية	TSS	٦٠ (ب)
الأس الهيدروجيني	pH	من ٦ إلى ٩ (ج)
النترات	NO3	٨٠ (د)
النيتروجين الكلي	T-N	٧٠ (د)
الإشيريشيا كلاوي	*E. coli*	١٠٠٠ (هـ)
بيوض الديدان المعوية	Intestinal Helminthes Eggs	٠,١ (و)
الدهون والزيوت و الشحوم	FOG	٨,٠
الفينول	Phenol	< ٠,٠٠٢
المنظفات	MBAS	٢٥
المواد الصلبة الذائبة الكلية	TDS	١٥٠٠
الفوسفات	P (as PO_4)	١٥
الكلورايد	Cl	٣٥٠
الكبريتات	SO_4	٣٠٠
البيكربونات	HCO_3	٤٠٠
الصوديوم	Na	٢٠٠
المغنسيوم	Mg	٦٠
الكالسيوم	Ca	٢٠٠
نسبة امتصاص الصوديوم	SAR	٦,٠
الألمنيوم	Al	٢,٠
الزرنيخ	As	٠,٠٥
البريليوم	Be	٠,١
النحاس	Cu	٠,٢

لودجلا ١ (تمتة)

المعايير	الرمز	الحد المسموح به مغ/ل (باستثناء المشرا إيلها)
فلالورايد	F	١,٥
الحديد	Fe	٥,٠
الليثيوم	Li	٢,٥
المغنيز	Mn	٠,٢
والمبلدينوم	Mo	٠,٠١
ينالكل	Ni	٠,٢
الرصاص	Pb	٠,٢
السيلينيوم	Se	٠,٠٥
الكادميوم	Cd	٠,٠١
الخاراصين	Zn	٥,٠
الكروم	Cr	٠,٠٢
الزئبق	Hg	٠,٠٠٢
فلالاناديوم	V	٠,١
الوكبالت	Co	٠,٠٥
بالورون	B	١,٠
السيانيد	CN	٠,١

[أ] نمبسم قميقة BOD_5 دعب إجارء قيلمع رتلاشيح لماطت قيقنتلا قيعيبطلا وأ تيلا تشمتل يلاع ربك لقص.

[ب] مسيح بضعف قميقلا لماطت قيقنتلا قيعيبطلا وأ تيلا تشمتل يلاع ربك لقص.

[ج] قدحو.

قيرغصلا قينلاكسلا تاعمجتلا تاطلخ [د]، قرطالما هايلأا ب ١٠٠ ل/غم.

[هـ] قرمعتسم نيوكت قدحو وأ لالمتحا رثكلأا ددعلا/١٠٠ لم.

[و] يوبضة لكلا رتلا.

٦-١-٢ قيفوجتقيئام ضاوحأ لإ يدؤت وأ ولعت قطانم ب قحلصتسلا مايلا روورم دنع، مزلالا يربلتلا ذاتاذا مبيجت نلع تسرب المياه المستصلحة لإ المياه الجوفية.

٦-١-٣ مـ رشابلا سلمتلا ةضرعم ةيئاملا تلاحطسم وأ ةيدوأ وأ لويسلا لإ ةحلصتسلا مايلا حرط نمنعلا عـينطلو تستخدم إحدى عمليتا التهطير المناسبة حافظاً على الحصة الملعة وعند ساتخدما الكلورين كمطهر يجب لاأ يتجاوز افئاض الكلور الحر في المياه المستصلحة عن ١,٠ ل/غم.

الهوصو **٦-١-٤** يلا حرط نمنع يلاوك لايشيرشيلإا دلدعأب ةصالخا ميقلا زوابز ةيعيبطلا ةيقنتلا تلاطلا حمسيـيدوأ لإ ملـة عيبطـودس لإ ةيدؤم ةد يتم تخزين المياه فيها وتستخدم ميهاها بلكلما لأغراض الري. أما في حالة ساتخدما المياه قبل دودسلا لإ، حو لامعتسلاا ةداعإ تايالغ ةحلصتسلا يرلا مايم ةفصاول ةصالخا يريلعلاب مازتلالا ةيفـبـس سلاا تخدما.

٦-٢ لامعتسلاا ةداعإ تايالغ ةحلصتسلا مايلا

٦-٢-١ يرلا تايالغ ةيفولجا مايلا ضاوحلأ ةيعانطصلاا ةينغتلا ضارغلأ ةلهاملا مدختسا داعلا ةحلصتسلا مايلا

٦-٢-١-١ يفولجا مايلا ضاوحلأ ةيعانطصلاا ةينغتلا ضارغلأ ةحلصتسلا مايلا لامعتسا ةداعإب حمسيـنع تامـد لودلجا في ةدراولا يريلعلا عم لهتيعون قفاوتة ٢.

لودلجاـــ٢ ةينغتلا ضارغلأ لهملمدختسلا حومسلا مايلا ةيعون صاوخو يريلعلا ه حومسلا مدلحا لانطصعاية لأحواض لمياه الجوفية

لمعايير	لارمز	لحالد لمسموح به مغ/ل (باستثناء المشار إليها)
لأكسجين المستهلك حيوياً	BOD_5	١٥
لأكسجين المستهلك كيماوياً	COD	٥٠
لأكسجين الذائب	DO	٢ <
لمواد اللعلقة لكللية	TSS	٥٠
لأس الهيدرويجني	pH	نم ٦ لى إ ٩[أ]
ردجة العكورة	Turbidity	٢[ب]
لتنرتا	NO3	٣٠
لأمونيوم	NH_4	٥,٠
نلايتروجين الكلي	T-N	٤٥
الإيشيريشيا كلاوي	*E. coli*	٢,٢>[ج]
يبوض الديدان المعوية	Intestinal Helminthes Eggs	١[د]

لودجا ـــ٢ (تمتة)

المعايير	الرمز	الحد المسموح به مغ/ل (باستثناء المشرا إيلها)
للدهون والزيوت و الشحوم	FOG	٨,٠
فالينول	Phenol	< ٠,٠٠٢
المنظفات	MBAS	٢٥
لوالماد اصللقبة الذائقبة الكلقي	TDS	١٥٠٠
فالوسفات	P (as PO_4)	١٥
الكلورايد	Cl	٣٥٠
الكبريتات	SO_4	٣٠٠
بيالكربونات	HCO_3	٤٠٠
صالوديوم	Na	٢٠٠
المنغييسوم	Mg	٦٠
الكاليسوم	Ca	٢٠٠
سنقبة ادمصاص الصوديوم	SAR	٦,٠
المألينوم	Al	٢,٠
الزرنيخ	As	٠,٠٥
البريليوم	Be	٠,١
نالحاس	Cu	١,٥
فاللورايد	F	٢
لحاديد	Fe	٥,٠
الليثيوم	Li	٢,٥
المانغنيز	Mn	٠,٢
والمبلديوم	Mo	٠,٠١
ينالكل	Ni	٠,٢
الرصاص	Pb	٠,٢
السيلييوم	Se	٠,٠٥
الكادميوم	Cd	٠,٠١

لودجلا ٢ (تمتة)

المعايير	الرمز	الحد المسموح به مغ/ل (باستثناء المشار إليها)
الخارصين	Zn	٥,٠
الكروم الكلي	Cr	٠,٠٥
الزئبق	Hg	٠,٠٠١
الفناديوم	V	٠,١
الكوبالت	Co	٠,٠٥
البورون	B	١,٠
السيانيد	CN	٠,١

أ) وحدة.

ب) نيفليومتر.

ج) ١٠٠/ مل.

د) بويضة للكلتر.

٦-٢-١-٢ تعينت تايلغلا تيفولجا ماميلا ضاوحلأ تيعانطصلاا تعينغتلا ضارغلأ تحلصتسلا ماميلا مادختسابب حمسي لا حأواض المياه الجوفية المستغلة لأغراض الشرب.

٦-٢-١-٣ تيفولجا ماميلا ضاوحأ تعينغت ضارغلأ تحلصتسلا ماميلا مادختسا لبق تمزلالا تينفلا تاساردلا ءارجإ بجي لمصصخة للري ليبان دعم تأثيراه على لأحواض المليئة الجوفية المصصخة للشرب.

٦-٢-٢ يرلا ضارغلأ مادختسا دعاقلا تحلصتسلا ماميلا

٦-٢-٢-١ عومجم لاثمي ينتيسيئر ينتعومجم يرلا ضارغلأ تحلصتسلا ماميلا لمادختسا ةداعإ مدنب نمضتيريايعلا ة لقياسية وبمجموعة سلاتشرادتا.

٦-٢-٢-٢ أب تيسايقلا يريايعلا تعومجم فرعت لودجلا في تدراولا ضاوخلا يريايعلا تعومجم ا ٣ ىلع بجوتي تيلاو لجاهتا التشغيلية لاالتزما لا لإنتاج مياه ماطبقة وحسب سلاتلدختسادا الواردة في ذه المواصفة القياسية لأاردينة.

لودلجاـــ٣ مازتلالا بجاولا تيسايقلا يريامعلاو صاوخلا ييرلا ضارغلأ ةمئاقلا ةدعاسملا ةحلصتسملا ميلمللا

المعايير والخواص	الحدود القصوى المسموح بها حسب أوجه الاستخدام مغ/ل (باستثناء المشار إليها)			
	الخضر المطبوخة نتاوــتاهز والملاعب وجوانب الطرق داخل المدن	شلأالمجر المثمقر جووناب الطرق الخارجية والمسطحات الخضراء	المحاليص القحلقية والمحاليص الصناعية وشلأالمجر الخارجية	رود الطقف
	أ	ب	ج	
الأكسجين المستهلك حيوياً	٣٠	٢٠٠	٣٠٠	١٥
الأكسجين المستهلك كيماوياً	١٠٠	٥٠٠	٥٠٠	٥٠
الأكسجين الذائب	٢<	-	-	٢
المواد العالقة الكلية	٥٠	٢٠٠	٣٠٠	١٥
الأس الهيدروجيني	٦ إلى ٩ [أ]	٦ إلى ٩ [أ]	٦ إلى ٩ [أ]	٦ إلى ٩ [أ]
درجة العكورة	١٠ [ب]	–	-	٥ [ب]
النترات	٣٠	٤٥	٧٠	٤٥
النيتروجين الكلي	٤٥	٧٠	١٠٠	٧٠
الإيثيريثيا كولاي	١٠٠ [ج]	١٠٠٠ [ج]	-	١,١ [ج]
يبوض الديدان المعوية	١ [د]	١ [د]	١ [د]	١ [د]
الدهون والزيوت والشحوم	٨	٨	٨	٢

[أ] قدحو.

[ب] رتمومليفيذ.

قرمعتسم نيوكت قدحو وأ لاالمتحا رئكلأا ددعلا [ج]/١٠٠ مل.

[د] يوبضة لكل رتل.

٦-٢-٢-٣ أ ب تاداشرتسلاا ةعومجم فرعت لودلجا في ةدراو ةيلالتساً لمية ا ٤ ىلع بجوتي اهزوانج ةلاح في ليبلاو ةماعلا ةحصلا ىلع ماليلا لكلت يرثأت جيضوت لإ ةفدالها ةيملعلا تاساردلا ءارجإ ماليلا لكلتل ةمدختسلا ةهجلا وقلتحار الإجراءات العلمية لكلفيقلا بتجنب الإضرار بأي منهما.

لودجلا ٤ يرلا ضارغلأ تحلصتسلا مايلا لامعتسلا ةصالخا ةيداشرتسلا ميقلا

ا موعة ب	لارمز	لودجلا في ةدراولا(ج+ب+أ ٣) مغ/ل	رووط الطقف مغ/ل
لافنيول	Phenol	< ٠,٠٠٢	< ٠,٠٠٢
لمنظافت	MBAS	١٠٠	١٥
لمواد الصلبة الذائبة لكللية	TDS	١٥٠٠	١٥٠٠
لافوسفتا	P(as PO_4)	٣٠	٣٠
كلاولمرايد	Cl	٤٠٠	٤٠٠
كلابرتيتا	SO_4	٥٠٠	٥٠٠
لليبكربونتا	HCO_3	٤٠٠	٤٠٠
لاصوديوم	Na	٢٣٠	٢٣٠
لماغينسيوم	Mg	١٠٠	١٠٠
كلاالسيوم	Ca	٢٣٠	٢٣٠
سنبة دامصاص الصوديوم	SAR	٩,٠	٩,٠
لألمينوم	Al	٥,٠	٥,٠
للزرينخ	As	٠,١	٠,١
لابريليوم	Be	٠,١	٠,١
لنحاس	Cu	٠,٢	٠,٢
لافولمرايد	F	٢	٢
لحلديد	Fe	٥,٠	٥,٠
لليثيوم	Li	٢,٥(٠,٠٧٥ تايضمحلا)	٠,٠٧٥
لمانغينز	Mn	٠,٢	٠,٢
لمولبدنيوم	Mo	٠,٠١	٠,٠١
لاينكل	Ni	٠,٢	٠,٢
لراصص	Pb	٠,٢	٠,٢
لاسيلينيوم	Se	٠,٠٥	٠,٠٥
كلالادميوم	Cd	٠,٠١	٠,٠١
لخارصين	Zn	٥,٠	٥,٠

لودلجاــ٤ (ةمتت)

ا موعة ب	للرمز	لودلجا في ةدراولا(ج+ب+أ ٣) مغ/ل	رود الطقف مغ/ل
كلالروم لكللي	Cr	٠,١	٠,١
للزبئق	Hg	٠,٠٠٢	٠,٠٠٢
لللفناديوم	V	٠,١	٠,١
كلالوبالت	Co	٠,٠٥	٠,٠٥
لليورون	B	١,٠	١,٠
لليسيايند	CN	٠,١	٠,١

٦-٢-٢-٤)ةئيز (ةخوبطم يرغ لكؤتيلا راضلخا يير ةحلصتسلا ماليلا لامعتسابحمسي لا.

٦-٢-٢-٥ تاشاشرلابيرلا مدختسابحمسي لا، بيجتاشاشرلا مدختسا منعو فلوغلا بعلام يير علنثتسابنأ يتم الري ليلا وباستخدام الشراشتا المترحكة وغير المعرضة للاستخدام ارا.

٦-٢-٢-٦ نجل يبقيرلا فلقيإبيجراجشلأا يير تاياغلا ةحلصتسلا ماليلا لامعتسا منع ينعوبسأب لوصلا ي لماثرمة عم سلبتاعد الثمار السقاقط والملامقس للتربة.

٧- ةيعونلا ةبقارم

تتم رمقلبة النوعية كالتالي:

٧-١ نلا يحصلا فرصلا ماليم ةيقنت ةطخ عورشلا ةكلالما ةهجلا ىلعةحلصتسلا ماليلا ةيعون ةقباطم نم دكأتلا ةيلز لمواصتلاف المعتمدة وحسب سلالتعملا النهائي لها وعليها القيما بإجراء الحفصوتا المخبرية اللازمة عم ضروةر فتح سجلات رسمية لتوثيق التنائج المخبرية وإبرازاه للجهتا الراقيبة الحكومية عند طلبها.

٧-٢ قدلمو ينتعاس لكمعقاوبعمنجقبكرم تانيع ذخأ ةيليغشتلا ةهجلا لىوتة ٢٤ ني نضولما ةيرابركتلا قفو ةعاس لودلجا ٥ ةبسانم اهارتيتلا ةيفيكلابتانيع عجم ةيباقرلا تاهجلا لىوتة لمنيب.

٧-٣ لودلجا ني دراو وه ام بسح ةيليغشتلاو ةيباقرلا تاهجلا تانيعلا عجم ةيرابركتة نوكتة ٥.

لودجلا ٥ــ ةيئايميكلا ليلحتلا عاونأو ميقتلاو ةيعونلا ةبارتلا تايانغلا لهعم بجوتلا ةحلصتسلا مايلا تانيع ددع فلاويزيائية والبيولوجية التي تتطلب إجراؤها على تلك العلنيات

نمط المعالجة	مركتارة يمع العانيت		فترة التقييم
نوعها	الجهة التشغيلية	لجاهة الرئابية	
الميكانيكية	ةينيتورلا تاصوحفلا: ٨)ةبكرم ةنيع(ًايرهش تانيع ةيئايميكلاو ةيئايزيفلا صلاولخا: ٣)ةيدرف(اًيموي تانيع ةيوعلا نلديدلا ضويب : ٤)ةبكرم ةنيع(ًايرهش تانيع يلاوكلا ميشيبرشيلإا: ٨)ةيدرف(اًيرهش تانيع	فلالحوصتا الروتينية: عنيتان شهرياً لخاصلو الفيزيائية والكيميائية: عيتنان هشرياً يبوض الديدان المعوية: عينتان شهرياً الإيشيريشيا كلاوي: عيتنان شهرياً	٣ أروهش
الطبيعية	ةينيتورلا تاصوحفلا: ٤)ةبكرم ةنيع(ًايرهش تانيع ةيئايميكلاو ةيئايزيفلا صلاولخا: ٣)ةيدرف(اًيموي تانيع يبوض الديدان المعوية: عيتنان شهرياً (عيقة مركبة) يلاوكلا ميشيبرشيلإا: ٤)ةيدرف(ًايرهش تانيع	فلالحوصتا الروتينية: عينة شهرياً لخاصلو الفيزيائية والكيميائية: عيقة هشرياً يبوض الديدان المعوية: عينة شهرياً الإيشيريشيا كلاوي: عيقة شهرياً	٦ بروهش
المتجمعات السالكانية الصغيرة	ةينيتورلا تاصوحفلا: ٤)ةبكرم ةنيع(ًايرهش تانيع ةيئايميكلاو ةيئايزيفلا صلاولخا: ٣)ةيدرف(اًيموي تانيع يبوض الديدان المعوية: عيتنان شهرياً (عيقة مركبة) يلاوكلا ميشيبرشيلإا: ٤)ةيدرف(ًايرهش تانيع	فلالحوصتا الروتينية: عينة شهرياً لخاصلو الفيزيائية والكيميائية: عيقة الديدان المعوية: عينة شهرياً هشرياً الإيشيريشيا كلاوي: عيقة شهرياً يبوض	٦ بروهش

)طابش –لوأ نونا(لوصفلا بسح أ، (رايأ –راذآ)، (بآ–نارزح)، (ألاذ نيرشت–لولياً).

عاتش واًفيص ب (لوأ نيرشت–رايأ ةيلدب نم اًفيص، عاتشً: نلسين–ألاذ نيرشت ةيلدب نم).

ملاحظة: وحفلالصات ةينيتورلا:NO3, BOD5, COD, TSS, NH4, T-N صلاوخلالو ةيئايزيفلا ةيئايميكلاو : pH, DO, RCl_2, Turbidity, Temperature

٧–٤ مداعلا مايلاو مايلا صحفل ةيسايقلا قرطلا بلاتكلا في دراو وه ام بسح لهليلتو لهلقنو لهظفحو تانيعلا ذخأ ةيتهم ط ةيأو ةتلايدعتو لهثولتلا ةباقرو مايلا ثاباولأ ةيكيرملأا ةيلارديفلا ةيعمجلاو ةمادلا ةحصلا ةيكيرملأا ةيعمجلا نء ردانصلالقر تحليل متعددة أخرى إذا لم تتوفر في المرجع المشار إليه.

٧-٥ يعيطلا ةيقنتلا تاطلسلو لقصلا لكرب ىلع يوتحت يلا ةيكينالكيلا ةيقنتلا تاطلسلا ةبسنلابب ةحتاملا مهتسبلا لأاكسجين المستلهك حيوياً بعد إجراء عملية الفلترة.

٧-٦ مهيقت دنع يلاوكلايشيبرشيلإا وأ ةرارحلا ةمولقلا نولوقلا تايصع جئاتن بالاستحلا يسدنطلا لدعلا مدختسي ونعية المياه المستصلحة.

٧-٧ يلكلا ينجورتينلا نم ةحلصتسلا ةمدلعلا ماليلا ىوتحي مهيقت مهتي، تانيعلا دعب لقي لا ثيحو لدعلا بالاستحابة لماشمولا في حسابه عن خمس عنيتا.

٧-٨ رفوت مدع دنع يلاوكلايشيبرشيلإا صحف جئاتن نعلايدب ةرارحلا ةمولقلا نولوقلا تايصع صحف جئاتن برتعت الإمكاينتا الفينة اللازمة للحفص.

٧-٩ ةسسؤم لإ عوجرلا مهتي ةيندرلأا ةيسايقلا ةفصاولما مذه في ةدراو يرغ قدجتسم يريامع ديدحت لإ ةجالحا ةلاح في لماواصتلاف والماقييس لاتخاذ الإجراء اللازم.

١٠-٧ ضرملا ةيوعلا ميثارلجا نع يربحتلاب مايقلا ةيليغشتلاو ةيباقرلا تاهلجا ىلع ةيئابولا تلالحا ةيكملا ةحن وتاجلاه في المياه.

٨- مهيقتلا ةيلآ

لأاوجه المنيبة في نذهه المواصفة القياسية لأاردينة تعتمد غلأاراض نذهه المواصفة القياسية لأاردينة تبتع آلية التقييم التالية:

٨-١ بسح ةمدختسلاو ةحلصتسلا ماليلا ةيعون مهيقت تايلغا
لودلجا في نضولما ةينمزلا تارتفلا ٥.

٨-٢ مهتي ةيئالما تاحطسلا وأ لويسلا وأ ةيدولأا ةحلصتسلا ماليلا حرطب ةصالخا يريامعلا نم يأ في زيابج روهظ دنع خأذ ةحلصتسلا ماليلا نم ةيفاضإ ةيديكأت ةنيع، فإذا نيبت النتائج المخبرية وجود تجاوز في العتنيين يتم شإلمعر الجقه

لمعينة بضروةر صتويب الوضع بالسرعة الممكنة موتابعة الإجراءتا المتنخة عولى الجقه المعينة بيان الإجراءتا لتصويبية.

٨-٣ ةيديكأت ةنيع ذخأ مهتي لمعتسلا ةداعإ تايلغا ةحلصتسلا ماليلا في ةصالخا يريامعلا نم يأ في زيابج روهظ دنع حيفي لماليلا نم ةيفاضإ صحت ةحلصتسلا، هجلا رامعشإ مهتي ينتنيعلا في زيابج دوجو ةيبرخلا جئاتنلا تنيبو اذإفينعلا ةحتسلا ماليلا لمعتسلا فلقيإ مهتي رهشأ ةثلاث زواجتة قدلو زواجتلا رمتسا اذإو عضولا بيوصتةحلصم سلاالتدخما الذي تم تجاوز الملعيير الخقصو به لحين ستقرار نوعية المياه.

المصطلحات

في الأغراض هذه المواصفة تحمل المصطلحات العربية المذكورة أدناه المعنى للمصطلحات الإنجليزية المقابلة لها.

رقم البند	المصطلح العربي	المقابل الإنجليزي
٣-١	الأكسجين المستهلك حيوياً	biological oxygen demand (Five Day)
٣-٢	الأكسجين المستهلك كيميائياً	chemical oxygen demand
٥-٣	عينة مجمعة	composite sample
٣-٣	الأكسجين الذائب	dissolved oxygen
٧-٦	صفيات القولون المقاومة للحرارة	thermotolerant coliforms
٣-٤	مرشح	filter
٣-٥	الإشيريشيا كولاي	escherichia coli
٥-٤	عينات منفردة	grab sample
٣-٦	بيوض الديدان المعوية	intestinal helminthes eggs
٣-٧	المواد العالقة الكلية	total suspended solids
٣-٨	المواد الصلبة الذائبة الكلية	total dissolved solids
٣-٩	النيتروجين الكلي	total nitrogen
٣-١٠	وحدة تكوين المستعمرات	colony forming unit
٣-١١	العدد الأكثر احتمالاً	most probable number

المراجع

- منظمة الصحة العالمية، ٢٠٠١/٢٨٦، المبادئ التوجيهية الصحية لاستخدام مياه الصرف في الزراعة وتربية الأحياء المائية.

- Health Guidelines for the Use of Wastewater in Agriculture and Aquaculture, (WHO),1989.
- Treated Municipal Wastewater Irrigation Guidelines, EPB 235, June 2004.
- Wastewater Treatment and Use in Agriculture – FAO Irrigation and Drainage Paper
47, 1992.

- Annex (5) and (6) to view stakeholder's consultation and visits reports to view the issues & concerns presented by participants.

Risk Screening forms were distributed, explained and attendees were given the chance to individually fill in these forms that also discussed the 15 ESP principles of the AF Fund and what needs to be given attention to while implementing the CC adaptation measures under the funded project activities.

For the four WWTPs' Capacity Enhancements for WW Reuse Pilot Sub-Projects: consultation meetings with the local community of farmers and Syrian refugees were held through JOHUD and Hashemite Fund for Development of Jordan Badia (Community Based Capacity Building Organizations) to discuss how to implement agricultural-related project activities relevant to harvesting fodder and forages irrigated with treated wastewater effluent and socio-income generating projects. Wastewater reuse and how it can be implemented with successful activities that enhance the productivity, create new job opportunities, and improve the living standards of beneficiaries through utilizing this water resource as an adaptation measure to climate change impacts.

Special sessions were held for farmers especially the ones who will directly benefit from the implementation of this project, who have had historically the right to rain fed cultivation of the land plots immediately surrounding the selected WWTPs in Al Akaider, Al Mearad and Mafraq through contracts on ww reuse with Yarmouk Water Company (who is in charge of the water resources management in the northern governorates). Training for the farmers on good agricultural practices, irrigation management and proper handling of reclaimed water used in irrigation will be initiated under the reuse project activities. These consultation meetings aimed to reach an agreement on upscaling the existing pilot wastewater reuse projects as a climate change adaptation tool

Refer to Annexes 5 and 6 to view the list of participants representing community consultation sign-up sheets and community needs. A wide spectrum of the community representatives ranging from farmers, female heads of households (divorced or widows supporting their families), Syrian refugees and local NGOs, discussed the project concept and recognized the importance of using treated wastewater as a climate change adaptation measure in the water and agriculture sectors. The concerns about possible impacts as voiced by the participants were recorded and risk assessment sheets were filled in by the attendees and their concerns and questions were answered by the team.

Key official stakeholders from YWC, WAJ, and Jordan Valley Authority (JVA) were also consulted to seek their feedback and guidance, and to seek permissions for activity at the sub-projects' sites. Also, several official stakeholders were consulted among these were the MWI, the Ministry of Agriculture, Donors (GIZ and USAID) and UNICEF where all agreed that there is a great value of the multi-stakeholder engagement initiative around water and agriculture.

Community consultation through extending *Permaculture Design, Technologies and Beyond* in Jordan were held at Jordan University for Science and Technology (JUST) aimed at Climate Change Adaptation and Building Resilient Food Security Systems. Two consultation meetings were held with JUST's Vice President and Dean of Agriculture, staff and post graduate students who expressed their interest in the permaculture concept and said that the methodology followed in this sub-project's design will help them to introduce the concept to students of the Faculties of Agriculture and Veterinary Sciences, teach the students the new concept of Permaculture, farmers on how to sustain their crops, and families to not depending on any external source for maintaining farming viability in the future. They stressed on the importance of including female students and farmers in these activities and requested a mechanism that will help them market produce to other regions.

For the Rainwater Harvesting for community resilience and adaptation to climate change through rain water harvesting technologies to demonstrate viability in poverty pocket locations in landmarks such as schools and mosques. The consultation process covered a representative sample of schools and mosques in Irbid, Mafraq, Ramtha and Bani Obied from the northern governorates regional centers. Selection of targeted schools and mosques took place via close consultation with the Ministries of Education and

Awqaf and Islamic Affairs and their buildings directorates' at the governorate branches. Selection criteria focused on those **buildings owned by the government** (to avoid land acquisition and compensation issues) **that serve a large concentration of both Syrian refugees and Jordanians (students and worshippers) as places of demonstration for wide rainbow of viewers, with relatively high water usages verified through their log of quarterly water bills**. Outcomes showed that the community requested replication at household level, agreed that this is a viable intervention that would demonstrate water conservation and adaptation to CC which also can be used for small scale irrigation of household agriculture and livestock.

Meetings were also frequently held at MoEnv with the Secretary General and the Director of the Climate Change Directorate at the ministry where both of them stressed on the importance of this proposal and that through implementing many of the proposed subprojects MoEnv achieves several goals related to its commitment & responsibility towards mainstreaming climate change adaptation plans into its environmental policies, and also aid in the capacity building activities in poverty pockets. MoEnv role lies in managing, facilitating & supervising the work of the executing entities through close collaboration with UN Habitat as the MIE.

The consultation sessions resulted in identifying a number of issues and concerns for different phases of the project. All of the issues and concerns were documented in the risk assessment forms filled in by the groups during the consultation sessions and were collected, synthesized and documented by the ESIA consultant.

All issues identified during the consultation sessions were analyzed and studied by the MIE/ESIA team. Potential interactions of these issues were evaluated against the AF's ESP Principles and national law/regulations. The level of significance for each issue was evaluated as follows: (An English translation of the risk assessment forms per intervention is attached in Annex (1)

- The level of impact was ranked as: Negative or Positive based on applied procedures and expert judgement.
- The likelihood of occurrence was ranked as: (low), (medium) and (high) based on applied procedures and expert judgement.

- List of potential issues and concerns identified by participants during design, operation & decommissioning phases and their evaluation including the potential interactions between project activities and the AF's 15 Environmental & Social Principles. All the concerns were further assessed and taken into consideration in the mitigation and monitoring plans.

Public Disclosure

UN-HABITAT as a multilateral implementing entity (MIE) and in cooperation with MoEnv, UNICEF and the potential National Execution Entities (NEEs) have identified stakeholders and involved them at early stages of project concept design to get the feedback needed for planning project activities to be supported by the Fund. (Consultation reports are attached to Annexes 5 and 6).

The resultant screening and management plans of this ESIA-ESMMPs were made available for public review and feedback by the Ministry of Environment who posted them on their web site in a timely, effective, and inclusive manner free of coercion and in an appropriate way. This is to ensure that Syrian refugees, Jordanians in host communities, women, youth and marginalized groups that are directly affected positively or negatively by the proposed project have a say in project design and monitoring of risks.

Also, the AF Secretariat will publicly disclose the project proposal through their website as soon as it is received and approved. Each implementing entity is responsible for disclosing the final environmental and social assessment to project-affected people and other stakeholders. Project performance reports, including the status on implementation of environmental and social measures, shall be publicly disclosed.

According to the scope of work of the Environmental & Social Impact Assessment (ESIA) and the resultant Environmental and Social Management and Monitoring Plan (ESMMP) for the project activities, comprehensive consultation meetings were conducted by the consulting study team. These consultations represent an important phase of the ESMMP for the project, aimed at identifying the stakeholders concerns' about the project activities in relation to the major environmental and social aspects.

The report concludes that all potential environmental and social risks of all proposed activities under this proposed project (Jordan part) have been identified and their impacts were assessed with mitigation measures proposed. The ultimate conclusion is that all potential environmental and social project risks are either minor to moderate and can be mitigated through monitoring and best management practices. No unidentified sub-project risks exist. However, if they were to arise due to unforeseen reasons in the future through any significant proposed changes in the project during implementation then these shall be made available for effective and timely public consultation with directly affected communities and assessed for mitigation measures. If an ad-hoc standalone new EIA for a particular sub-activity appeared to be needed during the execution of sub-activities, the relevant EE will contract an EIA expert to conduct that study. As per above, the Jordan part of the project is regarded as an AF category C project and category (I) as per the Jordan national EIA Regulations (EIA By-Law).

COMPLIANCE OF PROJECT ACTIVITIES WITH NATIONAL LAW AND THE AF ESPS

EIA in Jordan is a key tool to ensure that decisions taken at the legislative and regulatory level are actually executed and built into the design and implementation of development projects. The legal basis for EIA in Jordan is established in the Environment Protection Law (EPL) no. 6/2017. It is implemented through its EIA regulation (By-Law) no. 37/2006 and its five annexes. These require that the project proponent hires an accredited national consulting firm to conduct the EIA and prepare its report. It also assigns full authority to MoEnv through its Department of Licensing and Guidance (which includes the EIA Section) to make arrangements for screening, control and follow up on the EIA process and its implementation. The approval of an EIA is a pre-requisite for any subsequent license or permit by any or all other relevant authorities that may be required prior to construction. All development projects, such as the retrofitting of these three WWTPs selected in this project regardless of EIA classification, must adhere to the air emission, water, wastewater reuse, and industrial and municipal discharges governed by the Jordanian pertinent national standards. Many features of the Jordanian EIA system are compatible with the new Environmental and Social Framework (ESF) of the

World Bank Group and the European Commission (EC) EIA Regulations no. 97/11 and EBRD regulations. These features are in (i) screening (ii) scoping (iii) EIA report content (iv) content of the environment management plan (v) provisions for appeal; and (vi) requirements for monitoring and follow up.

As per the EIA regulation no. 37/2005, the *Technical Review Committee* administered by MoEnv consists of representatives of the following agencies and line ministries: ministries of environment, planning and international cooperation, municipal affairs, health, agriculture, industry and trade, energy and mineral resources, water and irrigation, tourism and antiquities, and public works and housing, in addition, to representatives from key NGOs and academia. The table below (Table 2) summarizes the Jordanian EIA Procedures and Annexes 2 and 3 for detailed projects classification. It is noted that during the given project formulation stage, detailed design processes will need to be reviewed or generated, and in the event new activities arise or may be identified then the EE wishing to proceed with these activities, will need to explicitly get approval of the MIE in accordance with the project's ESMP. In this regard, the proponents will need to show how the required assessment can be achieved within project time frame and budgetary constraints. If this cannot be done, alternative activities will need to be proposed/identified.

TABLE 2 SUMMARY OF THE JORDANIAN EIA PROCEDURES

Summary of the Jordanian EIA Procedures	
Stage	**Activity**
Initial Filing and Screening	The Project Proponent completes a Project Information Form (PIF) of the intended project and submits it to the Ministry of Environment for screening. An Inter-ministerial Central Licensing Committee reviews the PIF, and after conducting site surveys determines if the project is classified as: • Category I projects for which an EIA report is required • Category II projects for which an initial EIA is only required

	• Category III for which no environment analysis is required **The decision is publicly displayed for 2 weeks**
Scoping	The Ministry issues legally binding guidance on the Scope of the Assessment Proponent prepares a ToR, after a mandatory public consultation. An Inter-Ministerial Technical Review Committee (TRC) reviews and approves the ToR. Accredited consulting entity commences with EIA.

In light of the above and for this project of proposed CC adaptation interventions and during the design and planning for the project activities, their compliance and adherence with the national environmental law and AF's Environmental & Social Principles were taken into consideration. **All proposed interventions are planned in already existing built up areas and have gone through the required national scrutiny and reviews. Furthermore, through consultation with MoEnv and review against the AF's ESP principles, it was concluded that no project intervention activities would require an EIA by GoJ's laws but only an ESMMP. However, to comply to AF's requirements/policies, the assessments on-hand have been conducted anyways.**

For the ESMMP for the proposed effluent quality improvements of the existing WWTPs and their reuse pilots, these WWTPs had undergone scrutiny as part of the national EIA completion requirement for compliance where their EIAs have been prepared and approvals secured prior to construction commencement to ensure compliance with the Jordan EIA Regulation # 37 FY 2005 and Environmental law # 52 FY 2006 (the updated one # 6 FY 2017) which coincidently begins with adherence to AF's ESP Principle # 1 which is screening against domestic and international law and the 15 other principles. The AF's 15 principles correlate with the national laws, regulations and ratified international agreements and when accompanied with the ESMMPs satisfy the AF's ESP Guidance and its Principles as described in the Compliance with AF's ESP Principles Table (3) below. The documentation of the screening and consultation processes and the results are detailed in this ESMMP and their potential impacts and

risks management requirements for further assessment and compliance and required corrective or preventive actions are detailed in Tables to follow.

TABLE 3 COMPLIANCE OF PROJECT'S ACTIVITIES WITH THE AF'S 15 PRINCIPLES

Principle	***Compliance of Project/ Program components & activities with the CC AF ESP***
Principle 1: *Compliance with the Law.*	Compliance of project activities with applicable domestic and international laws through adherence to national and internationally approved regulations and standards will ensure compliance with the AF ESP. The EIAs describe the legal and regulatory framework for the project activities that may require prior permission (such as planning permission, environmental permits, construction permits, permits for water extraction, emissions, and use or production or storage of harmful substances describe the baseline conditions and the plan to achieve compliance with the relevant requirement during construction and operation of any given project. The project proposal document provides a description of the legal and regulatory framework for any project activity that may require prior permission (e.g. EIAs) and describes the current status, any steps already taken, and the plan to achieve compliance with relevant domestic and international laws.
Principle 2: Access and Equity.	The project activities supported by the AF Fund shall be designed and implemented in such a way that both women and men (a) are able to participate fully and equitably; (b) receive comparable social and economic benefits; be socially sensitive and (c) do not suffer disproportionate adverse effects during the development process. This is guaranteed under the EIA Regulation # 37 FY 2005 and Environmental Law # 52 FY 2006 (and updated version of the Law No. 6 of 2017), health and water laws as well as under the construction law, labor by laws and human rights national centre's oversight to ensure fair and equitable access to benefits in a manner that is inclusive and does not impede access to basic health services, clean water and sanitation, energy, education, housing, safe and decent working conditions, and land rights. Disputes are resolved via the grievance and redress mechanism disputants equally. Furthermore, the project will be designed in a way that will not impede access of any group (vulnerable groups (males & females) youth and women in governorates, Syrian refugees, farmers, marginalized groups and beduins (they are not internationally recognized as indigenous groups) to the essential services and rights mentioned in the principle. The project will ensure there be neither discrimination nor favoritism in accessing project/programme benefits. The project document describing the process of allocating and distributing project/programme benefits equally. Also The project activities supported by the AF Fund shall be designed and implemented in such a way that both women and men (a) are able to participate fully and equitably; (b) receive comparable social and economic benefits; be socially

	sensitive and (c) do not suffer disproportionate adverse effects during the development process
Principle 3: Marginalized and Vulnerable Groups	The implementing entity, MoEnv and ESIA consultant assessed and considered particular impacts on marginalized and vulnerable groups. This has been done through identification of these groups and through consultations with these groups. This has to be done before initiating any development project, especially with those funded by donors, such as this project in hand aiming at enhancements to the treatment of the existing WWTPs at Mafraq, Al Mearad, and Al Akaider, the schools and mosques rainwater harvesting systems and grey water systems proposed for mosques and the application of good agriculture management practices at JUST through permaculture and this project to be implemented by UN-Habitat as MIE. In the project's concept note submitted and approved by the AF, the consultations with the municipalities at the targeted governorates, and donors identified where these groups reside and the potential risks associated with: water usage and costs, socio economic aspects of the impacted host communities and Syrian refugees residing in the northern regions of Jordan, and looked at land deeds and rights to ensure that no land acquisition will take place as project activities will be executed strictly in government owned lands and buildings. The stakeholders consultations with these marginalized and vulnerable groups verified the social structure, gender issues and needs, who has the most right to work at the project interventions, local NGOs , women and youth groups, inclusion of people with disabilities, community leaders who should manage community perceptions and alert the project team to sensitivities. The proposed CC Adaptation project will continue to adhere and monitor social changes and be sensitive to the marginalized and vulnerable groups such as Syrian refugees and poor Jordanians in host communities and the expatriate labor force in project locations. Impacts on marginalized and vulnerable groups will be continuously assessed and considered such that they do not experience adverse impacts from the project that are disproportionate to those experienced by others. The fact that project beneficiaries are either Syrian refugees, Jordanians in poor and marginalized northern governorates communities, students at JUST learning good agricultural practices where **revenue of the intervention at JUST will go to the needy Student Fund** as proposed by the design team and agreed by the Vice President of the University, and farm land owners who employee marginalized and refugees, the MIE and the execution partners will ensure governance, stakeholder participation and that nobody is disadvantaged and that fair and equitable treatment when it comes to profits is allocated this will be ensured through the supervision of (UN-HABITAT)/ and the execution partners

Principle 4: *Human Rights.*	Jordan is signatory to UN Human Rights declarations and has active NGOs and civil society programs that monitor human rights as well as international organizations doing that. The Project interventions shall respect and where applicable promote international human rights and monitoring mechanisms to report to the United Nations system.
Principle 5: Gender Equity and Women's Empowerment	The project will ensure that gender equality and women's and youth empowerment is ensured for all project activities. This has been done through detailed stakeholder mapping, including identification of specific concerns, needs and benefits of women and youth (see project proposal document). Also, a 'gender' approach and baseline has been developed. UN Women and UNICEF have been consulted to specifically identify potential risks and needs of women. The project will ensure women will have equal opportunities and access to project benefits (through quotas) and involve women and promote them as leaders where possible while ensuring their safety through safety measures. In response to international commitments, mainly the provisions of Article 18 of the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW), the Jordan National Commission for Women (JNCW) prepared the Kingdom's Fifth National Periodic Report for subsequent submission to the CEDAW Committee, which was prepared with the active participation of many public institutions and non-governmental organizations all provided the required information and data needed to prepare the report. The report depicts the achievements of the Hashemite Kingdom of Jordan in its quest to eliminate discrimination against women as well as the efforts being exerted to mainstream gender into the process of activating constitutional and legal rights in the framework of implementing CEDAW's articles. It also reported the progress achieved during the period from July 2005 (when the Combined Third and Fourth reports were submitted) until November 2009 in the economic, social, cultural political and civil rights areas, through a review of the CEDAW articles one by one in order to assess the achievements made for women in all the CEDAW domains, supported by some indicators. A preliminary version of the said report was studied and refined by all official and non-governmental organizations' commissions during several workshops addressing all the Convention's articles before it was adopted in its final form. When Jordan ratified the Convention on 1/7/1992, it entered a reservation to Article 9/2, which stipulates that «States Parties shall grant women equal rights with men with respect to the nationality of their children» as well as Article 15/4, relating to «the movement of persons and the freedom to choose their residence and domicile», and paragraphs c, d and g of Article 16, related, respectively to «the same rights and responsibilities during marriage and at its dissolution»; «the same rights and

	responsibilities as parents, irrespective of their marital status; and «the same personal rights as husband and wife.» The following should be considered in the project implementation: - The concept of gender mainstreaming for better understanding by the water sector employees. Males and females alike. - Women dimension should be mainstreamed from the beginning of the first phase of needs assessment, plans, project identification, monitoring as well as the evaluation process, to ensure that objectives have been adopted and equally reflected in increasing women productivity as well as enabling them to control and access resources and benefits. - Women's direct participation and consultation should be insured within the process of identifying needs and opportunities as good governance programs require. - Female employees should design objectives of the projects hand in hand with male employees to guarantee gender mainstreaming and creating "change**"** in the mentalities and attitudes, as a goal to achieve positive impact on female and male employee performance related to water management in the field. - Efforts should be directed towards the exploration of restrictions that hinder women playing an active role in water management, as well as ensuring feasible improvements in the implementation systems, which need specific training skills and techniques. Such awareness will supposedly increase the chances for female employees to possess higher positions, since their percentage in this level is low and does not exceed 10%. Such actions will hopefully have positive impacts in better managing and controlling activities on various local levels. Women who are unable to take decisions within their families are vulnerable to being discriminated against regarding training and promotion opportunities. The project ensures that possible core labour rights issues relevant to all proposed project activities are avoided/mitigated. This has been done through an identification and analysis of relevant international and national core labour rights and by making core labour rights a subject during consultations (see outcomes consultations in part II.I. ILO identified the following: Agriculture: Jordan has not ratified C129 - Labour Inspection (Agriculture) Convention, 1969 (No. 129) Construction: Jordan has not ratified C167 - Safety and Health in Construction Convention, 1988 (No. 167) Migrant workers: Jordan has not ratified C143 - Migrant Workers (Supplementary Provisions) Convention, 1975 (No. 143) Women: Jordan has not ratified: P089 - Protocol of 1990 to the Night Work (Women) Convention (Revised), 1948

	Main potential issue/risk in Jordan: - Convention 81 – labour inspection convention. Although ratified there is limited inspection capacity - Increase in child labour (because refugees often work with whole family) - Safety/harassment issues for women figures: - Not many women in construction, but many in agriculture Improvements and projects: - Collective Bargaining Agreement (CBA) by 2019 - Shawish (mediator) protect wage of Syrian refugees - Flexible work permit for Syrian refugees (not dependent on one employer) Therefore, MIE will ensure all contracts include standard clauses to avoid any risks regarding above and that safety measures are taken and inspections conducted. UN-Habitat may work with ILO to do this during project execution.
Principle 6: *Core Labour Rights*	The project activities to be supported by the Adaptation Fund will meet the core labour standards as identified by the ILO. The link below to the ILO Conventions ratified by Jordan. https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:11200:0::NO::P11200_COUNTRY_ID:103201 Jordan ratified 7 out of the 8 fundamental conventions, except for C087 on the Freedom of Association & Protection of the Right to Organize, 1948 The **Decent Work Country Programme in the Arab Region in Jordan in 2006.** Since the completion of the first Jordan Decent Work Country Programme (2006-2009), Jordan was selected as one of nine countries globally, and the only country in the Arab region, to pilot the Global Jobs Pact that was adopted by the International Labour Conference in June 2009. The Global Jobs Pact contains a portfolio of policies to promote jobs and protect people, based on the Decent Work agenda. The Jordan Decent Work Country Programme 2012-2015 seeks "t*o support national initiatives aimed at reducing decent work deficits and strengthening national capacity to mainstream decent work in social and economic policies*." Jordan and ILO: Since joining the ILO in 1956, Jordan has ratified 24 Conventions including seven out of eight fundamental Conventions. The ILO's priorities in Jordan are: - To expand decent work opportunities for young Jordanian men and women through the promotion of better working conditions, non-discrimination and equal rights at work; - To extend a minimum level of social security to the most vulnerable groups of society through the Social Protection Floor

	as part of a more comprehensive social security system in Jordan; - To enhance employment opportunities with a focus on youth employment; - To achieve these objectives, the ILO is working with the GoJ, workers and employers to advance the national employment agenda and enhance access to decent work opportunities. It represents the common commitment of the ILO and its partners to collaborate on specific objectives in the areas of employment promotion, rights at work, social protection, social dialogue, pay equity, youth employment, labour inspection, child labour among others. **Workers' Rights** Jordanian law prohibits most workers from working more than the customary 48 hours a week, and 54 hours for hotel restaurant and cinema employees. Employees are entitled to one day off each week, and workers may not work more than 16 hours in any continuous period or more than 60 hours' overtime per month Workers in the private sector and in some state-owned companies have the right to establish and join unions, although unions must be registered to be considered legal. Over 30 percent of the work force is organized into seventeen unions, which comprise the General Federation of Jordanian Trade Unions. The Constitution prohibits anti-union discrimination, and unions exercise their right to bargain collectively. Labor disputes are usually resolved through mediation or arbitration, and during this time strikes are prohibited. If a settlement cannot be reached through mediation, the Ministry of Labor may refer the dispute to an industrial tribunal by the agreement of both parties. If only one party agrees, the Ministry of Labor refers the dispute to the cabinet and then to Parliament. Labor law prohibits employers from dismissing a worker during a labor dispute. **Children's Rights** The government is committed to ensuring the rights of children. Education is free for all primary and secondary school students and compulsory until age 15, and corporal punishment in schools is prohibited. Jordanian labor laws prohibit children under the age of 16 from working except as apprentices, who at age 13 may begin part-time training for up to six hours per day. Poverty has contributed to the problem of child street peddlers, and the Ministry of Social Development has formed a committee to address the problem. In most cases, the children are removed from the streets, returned to their families or to juvenile centers, and their families are sometimes provided with a monthly stipend. **Women's Rights** Jordan's constitution protects women by explicitly stating that all Jordanians are equal before the law, have the right to assume public office and the right to work. In 1974,

	women were given the right to vote and the right to run in general elections. In September 1996, a National Committee for Women was formed in order to formulate general policies related to women in all fields. The committee also defines the priorities, charts plans and programs for women in both the governmental and non-governmental sectors. In June 1996, working mothers were provided with additional legal protection. The new labor law that went into effect includes an article that prohibits employers from terminating their jobs or giving them notice about termination if they are past their sixth month of pregnancy or on maternity leave. It also gives mothers ten weeks of paid maternity leave, compared with the previous allowance of eight weeks, as well as an hour a day for breast-feeding during the first year after delivery and a year's unpaid leave to care for their newborns. Impact assessment results from Jordan under the Better Work Jordan Programme suggest significant progress has been made, with potential for further improvement. Some of the results are: - Better Work has curbed the use of forced labour tactics and their negative effects - Better Work participation leads to less incidence of abusive treatment in the workplace - Worker-reported pay increases - Training line supervisors, particularly women, pays off in better working relationships and higher productivity
Principle 7: Indigenous Peoples	The project fund shall not support interventions that are inconsistent with the rights and responsibilities set forth in the UN Declaration on the Rights of Indigenous Peoples and other applicable international instruments relating to indigenous peoples. **This is protected under the National Tribal Law of Jordan.** The United Nations Development Fund for Women (UNIFEM) indicated that tribal law in Jordan was abolished in 1975 (UN 2006, 17) where as far as the role of the state is concerned it should be noted that Jordan tends to respect tribal law and customs and allows much autonomy to its tribes in conducting their own internal affairs. In fact, the Jordanian legal system informally recognizes the existence of tribal law side by side with civil law. For instance, a conflict between two families would be dealt with in court but at the same time the families would try to solve their case through tribal processes of conflict resolution (temporary truce, mediation, arbitration, compensation, reconciliation, etc.). **It should be noted here that the Beduins in Jordan are not recognized internationally and by GOJ as Indigenous Peoples.**
Principle 8: Involuntary	Project activities supported by the Adaptation Fund shall be designed and implemented in a way that will not support and avoids the need for involuntary resettlement. The national law

Resettlement	enforces that when limited involuntary resettlement is unavoidable, due process should be observed so that displaced persons shall be informed of their rights, consulted on their options, and offered technically, economically, and socially feasible resettlement alternatives or fair and adequate compensation. **No involuntary resettlement is to take place under this project or its activities. All project interventions will strictly take place only on government owned lands and buildings. This was ensured by the review of the data logs provided by the buildings directorates of the Ministries of Eucation and Awqaf and was used as one of the criteria for selecting locations sub activities for rainwater harvesting and grey water systems. As for the permaculture (JUST) is a government owned university and the same for the selected three WWTPs where farmers implement wastewater reuse under contracts with Yarmouk water company. The project also assures that there are no (informal) activities/livelihoods take place on the project's lands.**
Principle 9: Protection of Natural Habitats	The project funded activities supported by the AF would not involve unjustified conversion or degradation of critical natural habitats, including those that are (a) legally protected; (b) officially proposed for protection; (c) recognized by authoritative sources for their high conservation value, including as critical habitat; or (d) recognized as protected by traditional or indigenous local communities. Jordan is signatory to the main international charters dealing with biodiversity and conventions such as convention on international trading in the wildlife animals and plants that are threatened with extinction (CITES) that was adopted in Washington on 3.3.1973, and the Convention on Biodiversity (CBD) that was adopted in the city of Rio De Janiro on 5.6.1992, and the convention relating to wet lands (which is of an international significance) in its capacity as the habitat of water birds (RAMSAR) that was adopted in the city of Ramsar on 2.2.1971, and the Carthage Protocol for restorative safety that was adopted on 29.1.2000. A list of international agreements in which Jordan is signatory to was presented in Table (5) below. UN-Habitat checked the IUCN Red list and consulted IUCN regional office (see project proposal document). No protected natural habitats are in the target areas. There is no existence of biodiversity of worth in the surrounding areas around all sub-projects' locations. For example, the nearest natural reserve (Yarmouk Reserve) is located 50 km to Northwest of Al-Akaider WWTP.
Principle 10: Conservation of	Project activities supported by the Fund shall be designed and implemented in a way that avoids any significant or unjustified reduction or loss of biological diversity or the introduction of known invasive species. The project ensures no negative impacts

Biological Diversity	on biological diversity will result from project activities. According to the IUCN red list and UNESCO Man and the Biosphere Programme Reserve, no sensitive biospheres are located in the target areas. This is also ensured by the engagement of the MoEnv. **The Royal Society for The Conservation of Nature** (RSCN) is an independent voluntary organization that is devoted to the conservation of Jordan's natural resources; it was established in 1966 under the patronage of Her Majesty Queen Noor with the late King Hussein as Honorary President. RSCN has the mission of protecting and managing the natural resources of Jordan, for it is responsible for protecting wildlife and wild places and is one of the few voluntary organizations in the Middle East with such a public service mandate. The organization's principal activities include: - Setting up protected areas to safeguard the best wildlife and scenic areas - Breeding endangered species to save them from extinction. - Enforcing governmental laws to protect wildlife, control illegal hunting - Raise awareness in environmental issues through educational programs. - Socio-economic development of rural communities. - Promoting the sustainable use of natural resources. There is no existence of biodiversity of worth in the surrounding areas around all sub-projects' locations. For example, the nearest natural reserve (Yarmouk Reserve) is located 50 km to Northwest of Al-Akaider WWTP.
Principle 11: Climate Change	Project activities supported by the AF Fund shall not result in any significant or unjustified increase in greenhouse gas emissions or other drivers of climate change. Jordan has issued in November 2014 a "**Third National Communication to the UNFCCC**" and has a " **National Climate Change Policy of the Hashemite Kingdom of Jordan 2013-2020**" This policy has been developed with a dual objective in mind. The first was to strengthen Jordan's capacity to respond to the detrimental impacts of Climate Change expected to add a multiplying effect to current challenges in sectors like water and agriculture. The second was to strengthen Jordan's global stewardship in addressing options to reduce emissions while achieving sound and sustainable developmental objectives especially in the various sectors of energy. Reaching a national consensus on this policy has not been easy, and that is a positive factor by itself. Extensive debates and exchanges of ideas are always an indicator of seriousness of participating parties to have the best possible outcomes. A policy document on Climate Change should encompass national sectoral priorities packaged in a way that is integrated with the national and global

	responsibilities to contribute to addressing Climate Change threats at all levels, specially adaptation and mitigation. During the consultation process for this policy, national stakeholders were engaged including women and beduins in a healthy discussion that reflected the importance of the topic and the need to optimize the policy document to a level that guarantees maximizing Jordan's role in the global fight against Climate Change and providing best conditions for gaining opportunities for enhancing Jordan's technical, human and institutional capacities to adapt to Climate Change impact. Jordan is a mere contributor to the global GHG emissions with only a marginal emission rate of 0.01% of total global emissions. However, committed to its role and reputation as a global pioneer in the implementation of the various UN conventions, Jordan believes it has a major responsibility in addressing Climate Change challenges while adhering to its national priorities and developmental objectives. The outcomes of the UNFCCC negotiations in the future will probably put more responsibilities on the shoulders of developing countries and environmental activists want to make sure that Jordan is prepared for the new phase with a clear plan. Being a pioneer is not new to Jordan as it was the first Non-Annex I country to produce an Initial National Communication back in 1997 and has been an active member in almost all Climate Change and other UN Conventions' global treaties, partnerships and programmes. **The National Climate Change Policy and Sector Strategic Guidance Framework of the Hashemite Kingdom of** Jordan 2013-2020 (**(in short "Policy")** set for the first time in Jordan and the Middle East, a comprehensive national policy for Climate Change. The Policy has been produced in a participatory and transparent manner that makes this policy a clear reflection of the priorities and objectives of various environmental and development sectors in Jordan. The long-term goal of the **Policy** is to achieve a pro-active, climate risk-resilient Jordan, to remain with a low carbon but growing economy, with healthy, sustainable, resilient communities, sustainable water and agricultural resources, and thriving and productive ecosystems in the path towards sustainable development. • The objective of the Policy (2013-2020) is to build the adaptive capacity of communities and institutions in Jordan, with consideration for gender and addressing the needs of vulnerable groups, to increase the resilience of natural ecosystems and water as well as agricultural resources to climate change, and to optimize mitigation opportunities. • The national priorities and the pillars of the Climate Change Policy are adaptation to climate change and

	mitigation of greenhouse emissions, with an emphasis on adaptation as the imperative track. **The main short-term sub-objectives of the Policy** • Provide an overarching (umbrella/high level) guidance for the Government of Jordan (GoJ)to implement the climate change objectives advanced herewith related to adaptation to climate change and the mitigation of greenhouse gas (GHG) emissions; • Work towards the integration of vulnerability and climate change impact assessment and the adaptation measures into key relevant sectors' policies, strategies, and legal framework, in particular water, agriculture/food security, health, biodiversity, combating desertification, and tourism; • Encourage mitigation and adaptation strategies that maximize health co-benefits, and minimize unintended consequences (adverse health impacts); • Work towards the integration of climate change mitigation objectives into key relevant sectors' policies, strategies and legal framework, in particular energy, transport, and waste; • Ensure that the interests of vulnerable groups, with emphasis on the poor, youth and gender are adequately addressed in mitigation and adaptation policies and strategies and integrate climate change mitigation and adaptation aspects into national sustainable development and green growth policies, strategies, and legal framework taking into account gender mainstreaming and the role and needs of youth and elderly people; • Mainstream climate change considerations in infrastructure planning and services as well as land use planning; and • Provide a ground to secure sufficient financial support, and strengthen institutional and human resources capacities to achieve the objectives advanced herewith, including providing access to regional and international financing resources and capacity building initiatives and programs Jordan's position towards the international commitments and opportunities in mitigation of greenhouse gases and adaptation **Jordan, having signed the United Nations Framework Convention on Climate Change (UNFCCC) in 1992 and ratified it in 1993 and having acceded the Kyoto Protocol as non-Annex-I country in 2003**, has maintained and will continue maintaining strong commitment to the objectives developed by the international community for the integrated environmental and economic response to the threat of climate change. Jordan supports the Durban Platform and intends to become a Party to the new global legal agreement on climate change to be developed under the Durban Platform (to be formalized by 2015 and take effect from 2020), under the condition that the differentiation of the commitments under the new agreement are in accordance with the principle of "common but differentiated responsibilities and respective capabilities".

	Jordan's vulnerability, impact, and adaptation to climate change Jordan faces vulnerability and potential serious impacts on its natural ecosystems, on its river basins and watersheds, on biodiversity—then cascading to impacts on agriculture and food security/production, water resources, human health, public infrastructure, human settlements and socio-economic framework. Adaptation actions to be taken to secure that the people and the economic, social and natural systems in Jordan will not suffer from climate change impacts. Objectives for vulnerability, impact, and adaptation to climate change • Further increase the scientific knowledge of climate change vulnerability and impact on water, agriculture/food production, health, biodiversity, desertification and other relevant sectors, with water and agriculture as the key sectors. This will include the link between climate change adaptation and disaster risk; • Develop national and regional capacity to address climate change risks; • Develop adaptation strategies in all relevant vulnerable sectors and work towards integrations/filling gaps of climate change aspects into relevant sectors' existing adaptation policies and strategies as well as action plans; • Strengthen the cross-sector approach to adaptation given the strong thematic relation between the sectors, and strengthen the existing national institutional framework, including the National Committee on Climate Change (NCCC) and its advisory bodies with emphasis on climate change research group; and • Promote the access to national and international financing for adaptation projects, including mainstreaming climate consideration in the allocation of national budgets. It is worth noting here that project selected interventions aim at CC Adaptation. Whereby for agriculture and wastewater treatment enhancement and reuse interventions, the 'extra' energy use will be compensated through Photo Voltaic (PV) systems and pumping this is to be in compliance with the national and AF requirements and ensures no negative climate change impacts will result from project activities, such as increases in the emissions of greenhouse gasses or in other drivers of climate change. In line with internationally recognized standards, large interventions in the following sector require a greenhouse gas emissions calculation: energy, transport, heavy industry, building materials, large-scale agriculture, large-scale forest products, and waste management. In line with national standards, environmental and social impact assessments have been conducted for a few proposed sub-projects. These studies will include an assessment of energy use for proposed interventions. In any case, renewable energy sources will be used). The case of this project agriculture and ww reuse activities as well as small scale buildings (mosques and schools) the extra energy required

	for pumping will be small scaled and will be compensated by the installation of solar powered pumps. For Permaculture JUST has the largest solar farm in Jordan and is self-sufficient and can accommodate any extra energy requirements.
Principle 12: Pollution Prevention and Resource Efficiency	Project activities supported by the AF are designed and implemented in a way that meets applicable international standards for maximizing energy efficiency and minimizing material resource use, the production of wastes, and the release of pollutants Covered under the Jordan Environmental Law # 52 for 2006 and the Natural Resources Authority Law 2002 Ministry of Agriculture Law (No. 44, 2002). Waste management including sludge management is key to ensuring compliance with P12 and is in the focus of MoEnv and the execution partners. Agricultural waste will be composted and support from the JUST group will be extended to the northern governorates farmers to teach them on how to do small scale composing at farm level to return nutrients to the soil and condition it. Soil management will be a core element in the wastewater reuse activities to ensure management of salinity, again this is in the in house knowledge base within the expertise of the execution entities
Principle 13: Public Health	Project activities supported by the AF shall be designed and implemented in a way that avoids potentially significant negative impacts on public and workers health. Public health protection is assured under the Public Health Law (No. 7, 2008). According to the new Public Health Law issued by a Royal Decree in 2008, the Ministry of Health is responsible for all health matters in the Kingdom, and in particular: - Protecting health through providing preventive and curative services as well as monitoring responsibilities. - Organizing and supervising health services provided by the public and private sectors - Providing health insurance for citizens within available resources - Establishing educational and training health institutions managed by the MOH To avoid potential negative health impacts for this activity and other activities safety signs and personal protective equipment and hygiene services such as toilets and wash basins will be provided in line with core labour rights (155 and 187) Occupational safety and health is also assured through the Occupational safety and Health Inspectors of the Ministry of labor who conduct frequent site visits to work sites and locations to ensure that workers do not get occupational diseases and that they are frequently tested such as wastewater reuse sites. Ensuring this takes place will be part of the duties of the environmental, social-health and safety officers overseeing the ESMMP implementation of this project and compliance with this must be in the quarterly reporting.

	Article 4 of the Law defines areas of work for the Ministry of Health including health promotion and healthy lifestyles, disease control, prevention of nutritional deficiencies, maternal and child health, school health, health of the elderly and prevention and control of no communicable diseases. The Law contains provisions on the practice of medical and health professions, private health care institutions, mental health and drug addiction, communicable diseases, immunization, pharmaceuticals, water and sanitation.
Principle 14: Physical and Cultural Heritage	Project activities supported by the AF shall be designed and implemented in a way that avoids the alteration, damage, or removal of any physical cultural resources, cultural sites, and sites with unique natural values recognized as such at the community, national or international level. Projects/Programmes should also not permanently interfere with existing access and use of such physical and cultural resources in accordance with the Public Antiquities Law (No. 21, 1988 and the revised version Revised Public Antiquities Law No. 23 of the Year 2004) and The Strategy for Management of Jordan's Archeological Heritage Under the UNESCO listed Heritage Sites there is no site identified in the target areas: Jordan's cultural heritage is divided into Antiquities (any object, whether movable or immovable, which has been constructed, shaped , inscribed, erected, excavated, or otherwise produced or modified by humankind earlier than the year 1750 A.D.) , and Heritage which is protected by the Antiquity Law No. 21 for the year 1988 and its amendment. Recently on 2003, Interim Law No. (49) For the Protection of Urban and Architectural Heritage was approved. The law deals with heritage sites constructed after the year 1750 for its importance either with regards to the structural technique, or its relation to a historically important personality, or its relationship to important national or religious events. A new directorate was created at the Ministry of Tourism and Antiquities to implement this law. This was followed by Revised Public Antiquities Law No. 23 of the Year 2004.
Principle 15: Lands and Soil Conservation.	Project activities supported by the Adaptation Fund shall be designed and implemented in a way that promotes soil conservation and avoids degradation or conversion of productive lands or land that provides valuable ecosystem services. Ministry of Agriculture Law (No. 44, 2002 and the Recent Law No. 13 of the Year 2015 and its amendment Law No. 50 of 2015) ensures conservation of land and soils coupled with the provisions under the Environmental Protection Law 6 FY 2017. All proposed project activities aim to enhance sustainable land and soil use, especially for agriculture use. No major excavations will take place.

COMPLIANCE WITH THE NATIONAL LAWS/REGULATIONS AND INTERNATIONAL LAWS AND AGREEMENTS

Below is an outline of the existing environmental legislations, standards, & requirements in addition to international agreements and conventions in which Jordan is party to.

Major Relevant Regulatory Bodies:

- Ministry of Environment (MoEnv).
- Ministry of Education
- Ministry of Higher Education and Research
- Ministry of Health
- Ministry of Awqaf and Islamic Affairs
- Ministry of Agriculture
- Civil Defense Directorate
- Department of Antiquities
- Ministry of Public Works and Housing.
- Ministry of Local Administration
- Ministry of Transport
- Jordan University for Science and Technology (JUST)
- NGOs (representing vulnerable groups and refugees), The Jordan Hashemite Fund for Human Development (JOHUD) and The Hashemite Fund for Development of Jordanian Badia (HFDJB).

A summary of responsibilities of governmental authorities is outlined in the following section and in Table 4.

TABLE 4 SUMMARY OF RESPONSIBILITIES OF RELEVANT REGULATORY AUTHORITIES

Authority	***Responsibility***
Ministry of Environment	The EIA Directorate in the Ministry is responsible for licensing of the projects. The projects are referred to the EIA Directorate, and submitted to a Central Licensing Committee that consists of representatives of the relevant governmental authorities such as Ministries of Environment, Health, Water, and Agriculture. An approval from the committee is required for licensing, which may have conditions attached to it, before the relevant authorities can grant permission. Refer to Figure 4 on Environmental and Social Risks Screening for Risk Management below to view this process. Permitting prior to operation (EIA report requirements) and where inspection during operation is mandatory.
Ministry of Labor	Permitting prior to operation (after the occupational health and safety measures are considered). Labor inspection during establishment, operation and decommissioning stages of a given project.

Ministry of Health - The Environmental Health Directorate	The Environmental Health Directorate has the responsibility to check on the compliance of all industries with the health protection requirements. Disease Prevention and Safety Directorate, Occupational Health Division conduct periodical inspection programs on all industries in Jordan. Inspection during operation.
The Water Authority of Jordan	According to the Water Authority Law No. 18, 1988, YARMOUK WATER COMPANY is responsible for water distribution network in the Kingdom and supplying projects with the required quantity of water needed. Additionally, YWC is responsible for monitoring water quality (surface and ground water and industrial discharges). Permitting prior to construction (identification of intersection with water piping distribution system). Supplying water needs for the project.
Department of Antiquities	The Law of Antiquities calls for immediate reporting of any found remains. The Department of Antiquities then has the right to assess the significance of any discovered remains/antiquities and puts its recommendations accordingly. Permitting in case of existence of archaeological remains (EIA report would be needed).
Ministry of Energy and Mineral Resources	Supervising the work of power companies who are in charge of supplying electricity needs for the project.
Civil Defense	Civil Defense Directorate grants approval on safety measures for industries and projects including emergency plan, occupational health and safety plans, and storage and handling of hazardous materials. The Directorate issues its final approval after an inspection visit has taken place to the project facilities to ensure conformity with the set requirements. Approval for construction plans. Permitting prior to operation.
Ministry of Education	The general objectives of education in the Kingdom emanate from the philosophy of education, and are exemplified in shaping a citizen; believer in God, adherent to homeland and nation, endowed by virtues and human aspects, and mature physically, mentally, spiritually and socially
The Jordanian Hashemite Fund for Human Development (JOHUD)	“Established in 1977, the Jordanian Hashemite Fund for Human Development (JOHUD) is the oldest and largest non-profit, non-governmental organization dedicated to promoting rights-based, sustainable human development in Jordan. With a network of 51 Community Development Centers located throughout the country, JOHUD is at the forefront of building a brighter future for those living in under-served, poor, and remote communities. JOHUD provides sustainable support that empowers individuals to work with their neighbors, strengthen their communities and secure access to the resources they need to achieve healthy and fulfilled lives.”
The Hashemite Fund For Development of Jordan Badia (HFDJB)	The Hashemite Fund For Development of Jordan Badia (HFDJB) was founded in mid-2003 and issued the Fund Act and commenced its work in the second half of 2006, where its serves the Jordanian Badia in the various regions; North, Central and South Jordanian Territories. The Fund seeks primarily to improve the social and economic reality for the people of the desert of Jordan and contribute to address the problems of poverty

	and unemployment and to achieve comprehensive development in the desert areas of Jordan.
The Ministry of Local Administration	This Ministry is considered the technical, financial and administrative advisor for all the local councils in the Kingdom. It also supervises the functions of municipal and the joint services councils, to make sure that the work of these councils are in line with the current laws, regulations and instruction. The Ministry supervises all activities related to the local administrative issues of the municipal councils in terms of providing services and all regulatory issues, as well as the implementation of local development projects, and the coordination of the activities and plans of these councils, to be in line with developmental issues in the entire Kingdom. The Ministry also functions as the technical, financial and administrative advisor for all the municipal councils, and supervises, through its apparatus and teams, the action of the councils and the local organizations to make sure that their actions are in line with the current laws and regulations.
Yarmouk Water Company (YWC)	The Yarmouk Water Company is a national limited liability company wholly owned by the Jordan Water Authority. It started in 2011 working on the operation and maintenance of drinking water production and distribution systems, which depend mainly on groundwater, in addition to a set of different springs and water sources in addition to the collection and purification of wastewater in Northern Governorates of Jordan (Irbid, Jerash, Ajloun and Mafraq). Since its inception, the company has been challenged by the rapid growth of the served population due to the reception area served by nearly one million Syrian refugees over the past years and the increase in the number of water subscribers from (289) thousand in 2014 to (340) thousand in 2018 and from (107) thousands of Sewage subscribers to (141) thousand .In addition to Decline in productivity of internal water resources and the financial crises that started with its inception and which still constitute a huge burden on its shoulders. It has also exerted great efforts to improve the quality of services provided to citizens, develop electronic services, financial and accounting systems, human resources systems and tenders, and develop technical and administrative capabilities through training programs to promote the human element and effective communication with various media in order to achieve clarity, credibility and transparency in dealing with local communities and establish the confidence of the company and its performance.
Ministry of Awqaf, Islamic Affairs and Holy Places	The Law of Awqaf's Objectives: - Maintenance, development, preservation, and management of mosques and Awqaf funds. - Development of mosques to deliver the message of Islamic education. - Nourish the spirit of sacrifice, strife and stability in the nation and strengthen morals through the teachings of Islam and guidance of the faith.

	– Nurture and solidify Islamic mannerisms in the private and public lives of all Muslims. – Support public Islamic functions and the scriptures; call for the establishment of religious institutes and schools to teach recital of the Holy Koran. – Spread Islamic culture and preserve Islamic heritage; reveal the role of Islam in the elevation of mankind and bring Muslims closer to their faith. To achieve all the above-mentioned objectives, Article no. (3) in the Administrative Organization Law No. (16) in the year 1997 has defined the means by which the Ministry will realize its goals.

Environmental Legislations

Water & Wastewater Management: The Water Authority Law (18/88) — is described as the most far-reaching statute pertaining to water pollution. Article 3 of this law created Water Authority of Jordan (Yarmouk Water Company), and article 5 provides full responsibility to Ministry of Water and Irrigation (MWI) for all water and sewage systems and for establishing a water policy. Article 6 charges Yarmouk Water Company with its responsibilities.

The Public Health Law (2008) also serves as the basis for the regulation of wastewater discharges and water quality in Jordan. Pursuant to the Public Health Act, standards for the discharge of wastewater have been established. These are discussed in the Control of Spoiled Sites Regulations, which reiterates some of the above Public Health Act provisions and further establishes the right of the president of the municipality, based on the health inspector's recommendation, to take such actions as may be deemed appropriate against the violator. The Town and Country Regulations Act allows Local or Regional Councils to take action against the operator of any wastewater system that is found to be a nuisance and order that the nuisance be corrected within a specified period of time.

Air Quality, Noise & Waste Management: Air quality is regulated under the Public Health Act, The Control of Spoiled Sites Regulations and The Traffic and Transportation Law. Noise is regulated under the Town and Country Planning Act, the Control of Spoiled Sites Regulations, the Local Authorities Act, the Monitoring and Organization of Public Markets Regulations, the Traffic and Transportation Act, the Public Health Act, and the Environment Protection Law. Solid waste management is regulated under several

statutes, including the Public Health Law, Control of Spoiled Sites Regulations, the Town and Country Planning Act, and the Environment Protection Law.

Terrestrial Ecology & Antiquities: Terrestrial ecological resources are afforded protection under the Agriculture Law and the Hunting and Protection of Wild Animals and Birds regulations. Agriculture Law contains chapters on plant and forestry protection, registration of crops and pesticides, orchard and nursery regulations, fertilizer use, soil conservation, and range-land administration. Under the Law of Antiquities, it is unlawful to destroy, disfigure, or cause any harm to antiquities, including causing changes in features, disconnecting any part thereof, altering it, sticking advertisements or attaching any plates to them.

Labor & Occupational Safety: The construction and operation of the wastewater treatment plants will be affected by Labor Law including all of its subsequent amendments. The Labor Law pertains to nationalities and work permits and contracts and wages. The Law specifies, among other things, working hours, leave and juvenile employment and covers the obligations of the employer to provide a safe working environment for his workers, increased risks on the job and for the public, precautions and measures to be followed in the workplace, and protective and therapeutic medical care. The Law provides for issues related to work injuries and occupational diseases for those employees who are not covered under the provisions of the Social Security Law of Jordan.

The Jordan National Building Codes also establishes design principles and minimum requirements needed to ensure public safety of structures, provides sound and efficient electro-mechanical services and to safeguard against earthquake risks.

Relevant standards: At present, there are two approved sets of water and waste water treatment standards that are of relevant to this project:

- The Jordanian Standard for Reclaimed Domestic Water – No JS 893/2006 – Jordan Institute for Standards and Metrology (Water – Reclaimed Domestic Wastewater).(Annex 4)
- Grey water Reuse Standard JS 1776: 2013 (Annex 4)
- The Jordanian Standard for Sludge – Uses of Sludge in Agriculture - No. 1145/2006

JS 893/2006 – Jordan Institute for Standards and Metrology (Water – Reclaimed Domestic Wastewater) has two primary components: i) reclaimed water discharged to streams, wadis or water bodies and ii) reclaimed water for reuse. Reclaimed water for reuse standard in turn has two subsets. Reclaimed water specifications under this standard are divided in to two main parts and should conform to specified conditions for every part and according to the final planned use and it is not allowed to dilute reclaimed water by mixing it in the treatment plant with pure water to achieve the stated conditions in this specification.

A: Reclaimed water for Wadi (valley) discharge

B: Reclaimed water for reuse purposes

Jordanian Standard 202/2007 for treated industrial wastewater: Note: No treated industrial wastewater will be utilized or reused under this project noting that industrial effluents are not allowed into municipal wastewater treatment plants. There is no official translation of JS 202/2007 to English.

Sludge: JS1145/2006 on "Uses of Sludge in Agriculture" describes sludge treatment methods and presents sludge quality standards for reuse in agriculture.

Grey Water Reuse Standard (JS 1776: 2013) allows its reuse for all irrigation purposes including cooked or raw vegetables, gardens, green lands and other crops. In addition, water reuse in toilet flushing and cleaning was added to the modified standard where now treated grey water in Jordan can be used for the following purposes:

- Vegetables that are eaten both uncooked and cooked.
- Field crops.
- Fruitful and forest trees.
- Gardens, parks and green lands.
- Fodder crops, cereal crops, oil crops and industrial crops.
- Toilets Flushing.

Other Standards

There are also several other Jordanian regulations, guidelines and standards pertinent to the EIA process in Jordan:

- **Air Quality Standards**

- Jordan Ambient Air Quality Standards (JS: 1140/2006).
- Maximum Allowable Limits of Air Pollutants Emitted from the Stationary Sources (JS: 1189/2006).

- **Water Quality Standards**

  - Jordanian Standards for Treated Domestic Wastewater (JS: 893/2006 – Jordan Institute for Standards and Metrology (Water – Reclaimed Domestic Wastewater).).
  - Jordanian Drinking Water Standards (JS: 286/2008).
  - Jordanian Standards for Industrial Wastewater (JS: 202/2007).

- General Environmental Law and Regulations
- Environmental Protection Law (No. 6, 2017).
- The Antiquities Law (No. 23, 2004).
- Regulations for Protection of Birds and Wildlife and Rules Governing their Hunting (Regulation No. 113, 1973).
- Public Health Law (No. 74, 2008).
- Guidelines for Prevention of Noise, 2003.
- Water Authority Law (No. 18, 1988).
- Agricultural Law (No. 13, 2015).
- Penalty Law (No. 16, 1960 and Its Revsion No. 27 of 2017).
- Civil Defense Law (No. 18, 1999).
- Towns and Villages Law (No. 18, 1988) and Law on Municipalities No. 41 of 2015.
- Traffic Law (No. 49, 2008).
- Labor Law (No. 8, 1996 as amended).
- Social Security Law (No. 19, 2001)
- Investment Law (No. 68, 2003).
- Regulations No. (1) for the year 2006: Instructions for the elimination of unsanitary occurrences related to health harms generated from workers communities residential units.
- JS 286: 2001 – Drinking water standards
- JS 431: 1985 - Storage precautionary requirements for storage of hazardous material

<u>The following other regulations have also been issued pursuant to the Environment Protection Law:</u>

- Nature Protection.

- Environment Protection from Pollution in Emergency Cases.
- Water Protection.
- Air Protection.
- Marine Environment & Coastal Protection.
- Natural Reserves & Parks.
- Management, Transport and Handling of Harmful & Hazardous Substances.
- Management of Solid Waste.
- Soil Protection.
- Charges & Wages.

TABLE 5 INTERNATIONAL ENVIRONMENTAL AGREEMENTS JORDAN SIGNATORY TO

Title	***Signature Date***
International plant protection convention	24/4/70
Protocol to amend the convention on wetlands of international importance especially as waterfowl habitat (RAMSAR)	15/3/84
Convention concerning the protection of the world cultural on natural heritage.	5/5/75
Convention on international trade in endangered species of wild fauna and flora.	8/1/81
U.N. Framework Convention on Climate Change (UNFCCC)	Jordan signed the Convention on 11 June 1992 and ratified it on 12 November 1993
Convention on Biological Diversity (CBD).	11/6/96
Convention on Combating Desertification (UNCCD)	1996
Kyoto Protocol on Climate Change	2003
Nagoya Protocol on Access to Genetic Resources	2012
Minamata Convention on Mercury	2013
Framework Convention on Climate Change (Adoption of the Paris Agreement)	2015

The methodology used to develop and implement the Environmental and Social Impact Assessment (ESIA-ESMMP) for the proposed project is in compliance with policies and guidelines as per below:

- Environmental and Social Policy and Gender Policy (approved in November 2013; revised in march 2016)/Climate Change Adaptation Fund
- Environment Protection Law number 6 Year 2017 / Ministry of Environment, Jordan. Refer to **Error! Reference source not found.**4) to view other relevant laws and regulations.

TABLE 6 RELEVANT LAWS, POLICIES, AND LEGISLATIONS RELATED TO ENVIRONMENT AND WATER SECTOR IN JORDAN

Description	***Type***	***Theme***
Environment Protection law number 6 Year 2017	Law	Institutional
EIA regulation No.37 for the year 2005	Regulation	Institutional
Jordan Standard 893/2007, Reuse of Wastewater for Irrigation	Standards	wastewater
Grey water reuse (JS 1776: 2013) for all irrigation purposes including cooked or raw vegetables, gardens, green lands and other crops.	Standards	Water Sector
The National Climate Change Policy of the Hashemite Kingdom of Jordan 2013-2020	Policy	Climate Change
Noise level control regulation for the year 2003	Regulation	Noise
Public health law No. 74 of 2008	Regulation	Public Health
Regulations for protection of birds and wildlife and roles covering their hunting No, 113 of 1973	Regulation	Biodiversity
The Antiquities Law No. No. 23, 2004	Law	Institutional
Civil Defense Law No. 18 of 1999	Law	Institutional
Traffic Law No. No. 49, 2008	Law	Institutional
Labor Law No. 8, 1996 as amended	Law	Institutional
Penalty Law No. 16 of 1960 and Its Revsion No. 27 of 2017	Law	Institutional
Agriculture Law No. 13, 2015	Law	Institutional
Natural Resources Authority Laws 2002	Law	Institutional
Jordanian Standards for Air Pollution JS1189/2006	Standards	Air
Natural Reserves and National Parks By-Law No.29 of 2005	Law	Institutional
Soil Protection By-Law No.25 of 2005	Law	Institutional
Water Authority Law No. 18 of 1988	Law	Institutional
Jordan Valley Authority Law No. 19 of 1988	Law	Institutional

Ministry of Water and Irrigation By-law No. 54 of 1992	By-Law	Institutional
Wastewater Regulation No. 66 of 1994	Regulation	Wastewater
Drinking Water Subscription Regulation No. 67 of 1994	Regulation	Drinking Water
Water Utility Policy of 1997	Policy	Water Utility
Groundwater Management Policy of 1998	Policy	Groundwater
Irrigation Water Policy of 1998	Policy	Irrigation
Wastewater Management Policy of 1998	Policy	Wastewater
Jordan Valley Development Law No. 30 of 2001	Law	Institutional
Underground Water Control By-Law No. 85 of 2002 and its amendments of 2003, 2004 and 2007	By-Law	Groundwater
JVA Strategy Plan for 2003 - 2008	Strategy	Water Sector
National Water Master Plan of 2004	Water Master Plan	Water Sector
National Water Demand Management Policy of 2008	Policy	Water Demand Management
Water Authority Strategic Plan	Strategy	Water Sector
Jordan's Water Strategy 2008-2022: Water for Life	Strategy	Water Sector
Water Reallocation Strategy Between Governorates	Strategy	Water Sector
National Water Strategy	Strategy	Water Sector

There are several governmental organizations responsible for providing permissions for the implementation of concrete activities as well as giving all support needed for the executing entities in order to assure successful implementation of the program in a safe environment and in a fair social manner, that also prevent harming the community, DPs as well as the ecosystem and protecting the natural environment. Non-Governmental organizations also play a crucial role in supporting the communities including women, youth and DPs where they provide accurate information on the neediest families and hot spots areas which needs urgent interventions, Table (7) captures these organizations and their different roles & responsibilities.

TABLE 7 SUMMARY OF RESPONSIBILITIES OF RELEVANT IMPLEMENTATION AND EXECUTION ENTITIES DURING PROJECT IMPLEMENTATION

Authority/ Organization	***Responsibility***

UN Habitat	- Multilateral Implementing Entity (MIE) for the project providing specific technical support in urban development and resilience related areas - Facilitating the coordination between the government entities.
Irbid Governorate	- Responsible for permitting & overviewing the overall implementation of the Adaptation Fund Project Program - Responsible for the security & safety of citizens as well as DPs, through ensuring that the activities are implemented in safe zones.
Mafraq Governorate	- Responsible for permitting & overviewing the overall implementation of the Adaptation Fund Project Program. - Responsible for the security & safety of citizens as well as DPs, through ensuring that the activities are implemented in safe zones.
Ministry of Awqaf and Islamic Affairs and Holy Sites	- Responsible for permitting and facilitating the implementation of concrete interventions in Mosques.
Ministry of Education /Irbid /Ramtha/Bani Obeid and Mafraq branches	- Responsible for permitting and facilitating the implementation of concrete interventions in Schools.
Ministry of Environment	- Gives the legal permission for the implementation of concrete interventions related to environment protection after ensuring the compliance of the executing entity with the relevant laws & regulations. - Receive complains from the public related to environmental pollution and project related environmental and social grievances.
Ministry of Water & Irrigation	- Responsible for permitting and supervising projects related to water & wastewater. - Receiving complaints from the public related to problems in water networks and water shortages.
Municipalities of Irbid/ Ramtha and Mafraq	Coordination on technical issues (e.g. spatial planning) and communication of lessons learned during implementation. - Providing information needed for project locations, target community, hot spots
UNICEF	- Executing entity for concrete interventions
NGOs-Other Local Execution Partners (JOHUD and Hashemite Fund for Badia Development)	- Implementing the actual concrete interventions for the Grey water & Roof top Rainwater harvesting systems in target areas
UNHCR	- In charge of the management and coordination of Zaatari and Azraq refugee camps - to ensure that assistance is provided in the most effective and

	efficient way possible in accordance with international humanitarian standards and protection - Supports the Syrian Refugee Affairs
Yarmouk Water Company (YWC)	- Managing the water sector in Irbid & Mafraq as well as other governorates in the North. - Rationing operation, well maintenance and leakage repair and detection.

ENVIRONMENTAL & SOCIAL MANAGEMENT SYSTEM

The proposed project interventions have been subjected to a rigorous process of screening to identify risks and decide if an EIA is needed for any activity in order to be compliant with the national law and AF requirements. This also entailed detailed assessments and reviews by the Ministry of Environment as per the following:

- *A review of the environmental compliance for the existing WWTPs where retrofitting and quality enhancements will be undertaken so that effluent reuse potential will be expanded to be in compliance with the national wastewater reuse standard*
- *Inspection of the proposed sites of other project interventions related to rainwater harvesting, grey water treatment and reuse, permaculture through site visits and meetings with the management of these entities (buildings directorates at ministries of Education and Awqaf and Religious Affairs for schools and mosques respectively, and JUST Faculty of Agriculture for the permaculture activity.*

It was concluded that with the above detailed risk screening and assessments, adherence to the national law and regulations, and to this Environmental & Social Monitoring and Management System (ESMMPs) would be sufficient if they are designed and monitored properly in line with the ESPs to ameliorate risks and ensure that: adequate capacity building for risk management is provided at project start-up; where activity forecasts are screened for potential risks and that the project does not have any unidentified sub-projects and that the management system is in place to manage already identified risks and impacts and mitigation measures are in place to deal with any changes if they arise.

Also the associated disbursement(s) will not be approved where these may arise until ameliorated; the project reporting processes would have a particular focus on detection of environmental and social risks; the project oversight and governance processes are designed to ensure that risks are avoided where possible and appropriately mitigated in

the unlikely event of these occurring; and finally the stakeholders will be made aware of the grievance and redress mechanism to raise concerns relating to any potential risks with the project to the PSC and the MIE Steering Committee in the event concerns relating to risks are not adequately addressed by the Executing Entities.

Projects Start-up: During the project start-up phase, the MIE will engage directly with the EEs and other project partners on the operating procedures that will apply to the management of the project activities, this will be necessary to ensure compliance with National and AF policies and procedures. **All risks and impacts, if any, are already identified and assessed, and mitigation measures were put in place with their monitoring plans in this ESMMP**. During project start up these will be confirmed/validated as project does not have any unidentified sub-projects, which would require a different management system.

Where the environmental and social assessment identified risks, these were accompanied by an environmental and social monitoring and management plan that identifies those measures necessary to avoid, minimize, or mitigate the potential environmental and social risks. These ESMMPs also identify the responsible executing entity and its role.

Where minor risks are posed that can be easily mitigated via early detection, the EE may be required to develop and implement a subproject's Environmental and Social Risk Management Plan, commensurate with the severity of the risk associated with the relevant activity to be endorsed by the Ministry of Environment's, Environmental Assessment Directorate . The EEs and/or sub-Executing Entities will need to show that costs associated with this can be provided within the project budget, and this will need to be approved by the MIE.

Focus will be placed on this ESMMP, which has been prepared according to the AF's ESP. A dedicated capacity building session will be held at the onset of the project jointly by the MIE and MoEnv to ensure that the EEs and other project partners are able to competently manage the already identified risks and detect environmental and social risks in a timely manner. This is to be able to better comply with the project design, plans, monitoring, evaluation and reporting processes and be able to handle risk management requirements if changes arise during project execution. In this regard, attention will be

given to ensuring that project activities do not impact adversely on any priority, threatened species, biodiversity or cultural heritage areas or ecosystem services-support areas, and that there are no negative impacts on Syrian refugees and Jordanians in northern governorates' host communities, including vulnerable groups (women, elderly, children and people with special needs) and indigenous people (*including Bedouins where they may exist although they are not internationally considered as indigenous people*). No such adverse impacts are anticipated as a result of adherence to ESP Principles and the ESMMPs of each sub project.

PROJECT INTERVENTION ACTIVITIES

In Jordan, the AF-supported project will be implemented in northern Jordan at the northern Governorates of Irbid and Mafraq focusing on the following concrete adaptation measures:

- Roof-top rainwater harvesting from roofs of schools, mosques, municipal buildings and selected households in the Governorates of Irbidand Mafraq;
- Grey water treatment and reuse in public buildings (Mosques);
- Enhancing the treated effluent quality of Mafraq, Al Me'arad and Al Akaidar wastewater treatment plants and supporting farmers reusing the treated effluent from these WWTPs in agriculture;
- Permaculture at the farm level at Jordan University for Science and Technology's (JUST) Faculty of Agriculture.

ENVIRONMENTAL AND SOCIAL POLICY DELIVERY PROCESS

Screening of Environmental and Social Risks by the Multilateral Implementing Entity and Ministry of Environment

All proposed project interventions were screened with support from both the Ministry of Environment, the Multilateral Implementing Entity (UN Habitat), other UN agencies such as UNICEF and UNHCR, donors such as GIZ and USAID, and the executing entities. Full engagement of project beneficiaries was at the heart of project design where Jordanians and Syrian refugees, women, youth, people with special needs and marginalized groups were consulted as stakeholders to identify their needs and aspirations, potential impacts

and risks of project proposed interventions to determine their potential to cause environmental or social harm. The stakeholder consultation process included debriefing on climate change, adaptation measures suitable for Jordan, and the AF ESPs. The screening process considered the feedback from the stakeholders, sought to further identify potential environmental and social risks and their impacts, considered all potential direct, indirect, trans-boundary, and cumulative impacts in the projects areas of influence that could result from a given proposed project activity. The screening determined the extent to which the projects require environmental and social impact assessment (ESIA), and the extent to which they require mitigation and management plans and the extent to which they comply with the Adaptation Fund's Environmental and Social Principles and applicable national environmental laws.

Results of project interventions risk screening and review during project proposal drafting:

- The MIE and MoEnv have both collaboratively through their pool of experts concluded that the environmental and social risks associated with the proposed project's interventions are low based on the fact that all proposed activities are in locations that are already disturbed/built up, where rehabilitation work or improvements will take place with no new considerable construction activities taking place thus are expected to cause minimal yet manageable environmental and social risks; and
- The MIE/ESIA Consultant and MoEnv have initiated the process of managing these minimal risks in a collaborative way with the executing agencies and beneficiaries through an extensive screening and consultation process, and thus both have, a clear prospect of success within a reasonable timeframe, provided that the mitigation and monitoring management plans identified in this document are adhered to and updated when and as needed.
- Major interventions that were proposed in the concept document submitted to the AF that would have required a detailed ESIA were dropped from consideration such as the rehabilitation of large ponds for rainwater harvesting in Al Husun in Irbid (including high cost per m^3 to be harvested and the hydroponics intervention (other donors are implementing).

Self-Screening and Assessment of Compliance with the 15 ESPs of the AF

Screening: identification of risks and applicable principles

This process in Jordan normally begins with assessing each proposed intervention according to Principle 1, which is to screen against applicable domestic and international laws. The process continued with screening against the 15 principles to determine which are applicable to the project interventions. Jordan has national regulations of risk assessment that use a variety of screening tools, including threshold lists/levels via standards and sectoral requirements. Under the principle 1, the MIE (UN Habitat) worked closely and consulted with the MoEnv to demonstrate compliance with the national regulations, and also screened the interventions against all 15 Principles to show conformity.

The full MoEnv's EIA screening procedure was followed as per the organograms below and (Annexes 2 and 3). The environment and social expert (consultant) of the MIE reviewed the 15 Principles, which may be potentially triggered during the screening process including the feedback from the risk screening forms synthesis obtained from the stakeholders' consultation sessions and as a result, it was concluded that non would be triggered and prepared an Environmental and Social Management and Monitoring Plan to ensure compliance with both the national laws' requirements and the AF's 15 principles.

Screening and Assessment Process

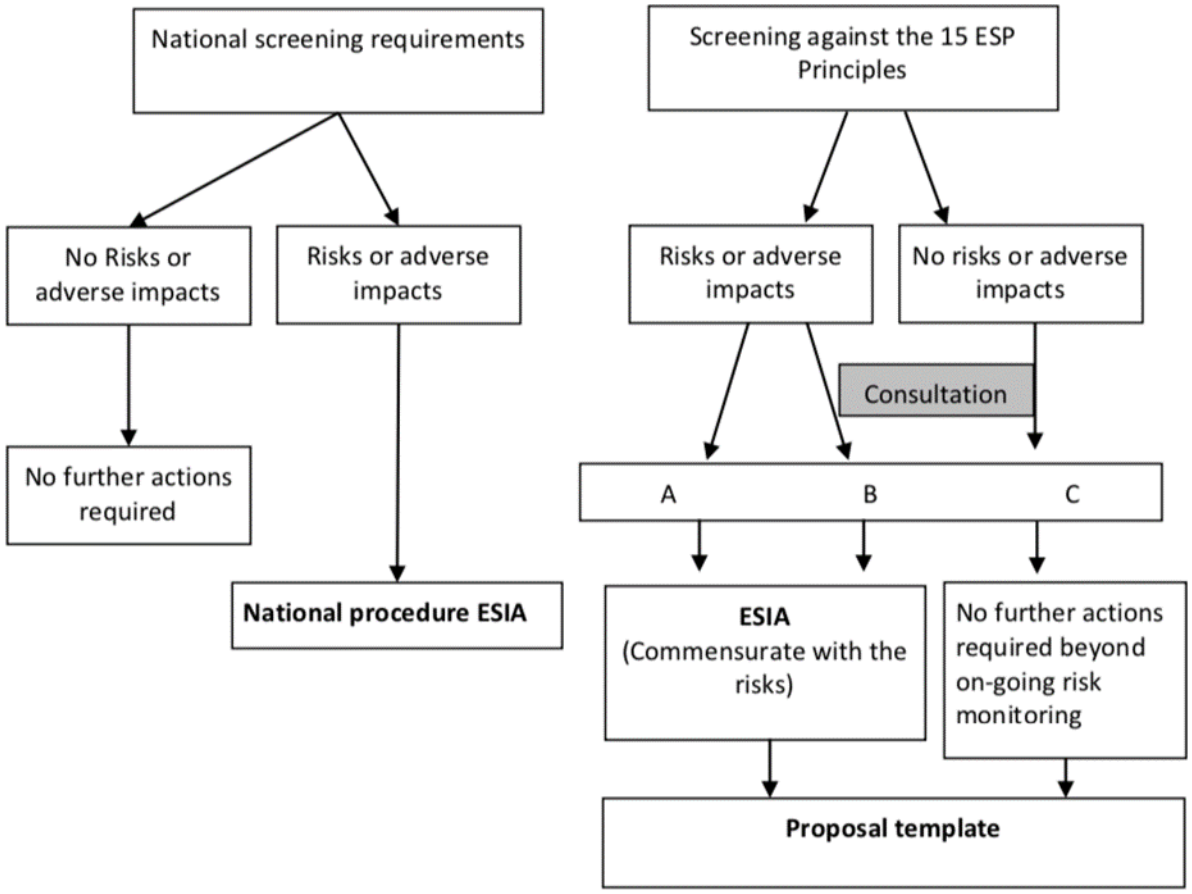

FIGURE 4 SCREENING AND ASSESSMENT PROCESS BOTH AT THE NATIONAL LEVEL AND AF SCREENING AGAINST THE 15 ESP PRINCIPLES

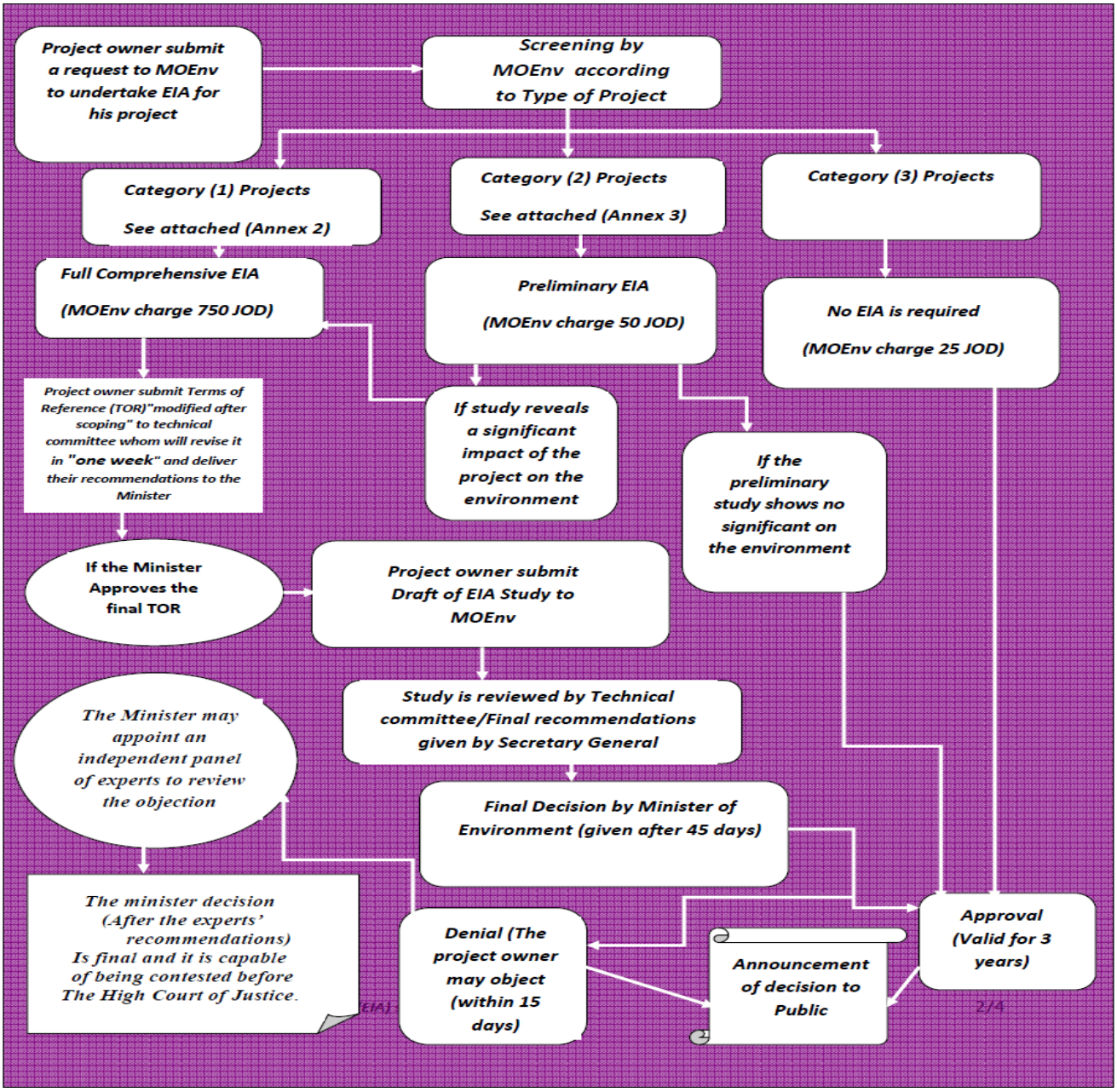

FIGURE 5 ENVIRONMENTAL & SOCIAL SCREENING FOR RISK MANAGEMENT SYSTEM IN JORDAN

Screening the Interventions

The proposed project intervention activities were categorized according to the scale, nature and severity of their potential environmental and social impacts as follows:

IV. Operational enhancements of existing wastewater treatment plants (WWTPs) at Mafraq, Al Mearad, and Al Akaider

This intervention comes to assure that the effluent quality meets the national standard 893/2006 for irrigation with treated effluent by farmers who already have reuse agreements with the Yarmouk Water Company/Water Authority of Jordan. It was

concluded that the proposed intervention on wastewater reuse may have a low to mild potential adverse impacts, that are localized, small in scale, less widespread, reversible and are easily mitigated with preventive and control measures governed by the WWTPS' EIAs conducted as part of the construction and reuse approval process by MoEnv. When guided by ESMMPs, these low risks can be managed and controlled. This is evidenced by compliance of the YWC of their WWTPs with operational protocol and treated effluent discharge requirement that are monitored by the Ministries of Health and Environment. The project however aims to widen the reuse potential in ensuring that the effluent meets the un-restricted wastewater reuse under the JS 893/2006 National Standard.

According to the screening process depicted in Figure 4 above, by which the interventions (activities) have been classified under the AF classification as a Category C or according to the Jordan's EIA as a Category II (Figure 4 and Figure 5) show the intervention are having no risks or adverse impacts, thus not requiring full EIAs. This is due to the fact that these already built and operating WWTPs have been subjected to MoEnv's review at the time of constructing, which included reuse activities around the WWTPs at that time. Readers may refer to Annexes 2 and 3 for how projects are evaluated in Jordan for the purpose of determining if they need an EIA or not). The same justification is concluded for the other project interventions listed below:

V. Rainwater harvesting from roof tops in mosques, schools, municipal buildings and selected households
VI. Grey water systems treatment and reuse in schools
VII. The application of best management practices through permaculture at the JUST Faculty of Agriculture.

All of the above sub-projects' interventions fall under Category C according to the AF's classification or Category III for Jordan's Ministry of Environment EIA Regulation's classification with no significant environmental or social impacts that can be minimized or mitigated through the application of the ESMMP or no adverse environmental or social impacts. This was confirmed by the team's discussions with Environment Secretary General and the Ministry CC team leader/project focal point. However, any potentially non-identified sub activity under this proposal that may arise and require an Initial Environmental Assessment (Category B/or its equivalent Category II) or require a full EIA Category (A)/ or its equivalent Category (I) as per the national EIA Regulations (described

above) **will not be supported**, due to administrative costs and potential delays on the commencement/progress of the project.

Stakeholder consultation meetings were continuously held during both concept note and full proposal development phases including the preparation of this ESMMP. This was done in order to re-introduce these sub-projects under the full proposal development where the environmental and social expert discussed potential risks/impacts with the national stakeholders and beneficiaries and sought their input through the risk screening forms distributed to them and collected and synthesized. Refer to Annexes (5) and (6) to view the stakeholders and official consultation reports. Identified risks from the screening process were discussed with MoEnv and UN Habitat technical teams to identify the mitigation and corrective measures, their frequencies and the entities responsible for monitoring and oversight during execution at the various stages of a given intervention (design and feasibility, construction, operation and decommissioning Stages). The Assessment has (i) considered all potential direct, indirect, trans-boundary, and cumulative environmental and social impacts and risks that could result from the proposed sub-projects; (ii) assessed possible measures to avoid, minimize, or mitigate environmental and social risks of the proposed sub-project resulting in this ESMMP. The outcomes of the risk screening and assessment process, assisted by the stakeholder consultations assured satisfactory determination of the categorization of the project interventions. Gathering this information helped to provide sufficient information and data to determine the level of risk, ensured that the MIE and MoEnv have full knowledge about the level of social and environmental risks and their impacts of each intervention All project activities are categorized as category III both from the National Screening Perspective and C from the AF Screening of the 15 AF Principles.

Description of the Operational Enhancement of Wastewater Treatment Plants to Widen the Treated Effluent Reuse for Irrigation Activity:

These concrete interventions will take place in three currently operating wastewater treatment plants at Al Akaider, Al Mafraq & Al Me'arad. The following table (Table 8) shows the proposed WWTPs interventions to enhance their effluent quality:

TABLE 8 THE OPERATIONAL ENHANCEMENT OF WASTEWATER TREATMENT PLANTS

Name of the wastewater treatment plant	***Operational enhancement***
Al Akaider WWTP: located within the Mafraq Governorate approximately 26.4 km East of Irbid and 1.3 km South of the Syrian border.	**<u>Al Akaider WWTP:</u>** **The Immediate and short-term plan are (to be implemented within 6-12 months):** - Rehabilitation of distribution piping system and manholes, desludging of anaerobic ponds if needed. - Fixing the septage receiving station, and the manholes splitting the flow between the two trains - Clearing all ponds dikes - Enhancing the staffing capability and lab capacity of the WWTP and implement management's improvements. - Capacity building and providing safety equipment - Retrofitting with provisions for enhancing the treated effluent - Effluent storage pond at the vicinity of the WWTP for saving Reclaimed Water during rainy seasons to be used for summer irrigation needs.This is ensured in the unified reuse agreement for farmers irrigation with reclaimed water which sets forth 3m3/dunum (1000 m2 of land) to ensure equity
The Al-Me'rad WWTP is located southwest of the Gaza Camp approximately 58 km from Amman.	- The short-term plan deals with process units' corrections/repairing and managerial improvements. - The medium-term plan deals with returning processes units into service and rehabilitating the existing facilities. - Expand the effluent storage tank with a capacity of 2000 m3 to store and deliver the treated reclaimed water which is treated at night to meet up farmers' demands. - The reclaimed water quality and sustainability needs to be improved by the provision of the needed spare parts required for comprehensive and workable successful operation of the wastewater treatment plant. This is ensured in the unified reuse agreement for farmers irrigation with reclaimed water which sets forth 3m3/dunum (1000 m2 of land) to ensure equity
Mafraq WWTP: located approximately 6 km north of Mafraq city.	- Enhance WW Effluent Treatment - Assessing the involvement of residents of the area in reuse activities especially people in Sarhan and Ghadeer Al-Abayd.

	- Specify target groups benefiting from the reuse scheme, especially the farmers who grow Livestock feed (fodder) and breeding and identify the potential users.

Description of the Permaculture Intervention

Permaculture is a design science that develops ethical & sustainable food abundance systems, regenerative and self-maintained habitat and agricultural systems modelled from natural ecosystems. The outcomes of Permaculture directly address Health, Food and Social issues right at the root causes, i.e. a prevention measure as opposed to cure. Naturally, prevention is much better and smarter than cure!

The Permaculture Research Institute (PRI) in Australia is a business unit of Holistic Sustainable development Ltd (PRI) intervention will in partnership with Jordan University for Science and Technology (JUST) aim to develop the following: -

- **Soils**: PRI will provide a comprehensive program of soil regeneration through, starting from theory & education, through **conducting hands-on workshops and training**, to finally implementing projects that establish the production of high quality top-soil. The program will include best practices and different techniques of composting.
- **Biodiversity**: Like the Top Soil Program, PRI will deliver an end-to-end program on the topic of biodiversity. JUST has a Scientific Forestry Arboretum with 600 specimens, and 150 species and subspecies of trees from Jordan and all over the world. The area of this living collection (25000 square meter) is crucially participate in **improving the green campus at JUST** via increasing vegetation cover, trapping dust and improving air quality, reducing wind velocity and therefore reducing soil erosion and preventing runoff in flash floods events. It serves multipurpose that specifically addresses holistic practical education for literate and illiterate populations, in addition to end zero carbon footprint, it creates organic food, herbal medicine and human recreation abundance. Climate change and changing precipitation patterns in the region will further aggravate the problem of water scarcity in Jordan. Therefore, there is an urgent need to reuse the available source more wisely.

The Arboretum can be used as pilot study to demonstrate how forest trees irrigated by treated wastewater are responding. One of the primary roles of JUST Arboretum is to promote the importance of plant diversity and its preservation, and to incorporate this principal in our communications, education and public awareness programs, in line with global strategy for plant conservation. In order to maintain the environmental and ecological role of JUST Arboretum, it needs a small greenhouse and nursery for plant propagation, germination chamber and install a drip irrigation system for the whole Arboretum.

- **Agriculture & Food Forests:** Perennial food forests is one of the main approaches to food abundance and security, also a solution to many social and humanitarian challenges. **PRI can design and implement food forests projects**. **Moreover, establish compost ditch as well as silage ditch would benefit JUST by reducing waste and producing high quality fertilizers**. This practice not only will **reduce the use of chemical fertilizers**, but also will ensure **recycling all organic matters** back to consumers as fresh produce; and thus enhances food security. In addition, making silage during grass availability season will extend the storage shelf life of roughages to be used during the feed shortage in winter time. Consequently, farm animals will have stable feed accessibility throughout the year.

  Also, silage **conducting hands-on workshops and training on compost and production** will increase the community awareness towards permaculture concept in general and the above techniques in specific.

- **Apiary**: Insects and wildlife are an important part of a permaculture design. Bees are the most important insects. **Raising bees**, produced honey that gave humanity its first sweet tooth and a lifetime supply of delicious, organic honey. More than the produced honey, having a few hives on our fields is the best way to ensure higher production of crops throughout ensuring quality pollination. It´s also an educational experience for JUST's students as well as increasing the community awareness towards permaculture concept.

- **Mushroom Farm**: Mushroom is a fungi producing a fleshy fruiting body. Not only are mushrooms a protein-rich food source for humans but the by-products of mushroom cultivation unlock nutrients for other members of the ecological community. The rapid return of nutrients to the ecosystem by mushrooms boosts the life cycles of plants, animals, insects (bees), and soil microflora. **Oyster mushrooms can be grown indoors on pasteurized crop residues** (i.e. corn-stalks or straw from wheat). Furthermore, the waste straw can be mulched into soils, not only to provide structure and nutrition but to reduce the populations of nematodes which are costly to gardeners and farmers.

- **Water Management Solutions:** Water is the essential element of life. Managing water, i.e. harvesting, storage and distribution, is an essential and integral element of Permaculture design. **Designing smart drought-proof farms is a speciality of PRI**. Such designs and projects are even more critical for a country like Jordan, where water is a scarce resource. Moreover, cooling pads installation at the current greenhouses will increase the production efficiency by providing more controlled environment inside the greenhouse, which will extend the growing season and magnify the amount of production.

  In addition, the monthly waste of whey from dairy factory ranges from 2500 – 3500 litters, which currently go down the drain. This by-product will be an excellent added value if used in a different line of production (wet and/or dry) due its high nutritional value.

- **Aquaponics:** Water can produce ~30% more protein more than land. In addition, the by-products of **aquaponic systems brings the value of the Permaculture to another level, including fish fertilisation and water savings**. IT is however, an optional component of the system, if needed PRI can again deliver an end-to-end program.

- **Systems Integration:** Plant, Animal, Water, Energy, Soil and human systems do not work in isolation. It would be a type-1 error to design these systems independently. PRI mastered the art of **designing an integrated system where the value of the whole is bigger than the sum of the parts.** PRI if of the belief that the connection between the elements of the system is as important and critical as the elements of the systems themselves.

ENVIRONMENTAL AND SOCIAL ASSESSMENT OF THE INTERVENTION ACTIVITIES:

The Multilateral Implementing Entity (UN Habitat) and Ministry of Environment have ensured that the below environmental and social assessment identifies any environmental or social risks, including any potential risks associated with the Fund's Environmental and Social Principles set forth above. The assessment (i) considered all potential direct, indirect, trans-boundary, and cumulative impacts and risks that could result from the proposed project activities; and (ii) assessed possible measures to avoid, minimize, or mitigate environmental and social risks of the proposed activities. These environmental and social assessments have been completed before the project proposal submission to the Adaptation Fund.

Risk Evaluation of Issues and Concerns

The screening process of the project interventions including those identified during public consultations resulted in an evaluation of the potential risks, and issues of concerns for all project activities is summarized in Table (9) in the next page.

The proposed reuse sub-projects around Mafraq, Al Akaidar & Al Mea'rad WWTPs

N.B: The wastewater effluent is used for irrigation purposes as allowed by JS 893/2006 – Jordan Institute for Standards and Metrology (Water – Reclaimed Domestic Wastewater). Each existing WWTP had a scheme for a wastewater reuse plots along with its original design and feasibility studies and the pertinent reuse activity was evaluated before the construction under the approved EIA of the pertinent WWTP. Also these WWTPs are GOJ-owned and the surrounding reuse plots are owned by the farmers who will continue to implement ww reuse tapping into the enhanced effluent quality that would be compliant with JS 893/2006 for treated wastewater reuse, Also there will be no land

acquisition or displacements of farmers and individuals or livelihoods (even informal land use) as they own these lands as individuals or reuse NGOs. These NGOs have wide spectrum of memberships that include females and will ensure equal opportunity and access:

TABLE 9 SUMMARY OF THE OVERALL PROJECT INTERVENTIONS FRAMEWORK FOR ADDRESSING POTENTAIL RISKS, AND THEIR LINK TO THE 15 ESP PRINCIPLES (N.B. THIS TABLE OUTLINES RESPONSIBILITIES FOR MONITORING & MITIGATIONS IMPLEMENTATION FOR THE WHOLE PROJECT)

Sub Project/Activity	***Potential Risks***	***Link to the AF's 15 ESP Principles***	***Responsibilities for monitoring & implementation of mitigation measures****
Wastewater reuse	Minor contamination of groundwater from on-plant accidental spills, overflows and seepages (such as in the case of uncontrolled/unplanned plant operation with surplus amount of untreated water to process or surplus treated water to handle	Pollution Prevention and Resource Efficiency	WAJ-YWC & MoEnv in cooperation with Project Team
Wastewater reuse	Contamination to surface water or groundwater (heavy metals, NO_3, salinity/TDS, pathogens, etc) from TWW discharges to the Wadi	Pollution Prevention and Resource Efficiency; Compliance with the Law *&* Protection of Natural Habitats	WAJ-YWC, WWTPs' operators, MoEnv
Wastewater reuse	On-farm soil (high salinity or heavy metals) or crop contamination (pathogens, etc) due to extensive ww reuse activities in irrigation, or uncontrolled/unplanned on-farm agriculture operations And Lack of hygiene conscious by farm workers, washing and moistening harvested crops with reclaimed water (not allowing safe period to pass before harvesting)	Pollution Prevention and Resource Efficiency Compliance with the Law *&* Protection of Natural Habitats	WAJ (Water Reuse and Environment Unit)-YWC/WWTP operators/WUAs (reuse contractor(s)) in cooperation with MoA, MoEnv, and MoH
Wastewater reuse	Salinity build up in soil	Pollution Prevention and Resource Efficiency	WAJ (Water Reuse and Environment Unit)-YWC/WWTP operators/WUAs (reuse contractor(s)) in cooperation with MoA and MoEnv Sub-projects execution teams (irrigation teams)

Wastewater reuse	Heavy metals build up in the soil	Pollution Prevention and Resource Efficiency Public Health & Compliance with the Law	WAJ (Water Reuse and Environment Unit)-YWC/WWTP operators/WUAs (reuse contractor(s)) in cooperation with MoA, MoEnv , and MoH Sub-projects execution teams (irrigation teams
Wastewater reuse	Contamination from sludge reuse and disposal	Pollution Prevention and Resource Efficiency	WAJ (Water Reuse and Environment Unit)-YWC/WWTP operators, project team, and monitoring by relevant authorities in cooperation with MoA and MoEnv
Wastewater reuse	Sediments deposition and algae blooming in the farms' reclaimed water storage ponds	Pollution Prevention and Resource Efficiency	WAJ-YWC/WWTP operators/ MoEnv/ WUAs (reuse contractor(s))
Wastewater reuse	Illegal access of the nearby residents for swimming in the farms' RW storage ponds and ignorance of issues related to source water quality	Public Health	WUAs (reuse contractor(s)), MoEnv in cooperation with Rangers/Environmental Police
Wastewater reuse	Use of RW for household or personal purposes resulting in cases of diarrhea and hepatitis		WAJ-YWC/WWTP operators/ MoEnv/ WUAs (reuse contractor(s)/MoEnv in cooperation with Rangers/Environmental Police
Wastewater reuse permaculture	Direct contact with RW during maintenance resulting in cases of diarrhea and hepatitis works		WAJ-YWC/WWTP operators/ MoEnv/MoH
Wastewater reuse; permaculture	Accessibility to ponds by cattle and animals	Pollution Prevention and Resource Efficiency	WUAs (reuse contractor(s)), MoEnv in cooperation with Rangers/Environmental Police MoA, NARC
Wastewater reuse	Absence or weak occupational health and safety provisions, disease spreading amongst farm workers	Public Health, Compliance with the Law	Ministries of Health and Labor Inspectors

Wastewater reuse	Irrigation with RW for crops that are not allowed by JS 893/2006 – Jordan Institute for Standards and Metrology (Water – Reclaimed Domestic Wastewater).	Compliance with the Law & Conservation of Biological Diversity	Ministry of Agriculture, National Agricultural Research Center (NARC) and WUAs/farmers
Wastewater reuse	Inequality of distribution of RW and sharing of socio-economic benefits	Access and Equity	WAJ-WYC/ WWTP operators/WUAs, and Project team
Rain Water Harvesting	Noncompliance of installation works, gutters, fittings, valves, screens, tanks and over flow pipe with the Jordan Building Codes and Uniform Plumbing Code.	Compliance with the Law	Municipalities and Ministry of Public Works and Housing
Rain Water Harvesting	Unclean roof surfaces with no good housekeeping practices	Pollution Prevention and Resource Efficiency Public Health	Municipalities and MoH
Rain Water Harvesting	Lack of housekeeping measures to protect the on-groundwater water collection tank from pollution sources, dust, insects and other air pollutants/ direct excessive exposure to sunlight (to prevent algae growth) Lack of filtering/water purification devices in case of harvested water in need of filtering Child proof locks to prevent children's access and vandalism	Pollution Prevention and Resource Efficiency Public Health	WAJ and YWC /Municipalities and MoH
On farm activities; permaculture	Use of unprocessed animal manure:	Pollution Prevention and Resource Efficiency	JUST, MoA, National Agricultural Research Center (NARC) and farmers; MoEnv in cooperation with Rangers/Environmental Police

On farm water reuse activities, permaculture, and installation works of rain water and grey water systems	Pay differences amongst different nationalities of labor, and issues related to contracts terms	Core Labor Rights	Ministry of Labor, project activities execution managers

TABLE 10 ISSUES OF CONCERN FOR THE WASTEWATER REUSE ACTIVITIES AROUND THE WWTPS

Issue of Concern	***Significance (rating based on stakeholder feedback input and expert opinion)***	***Potential Impact***	***Environmental & Social Principles***
Wastewater reuse in irrigated agriculture using treated effluent from Mafraq, Al Mearad, and Al Akaider WWTPs			
TWW accidental discharge from the plant due to spills, overflows and seepages	Negative–Medium	Yes	*Resource Efficiency, Public Health*
High salinity of TWW may harm citrus trees & other types of plants	Negative–Medium	Yes	*Conservation of Biological Diversity*
The quality of TWW not meeting the standards	Negative–Medium	Yes	*Compliance with the Law and Pollution Prevention*
Providing farmers with insufficient TWW quantities	Negative–Medium	Yes	*Access and Equity; Resource Efficiency*
Design capacity of TWWP not being able to treat increased quantities of WW in emergency situations.	Negative–High	Yes	*Pollution Prevention & Resource Efficiency*
People rejecting the use of TWW for irrigation due to cultural beliefs	Negative-Medium	Yes	*Social & Religious Beliefs of Indigenous People*
Inadequate monitoring / testing of TWW	Negative-Medium	Yes	*Compliance with the law*
Inadequate monitoring of crops irrigated with TWW	Negative-high	Yes	*Conservation of Biological Diversity*

Groundwater contamination	Negative-Medium	yes	*Pollution Prevention & Resource Efficiency*
Contamination from sludge reuse and disposal	Negative-Medium	yes	*Pollution Prevention & Resource Efficiency*
Soil contamination	Negative-Medium	Yes	*Land & Soil Conservation*
Noise from operational enhancements of treatment plants close to residential areas.	Negative-Medium	Yes	*Occupational Safety and Health,*
Odors resulting from WWT plant activities	Negative-Medium	Yes	*Occupational Safety and Health,*
Noise from operation activities of WWTPS on workers.	Negative-medium	Yes	*Occupational Safety and Health, Core Labor rights*
Dust and gaseous emissions generated from operation activities on workers.	Negative-medium	Yes	*Occupational Safety and Health, Core Labor rights*
Finding historical sites during works for operational enhancements of the WWTPs ”	Negative-low	YES	Physical & Cultural Heritage
Congestion of traffic situation in the area during WWTP operational enhancements	Negative-low	Yes	Public Health
Not giving the priority for employment to local community.	Negative-medium	Yes	Access & Equity and gender consideration
Not giving fair and equitable access and employment opportunities to women, youth and people with disabilities	Negative-low	Yes	Access , Equity& gender consideration

TABLE 11 ENVIRONMENTAL AND SOCIAL (IMPACTS, RATINGS) MITIGATION, AND MANAGEMENT RESPONSIBILITIES FOR THE OPERATIONAL ENHANCEMENTS IN MAFRAQ, AL AKAIDER & AL ME'ARAD WASTEWATER PLANTS.

Potential impact and its rating	***Mitigation Measures***	***Technical and Financial Responsibility***	***By when/frequency***
Potential Adverse Impacts during WWTP Effluent Treatment and Quality Upgrades & Reuse Operation			

Contamination of Groundwater from accidental spills, overflows and seepages (medium potential)	Install groundwater monitoring wells Install seepage/leakage detection piezometers	Project team and contractor, in cooperation with Yarmouk Water Company	As early as possible (for wells) Piezometers /prior to operation
	Collect adequate groundwater quality baseline data	YARMOUK WATER COMPANY & MoE in cooperation with Project Team	As early as possible
	Carry out regular inspections and routine tests Monitoring water quality using the nearby monitoring wells	WWTP operator	Regularly during operations, frequency TBD during development of O&M manual by project team
Contamination from Treated Wastewater (TWW) discharges to the Wadis (valleys) (medium potential)	Incorporate various built-in design mitigations Maximize on-site re-use	Project team	During Maintenance & Operations
	Encourage sale of TWW to nearby farmers	Project team and WWTP operator	
	Ensure strict compliance with JS 893/2006 – Jordan Institute for Standards and Metrology (Water – Reclaimed Domestic Wastewater). - wadi discharge standards of treated WW effluent	WWTP operator and monitoring agencies Continuous monitoring by YWC	Monitoring as per JS893/2006 sampling frequency requirements
Contamination from reuse of TWW in irrigation (medium potential)	Begin the water reuse activity only after the WWTP has been deemed to perform satisfactorily and preliminary test results show compliance with JS 893/2006 – Jordan Institute for Standards and Metrology (Water – Reclaimed Domestic Wastewater). Design and put in place appropriate irrigation (and Nitrates in groundwater) management systems and scheduling along with soil and TWW quality monitoring.	Continuous monitoring by YWC & WAJ As well as Project Team	During Maintenance & Operations Monitoring as per JS893/2006 sampling frequency requirements

	Adjust irrigation scheduling, management as needed based on soil and TWW monitoring results and with changes in cropping patterns Monitoring soil salinity levels to determine leaching requirements.	WWTP operator, reuse contractor(s) in cooperation with MoA/National Agriculture Research Centre (NARC)	Quarterly to An Monitoring and as per JS893/2006 sampling frequency requirements annually
Contamination from sludge reuse and disposal (medium potential)	Treat sludge to first or second level in accordance with JS 1145/2006: (1) 1st level: dry wet sludge on sludge drying beds followed by storage in piles (2) 2nd level: treat sludge by composting (temperature of at least 55°C for 15 days) Carry out sampling and analysis in accordance with JS1145/2006 Plan and obtain approval for reuse In case of sludge disposal, identify nearest suitable disposal site/landfill	Project team and WWTP operator, monitoring by relevant authorities such as Water Authority of Jordan/ Water Reuse and Environment Unit	Develop treatment / reuse/disposal plan during operation. Continuously as required thereafter as per JS 1145/2006
Soil Contamination (medium potential)	Over time, use of reclaimed wastewater for irrigation can lead to soil degradation due to salinity build up in the farming area of the project. Continue the soil management and washing through monitoring programs and compliance with Jordanian Standards 1145/2006 - Jordan Institute for Standards and Metrology (Sludge – Reuse of treated sludge in agriculture)	Ministry of Agriculture	as per the JS 1145/2006 requirements for frequency of monitoring and soil sampling
Odors (low potential)	Incorporate various built-in design mitigations Plant windbreaks around site perimeter (about 2km) to minimize wind/odors Install covers on anaerobic basins and denitrification reactors (as part of plant maintenance)	Project team and Ministry of Environment	During maintenance activities

Occupational Health	Ensure sound plant operation overall Provide protective masks for worker in the event of sudden odor surges	WWTP operator, monitored by Yarmouk Water Company	Continuously and during operation and maintenance
Dust and noise pollution (low potential)	Providing safety gears and equipment such as hard hats, safety glasses, steel boots, and hearing protection. Schedule work tasks so that exposure durations for workers are within the acceptable limits.	WWTP operator, monitored by Ministry of Labor /Occupational Safety & Health Institute And Ministry of Environment	During maintenance activities
Inequality of socio-economic impacts in ww effluent availability (low potential)	Give priority to farmers and local NGOs nearest to the WWTP for purchase of TWW and supporting them to carry out safe reuse	Project team and WWTP operator monitored by Yarmouk Water Company and MIE	During institutional agreements Followed up annually by WWTP operator
	Tanker charges should be openly discussed and revisited on a regular basis to ensure fair tanker charging systems	WWTP operator, Municipality/village councils and tanker drivers	Annually
Health & safety issues (low potential)	Follow safe practices and standard operating procedures, including basic providing and requiring protective clothing Provide basic safety training to all workers and managers Fence off the entire WWTP site, provide protective railings, safety measures and appropriate signs were needed For ww reuse: Properly implement the water reuse activity according to Jordanian regulations on safe reuse and in accordance with JS 893/2007 – Jordan Institute for Standards and Metrology (Water – Reclaimed Domestic Wastewater). Provide regular medical checkups for all employees	Project team and WWTP operator and ww reuse farmers	Continuously and during operation and maintenance

	Use anti-coagulants to control black rats and house mice Provide on-site capability to treat affected individuals (first-aid, anti-venom, medical kits) Investigate nearest hospital/clinic for treatment of snake and scorpion bites		
	Ensure advance warning of all workers of upcoming maintenance works and ensure proper maintenance signage is put up.	WWTP operator-YWC	Prior to maintenance activities at the WWTP or rainwater harvesting site
	Provide tanker access from different directions, minimizing the need for all tankers to pass through any single residential area. Routes need to be designated and committed to appropriate use by the tanker drivers. Impose Speed restrictions	Project team, municipality, tanker drivers and traffic police	Prior to completion of construction Monitoring throughout operations
Disease vectors spreading (low potential)	Hire local workers and Syrian refugees to the extent possible and inspect worker health prior to plant operation. Apply approved biological insecticide (e.g., BT *Bacillus thuringiensis*) to control mosquitoes through Ministry of Health and municipality Apply molluscides to control snail intermediates (carriers of schistosomiasis) in ponds and lagoons. Coordinate with the MoH and municipality.	WWTP operator in cooperation with MoH and the Malaria and Schistosomiasis Dept. at Ministry of Health	Continuously for WWTP operations and reuse pilots Frequencies to be determined by relevant authorities for disease control
Land Acquisition from owners who's lands might be taken when expanding WWTP (Zero potential)	No Land Acquisition will take place under this proposed AF project	MIE, and Project team	No Land Acquisition will take place under this proposed AF project -

Finding Historical sites during excavation works “ (low potential)	Directly report any findings of archaeological nature during construction activities to the DOA “Department of Antiquities”	Dept of Antiquities (DOA) & MoEnv.	No risk potential as work is in already built up locations. No new substantial construction will take place or any time thereafter
Traffic: The number of vehicles is expected to increase during operation activities (low to medium potential)	Scheduling trips to proposed work sites to avoid any major disruptions in traffic flow resulting from the movement of large vehicles and transporting WWTP equipment & materials. · Construction materials/wastewater should be securely packed/stored on trucks to prevent them from falling off/ spillage and causing harm. · The contractor should prepare and abide by a traffic management plan. · Transportation of workers should be done in vehicles equipped with seats and barriers for their safety. It is not permitted to transport individuals in dump trucks.	Ministry of Transport (MOT)	During WWTP rehabilitation work and reuse pilots establishment and operation
Volumetric flow imbalance and sub-optimal operating capacity (low potential)	Incorporate various built-in design mitigations Develop emergency response procedures	WWTP operator, monitored by YARMOUK WATER COMPANY Project team	During Operation (daily to weekly)
	Public awareness raising to help regulate pumping (provide more balanced discharges)	WWTP operator and/or other local civil society	Continuously during operations
	Carry out routine maintenance and ensure immediate access to spare parts	WWTP operator, monitored by YARMOUK WATER COMPANY	Regularly during operations, frequencies TBD during development of O&M manual by project team
	Implement emergency response and contingency plans	WWTP operator	During operation
Flooding	Incorporate various built-in design mitigations	Project team (NEE)	During detailed redesign (small Earthen Dams

(low potential)	Develop emergency response procedures to be revisited and refined if needed after initial operation		rehabilitation work) and continuously for WWTPs during the rainy winter seasons especially when flash flooding is expected or takes place
	Carry out routine inspection Implement emergency response and contingency plans	WWTP operator and reuse pilot executing entity	Inspections after every summer
Total power failure (low potential)	Investigate emergency power needs and incorporate into design as needed Develop emergency response procedures	Project team(NEE)	During detailed design Revisited and refined if needed after initial operation
Potential Positive Impacts			
Conserving Limited Natural Water Resources and adaptation to climate change (High +ve potential)	-	The need for support from the related governmental agencies such as the MWI, Yarmouk Water Company, MoA and MoEnv.	During operation
Desertification Control and Reduction of Soil Erosion (High +ve potential)	-	The need for support from the related governmental agencies such as the MWI, MoA and MoEnv.	During operation
Job Opportunities and Income Generation- Community resilience (High +ve potential)	Give priority for hiring labor from the local host community, disadvantages groups (Youth, women and people with disabilities) and Syrian refugees.	(UN-HABITAT) and executing entities	Throughout project

N.B The above issues resulted from the screening process and those identified during public consultations where risk screening forms were used and synthesized (for the WWTPs operational enhancements and treated wastewater reuse in irrigated agriculture at Mafraq, Al-Mearad, and Al Akaider WWTPs).

TABLE 12 ENVIRONMENTAL AND SOCIAL RISK ASSESSMENT, THEIR SIGNIFICANCE AND THE EXENT/LOCATION FOR THE WWTPS & WASTEWATER REUSE OPERATIONAL ENHANCEMENT ACTIVITIES IN MAFRAQ, AL AKAIDER & AND AL ME'ARAD

Issue	***Risk***	***Significance***	***Nature***	***Magnitude*** *(based on incumbent procedure and expert opinion)*	***Reversibility***	***Likelihood without Mitigation***	***Likelihood with Mitigation***	***Duration***	***Extent/ location***
Employment & Development	Increasing employment Opportunities.	High	Positive	High	--------	Not likely	Very likely	Temporary	Within Northern Governorate
Traffic	Increase in the number of vehicles traveling to and from the site.	Moderate	Negative	Moderate	Reversible	Likely	Unlikely	Temporary	Roads leading to existing WWTPs
Occupational Safety and Health	Possible injuries related to handling heavy machineries.	High	Negative	High	Irreversible	unlikely	Unlikely	Temporary	Within the rehabilitation site
Public health and safety	Spread of infectious diseases caused by hiring foreign workers without assuring their health clearance.	High	Negative	High	Reversible	Very likely	Unlikely	Long-term	Within northern governorates
Sanitation	Lack of sanitary facilities onsite will cause health hazards	Moderate	Negative	Moderate	Reversible	Very likely	Unlikely	Temporary	Within the rehabilitation site
Air Quality	Increased levels of dust.	Low	Negative	Low	Reversible	Very likely	Likely	Temporary	Within the rehabilitation site
Noise	Increased noise levels	Low	Negative	Low	Reversible	Very likely	Likely	Temporary	Within the

									rehabilitation site
Groundwater	Seepage of hazardous material	High	Negative	High	Irreversible	Likely	Unlikely	Temporary	Near WWTPs
Soil	Contamination of soil with machinery oil.	Moderate	Negative	Moderate	Irreversible	Likely	Unlikely	Temporary	Near WWTPs rehabilitation Sites
Water Supply and Demand	Help meet the increasing irrigation demands	High	Positive	Moderate	Reversible	Likely	Very Likely	Long-term	Within north east and north west Mafraq area
	More water will be available for other area	High	Positive	Moderate	Reversible	Likely	Very Likely	Long-term	Mafraq
Land Use	Encourage touristic investments in the lands. Increase of land prices. Increase of residential areas.	High	Positive	High	Reversible	Likely	Likely	Long-term	Mafraq Governorate
Vector Breeding	Attract aquatic insects such as mosquitoes, which are known vectors of malaria	High	Negative	High	Reversible	Likely	Unlikely	Long-term	Within Mafraq area
Public Health & Safety	Water contamination caused by dumping of pollutants	High	Negative	High	Irreversible	Likely	Unlikely	Long-term	National level
Surface Water	Eutrophication can reduce water quality.	Moderate	Negative	Moderate	Reversible	Likely	Unlikely	Long-term	Amman Zarqa Basin

N.B: the table above was generated using the risk rating form used in the stakeholder consultations, and technical consultations with governmental and donor agencies. The quantification of significance, nature, magnitude or likelihood and duration was based on perception of the respondents' feedback in risk forms and discussions.

Environmental and Social Management for the Implementation of Rainwater Harvesting Systems from Rooftops of Selected Mosques, Schools, Municipal buildings and Households

The capture and utilization of rainwater (or rainwater harvesting – RWH) is an ancient tradition that resembles techniques used in today's Jordan around 5,000 years ago. Agriculture using surface runoff and rain harvesting techniques were extensively practiced in earlier times. Some of these structures are in good operating condition, such as the Roman pools near Ajlun, Madaba and Muwagar. Rainwater can provide water for both domestic and irrigation uses. Jordanians continue to collect rainwater in spite of the availability of water distribution systems due to the shortage of water. In fact, there is rapidly growing interest in rainwater harvesting and storage as a potential water supply to meet part of urban and rural water demand.

The Ministry of Public Works and Housing (MPWH), in cooperation with MWI, has recently included rainwater harvesting in the new water and sanitation plumbing code. This code illustrates where and how rainwater harvesting is feasible and cost-effective.

Summary of Impacts for the Installation of Rainwater Harvesting Systems

Positive impacts of RWH	***Negative impacts of RWH***
1) The existence of the water harvesting systems along with the water supply network can serve as an additional water supply that can be used in dry seasons and periods of water shortages and thus reducing the gap between supply and demand. 2) Water harvesting systems provide water to near points of use, which reduces delivery and pumping costs as well as other operating expenses. 3) The size of the system can be adapted to the roof size and the climate;	1) RWH is susceptible to limited supply and uncertainty of rainfall; 2) There is a relatively high initial cost of building the permanent storage facilities (the primary expense is the storage tank); 3) The quantity of rainwater available depends on rainfall, and for long periods of drought it is necessary to store an excessively large volume of water; 4) Collected rainwater may not be fit for human consumption without additional

4) It is one of the easiest and cheapest methods of providing a good water supply to urban and rural communities in Jordan; 5) RWH does not require mobilizing vast quantities of resources and importing materials and expertise, as compared to those involved in the planning and building large dams and reservoirs; 6) A small RWH and storage system relies and builds on local skills and experience in construction, water consumption rate and rainfall patterns; 7) RWH maintenance is easy; and 8) RWH can be an essential resource during recurring periods of drought. 9) Economic benefits where the value of a property or facility can rise if it includes a rainwater harvesting system. 10) Reducing in the water consumption rate and as a result reducing the water bill. 11) Reducing flood and surface runoff especially in urban areas and reduces soil erosion and water contamination. 12) The risks associated with the contamination of collected rain water by heavy elements is very limited in rural areas.	screening and/or adding necessary minerals; and 5) As rainfall is usually unevenly distributed throughout the year, rainwater collection methods can serve as only supplementary sources of household water. 6) The quality of collected rainwater from industrial and heavy traffic areas presents a high concentration in heavy elements such as Lead (Pb), Cadmium (Cd), Copper (Cu) and Zinc (Zn). However, this type of contamination is restricted to urban areas only.

Environmental & Social Management and Monitoring System of Rainwater Harvesting Systems:

The ESMMP table outlines the environmental and social management processes and procedures applicable to the project and includes the potential environmental and social issues associated with the proposed interventions and the procedures and mitigation measures that are required to be implemented. The Project Team will utilize this ESMMP during project execution to achieve effective, appropriate environmental and social management strategy.

TABLE 13 ENVIRONMENTAL & SOCIAL RISKS MANAGEMENT PLAN FOR RAINWATER HARVESTING FROM ROOFTOPS OF SCHOOLS, MOSQUES, MUNICIPAL BUILDINGS AND HOUSEHOLDS INTO STORAGE TANKS

Link to the 15 ESP Principles	***Potential Risks***	***Responsibilities for monitoring & implementation of mitigation measures****
Compliance with the Law	All catchment areas, vertical spouts, gutters, fittings, valves, screens and tanks must be installed to be in compliance with the Jordan Uniform Plumbing Code.	Ministry of Public Works and Housing and Ministry of Municipal Affairs
Compliance with the Law	In cases where a cistern is used, a maintenance vent should be provided with a minimum clearance of 100 mm above ground, or to be constructed in a manner that prevents flow of rainwater from the surrounding into the water tank	Ministry of Public Works and Housing and Ministry of Municipal Affairs
Compliance with the Law	The rainwater tank must be constructed in a way that enables emptying the tank for cleaning purposes.	Ministry of Public Works and Housing and Ministry of Municipal Affairs
Compliance with the Law	An over flow pipe must be provided and must be designed to be consistent with the size of the vertical spout (inlet pipe). The overflow water must be discharged properly to be in compliance with local regulations	Ministry of Public Works and Housing and Ministry of Municipal Affairs
Compliance with the Law	Catchment surface or the rooftop should be an impervious roof made from smooth, clean non-toxic material.	Ministry of Public Works and Housing and Ministry of Municipal Affairs
Pollution Prevention and Resource Efficiency	Roof surface should always be kept clean and free from debris.	Ministry of Public Works and Housing and Ministry of Municipal Affairs
Pollution Prevention and Resource Efficiency	Rainwater collection tanks should be designed to protect the harvested water from any potential pollutants such as leaves, dust, insects and other pollutants.	Ministry of Public Works and Housing and Ministry of Municipal Affairs
Pollution Prevention and Resource Efficiency	Incoming water to the storage tank /cistern should be filtered or screened and allowed to settle prior to its use.	Ministry of Public Works and Housing and Ministry of Municipal Affairs
Pollution Prevention and Resource Efficiency	Collected rainwater inside tanks should not be exposed to direct sunlight to prevent algae growth	Ministry of Public Works and Housing and Ministry of Municipal Affairs
Compliance with the Law	Secure constructed tanks with child proof locks to prevent children's access and vandalism	Ministry of Public Works and Housing and Ministry of Municipal Affairs

Pollution prevention and Resource Efficiency	The number of vehicles is expected to increase during Operation & construction activities of Rainwater Harvesting Ponds	Ministry of Transportation (MOT)
Protection of Natural Habitats	Flooding	MOA & Project team
Marginalized and Vulnerable Groups, Gender Integration	Unequal Job Opportunities and Income Generation for women, and refugee workers with work permits and adherence to ILO conventions and AF ESP6 on core labor rights	Ministry of labor, and international aid agencies and NGOs
Human and Core Labor Rights	Illegal Child labor and adherence to ILO conventions and AF ESP6 on core labor rights	Ministry of Labor and Ministry of Social Affairs
Marginalized and Vulnerable Groups & Core Labor Rights	Unequal Job Opportunities and Income Generation for women, and refugee workers with work permits	Ministry of labor, and international aid agencies and NGOs

TABLE 14 ENVIRONMENTAL AND SOCIAL RISKS, MANAGEMENT AND MONITORING PLAN (ESMMP) FOR THE INSTALLATION OF RAINWATER HARVESTING SYSTEMS

AF Principle	*Environmental or Social Issue*	*Possible Risk*	*Proposed Mitigation Measure*	*Responsibilities*	
				Implementing	*Monitoring*
Pollution Prevention & Resource Efficiency	Water Resources	Harvested water is unclean	Cleaning surfaces or catchment areas before harvesting water. Increase in the number of the first flushes prior to collection is needed to remove the accumulated sediments and impediments	Contractor	WAJ
Resource Efficiency	Energy	Extra Energy needed for Pumping	Compensate extra pumping energy with solar panels and pumps	Contractor	Irbid &Ramtha Municipality Ministries of Education and Awqaf and Islamic Affairs
Pollution Prevention & Resource Efficiency and Equal Access	Water Resources	Increased water availability	Proper allocation of water should be done	Contractor	WAJ
Core Labor Rights and Gender Integration	Employment & Development	Increasing employment Opportunities	Giving priority to local workers	Contractor	Irbid &Ramtha Municipalities
Public Health	Water quality	Water contamination	A Sampling, monitoring & Evaluation Program as well as an emergency plan is prepared to follow up such incidents,	Contractor	WAJ

Public Health.	Occupational Safety and Health	Labor being injured during construction works.	An emergency, monitoring, & evaluation plan will be developed to report such incident. A first aid kit must be available	Contractor	Irbid &Ramtha Municipalities
Conservation of Biological Diversity,	Biodiversity	Access to water will Increase vegetation & plants	Preservation & Restoration of Eco-System	Contractor	MoEnv
Protection of Natural Habitats	Biodiversity	Water availability will aid in the Preservation & Restoration of Eco-System	Reviving wild life in the target area	Contractor	MoEnv
Marginalized & Vulnerable groups	Water Resources	Adverse weather conditions affect the schedule for installation,	Installation of these components will be carried out during dry season. Work plans for implementation of these activities must comply with this requisite	Contractor	WAJ
Climate Change	*Water Resources*	Severe water scarcity situation for human consumption	Target community must be trained to find alternative sources since rain is unpredictable.	Contractor	WAJ
Climate Change	*Water Resources*	Altered seasonal patterns of precipitation and run-of;	The final design of the intervention will introduce the climate change perspective. During the Awareness raising, the contractor should alert the Target community on the possibility of getting less water due to Climate Change Impacts	Contractor	WAJ

Physical and Cultural Heritage	Archeological Resources	Possibility of damaging archaeological sites during excavation works	If any suspected archaeological findings were discovered during construction, Department of Antiquities must be informed Immediately	Contractor	MOTA

TABLE 15 COMPLIANCE OF RAINWATER HARVESTING ACTIVITIES & PROJECT WITH THE AF ESP PRINCIPLES

Principle (1) Compliance with the Law	The collected rainwater must comply with the drinking water specifications No. (2015/286) issued by the Jordan Institute of Standards and Metrology Organization (JISMO), if it will be used for drinking. As for the regulatory requirement of the ESMMP for the rainwater harvesting for Jordan, it is not required for this type of a project, refer to Jordan Environment Protection Law number 6 year 2017, and The Environment Impact Assessment Regulatory (By-Law) framework number 37 year 2005 Annex (2), Annex (3). The project proposal document provides a description of the legal and regulatory framework for any project activity that may require prior permission (e.g. EIAs) and describes the current status, any steps already taken, and the plan to achieve compliance with relevant domestic and international laws
Principle (2): Access and Equity	The project activities supported by the AF Fund shall be designed and implemented in such a way that both women and men (a) are able to participate fully and equitably; (b) receive comparable social and economic benefits; be socially sensitive and (c) do not suffer disproportionate adverse effects during the development process. All potential beneficiaries and marginalized and vulnerable groups were initially identified during the preparation of the project proposal & referring to the demographic challenge as well as refugees crises in the main proposal, it was shown that the Northern governorates of Irbid and Mafraq saw the largest influx of refugees relative to the total population, leading to increased demand for public services. As for this specific intervention of installing the Rainwater Harvesting a stakeholder workshop was held with several governmental, nongovernmental as well as academic institutions to consult with them on the most impacted communities and discuss challenges to access and equity for the targeted communities & vulnerable groups in the North. Specific site visits were conducted by the study team to the targeted schools, Mosques, municipal buildings and households to ensure the need for this system, and based on these visits findings new suggestions were added to improve the current status of these buildings, refer to the site visits & meetings report. This issue was also discussed during the stakeholders' workshop. The project will ensure there be neither discrimination nor favoritism in accessing project/programme benefits. The project document describing the process of allocating and distributing project benefits equally. Also The project activities supported by the AF Fund shall be designed and implemented in such a way that both women and men (a) are able to participate fully and equitably; (b) receive comparable social and economic benefits; be socially sensitive and (c) do not suffer disproportionate adverse effects during the development process
Principle (3): Marginalized	One of the main reasons of choosing the target areas was after studying the situation and stress on the local community as well as on the Syrian Refugees and DPs. Refer to the main proposal which gives an overview of concrete interventions, beneficiaries and cost-effectiveness in Jordan. The implementing entity, Ministry of

and Vulnerable Groups	Environment and ESIA consultant assessed and considerd particular impacts on marginalized and vulnerable groups. This has been done through identification of these groups and through consultations with these groups. The stakeholders consultations with these marginalized and vulnerable groups verified the social structure, gender issues and needs, who has the most right to work at the project interventions, local NGOs , women and youth groups, inclusion of people with disabilities, community leaders who should manage community perceptions and alert the project team to sensitivities. The proposed CC Adaptation project will continue to adhere and monitor social changes and be sensitive to the marginalized and vulnerable groups such as Syrian refugees and poor Jordanians in host communities and the expatriate labor force in project locations. Impacts on marginalized and vulnerable groups will be continuously assessed and considered such that they do not experience adverse impacts from the project that are disproportionate to those experienced by others Also the target areas were chosen according to the most impacted DPs from Climate Change. Refer to project concept note for consultations with vulnerable and marginalized groups that took place at early stages of concept note development. . This requirement is part of the ESMMP Study where all possible risks and impacts on marginalized and vulnerable groups from the installation of the rainwater harvesting system are assessed, and several mitigation measures are proposed to ensure the safety of these groups.
Principle (4): Human Rights	Jordan is signatory to UN Human Rights declarations and has active NGO s and civil society programs that monitor human rights as well as international organizations doing that. The Project interventions supported by the Adaptation Funded Activities shall respect and where applicable promote international human rights and monitoring mechanisms to report to the United Nations system. UN-Habitat consulted Office of the United Nations High Commissioner for Human Rights (OHCHR), which mentioned that Jordan has not ratified core Human Right Committee on Migrant Workers (CMW) - International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families. Therefore, the project needs to ensure DPs and all other groups have equal access to work options and are equally treated/rewarded. This will be done through participatory planning process and by included standard clauses in all contract with partners ensuring all beneficiary groups will have equal access and opportunities.
***Principle (5):* Gender Equity and Women's Empowerment.**	The project will ensure that gender equality and women's and youth empowerment is ensured for all project activities. This has been done through detailed stakeholder mapping, including identification of specific concerns, needs and benefits of women and youth (see project proposal document). Also, a 'gender' approach and baseline has been developed. UN Women and UNICEF have been consulted to specifically identify potential risks and needs of women. The project will ensure women will have equal opportunities and access

	to project benefits (through quotas) and involve women and promote them as leaders where possible while ensuring their safety through safety measures. Jordan has witnessed tremendous development in the past few decades in the field of female education and gender equality. Female education is one of the most important social rights and is one of the most important indicators of equality between men and women towards sustainable community development. The data of the second round of the 2017 Employment and Unemployment Survey indicate that the rate of illiteracy among Jordanian females aged 15 and above was 6.9 per cent. In contrast, the percentage of educated females in the same age group was 93.1 per cent. In terms of women's participation in political life, statistics available on Jordan reveal that 25 women are in leadership positions; 6.6 per cent of ministerial portfolios are taken by women, whose role, in first rank positions, in political parties has exceeded 6 per cent and they occupy 1.5 per cent of leading positions at both private and public sectors. Official figures show that Jordanian female ambassadors account for 11.1 per cent of the total number of ambassadors; that is, one out of nine ambassadors, which is amongst the highest worldwide. Furthermore, the percentage of women stood at 15 per cent of the parliament, 21 per cent in parliamentary committees, 32 per cent in municipal councils, 22 per cent in professional and trade unions, 18.5 in the judicial system and 15 per cent in local councils. In 2017, Jordan showed remarkable gender equality in health and education. During the site visits to schools and mosques the issue of gender equality, religious and cultural matters were all brought up, and it was agreed with governmental institutions as ministry of education and Ministry of Islamic affairs and Awqaf of fair allocation of benefits. Females in Schools and mosques will be either a direct or indirect beneficiaries from the installation of the rainwater harvesting system as female teachers and students in schools. The ministry of education together with Greater Irbid Municipality and the implementing company will ensure fair gender access to benefits. Ex both female as well as male schools will benefit equally from this intervention.
Principle (6): Core Labour Rights	The Jordan Decent Work Country Programme 2012-2015 seeks “to support national initiatives aimed at reducing decent work deficits and strengthening national capacity to mainstream decent work in social and economic policies. ”Jordan and ILO: Since joining the ILO in 1956, Jordan has ratified 24 Conventions including seven out of eight fundamental Conventions. The link below to the ILO Conventions ratified by Jordan. https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:11200:0::NO::P11200_COUNTRY_ID:103201

	Jordan ratified 7 out of the 8 fundamental conventions, except for C087 on the Freedom of Association & Protection of the Right to Organize, 1948 However: The project ensures that possible core labour rights issues relevant to all proposed project activities are avoided / mitigated. This has been done through an identification and analysis of relevant international and national core labour rights and by making core labour rights a subject during consultations (see outcomes consultations in part II.I. ILO identified the following: Construction: Jordan has not ratified C167 - Safety and Health in Construction Convention, 1988 (No. 167) Migrant workers: Jordan has not not ratified C143 - Migrant Workers (Supplementary Provisions) Convention, 1975 (No. 143) Women: Jordan has not ratified: P089 - Protocol of 1990 to the Night Work (Women) Convention (Revised), 1948 Main potential issue / risk in Jordan: - Convention 81 – labour inspection convention. Although ratified there is limited inspection capacity - Increase in child labour (because refugees often work with whole family) - Safety / harassment issues for women Figures: - Not many women in construction, but many in agriculture Improvements and projects: - Collective Bargaining Agreement (CBA) by 2019 - Shawish (mediator) protect wage of Syrian refugees - Flexible work permit for Syrian refugees (not dependent on one employer) Therefore, UN-Habitat need to ensure all contracts include standard clauses to avoid any risks regarding above and that safety measures are taken and inspections conducted. UN-Habitat may work with ILO to do this during project execution.
Principle (7):Indigenous People	The project concept phase has been used to collect data required to map climate change vulnerable hotspots (see approach in figure 1 in the main proposal) and develop response plans (i.e. identify appropriate measures) to address specific vulnerabilities in these hotspot areas specially the impacts on indigenous peoples. This has been done through a combination of research and a comprehensive consultation process. The project fund shall not support interventions that are inconsistent with the rights and responsibilities set forth in the UN Declaration on the Rights of Indigenous Peoples and other applicable international instruments relating to indigenous peoples. **This is protected under the National Tribal Law of Jordan.** The United Nations Development Fund for Women (UNIFEM) indicated that tribal law in Jordan was abolished in 1975 (UN 2006, 17) **where as** far as the role of the state is concerned it should be noted that Jordan tends to

	respect tribal law and customs and allows much autonomy to its tribes in conducting their own internal affairs. In fact, the Jordanian legal system informally recognizes the existence of tribal law side by side with civil law. For instance, a conflict between two families would be dealt with in court but at the same time the families would try to solve their case through tribal processes of conflict resolution (temporary truce, mediation, arbitration, compensation, reconciliation, etc.). **It should be noted here that the Beduins in Jordan are not recognized internationally and by GOJ as Indigenous Peoples**
Principle (8): Involuntary Resettlement	There will be no involuntary resettlement neither for this activity nor for any other activity or intervention in this proposal. **All project interventions will strictly take place only on government owned lands and buildings. This was ensured by the review of the data logs provided by the buildings directorates of the Ministries of Education and Awqaf and was used as one of the criteria for selecting locations sub activities for rainwater harvesting and grey water systems. There are no (informal) activities / livelihoods take place on the project's lands.**
Principle (9): Protection of Natural Habitat	The project Funded activities supported by the CCAF would not involve unjustified conversion or degradation of critical natural habitats, including those that are (a) legally protected; (b) officially proposed for protection; (c) recognized by authoritative sources for their high conservation value, including as critical habitat; or (d) recognized as protected by traditional or indigenous local communities. Jordan is signatory to the main international charters dealing with bio-diversity and conventions such as convention on international trading in the wildlife animals and plants that are threatened with extinction (CITES) that was adopted in Washington on 3.3.1973, and the biological diversity convention that was adopted in the city of Rio De Janiro on 5.6.1992, and the convention relating to wet lands (which is of an international significance) in its capacity as the habitat of water birds (RAMSAR) that was adopted in the city of Ramsar on 2.2.1971, and the Carthage Protocol for restorative safety that was adopted on 29.1.2000. A list of international agreements in which Jordan is signatory to was presented in the sections above. UN-Habitat checked the IUCN Red list and consulted IUCN regional office (see project proposal document). No protected natural habitats are in the target areas.
Principle (10): Conserving Biodiversity	Project activities supported by the Fund shall be designed and implemented in a way that avoids any significant or unjustified reduction or loss of biological diversity or the introduction of known invasive species. The project ensures no negative impacts on biological diversity will result from project activities. According to the IUCN red list and UNESCO Man and the Biosphere Programme Reserve, no sensitive biospheres are located in the target areas. This is also ensured by the engagement of the Ministry of Environment There will be no loss of biodiversity on the contrary the installation of a rain water harvesting system is expected to increase the intensity of plants and contribute to the protection of biodiversity. Based on the Environment Impact Assessment Regulatory framework number 37 year 2005 Annex (2), Annex (3), an ESIA is not

	required for this type of project, however the study team will do general assessment for any possible impact of this intervention on the biological diversity. Rain water harvesting will result in Agricultural expansion within arid and semi-arid areas
Principle (11): Climate Change	Rainwater Harvesting System to Reduce Climate Change Vulnerability has two goals: first, to be one of the alternatives for clean water source during a drought, and second, provide adaptation actions to reduce flooding. This activity has the ability to cut 30% of water used during the rainy season (about six months). The benefits of rainwater utilization will be increased when a tank is used to store water. It is worth noting here that project selected interventions aim at CC Adaptation. Whereby for rain water harvesting and grey water systems pumping the'extra' energy use will be compensated through Photo Voltaic (PV) systems and pumping this is to be in compliance with the national and AF requirements and ensures no negative climate change impacts will result from project activities, such as increases in the emissions of greenhouse gasses or in other drivers of climate change. In line with internationally recognized standards, large interventions in the following sector require a greenhouse gas emissions calculation: energy, transport, heavy industry, building materials, large-scale agriculture, large-scale forest products, and waste management. In line with national standards, environmental and social impact assessments have been conducted for a few proposed sub-projects. These studies will include an assessment of energy use for proposed interventions. In any case, renewable energy sources will be used). The case of this project rain water and grey water systems activities which will be in small scale buildings (mosques and schools) the extra energy required for pumping will be small scaled and will be compensated by the installation of solar powered pumps.
Principle (12): Pollution & Resource Efficiency	Project activities supported by the AF Fund are designed and implemented in a way that meets applicable international standards for maximizing energy efficiency and minimizing material resource use, the production of wastes, and the release of pollutants Covered under the Jordan Environmental Law # 52 for 2006 and the Natural Resources Authority Law 2002 Ministry of Agriculture Law (No. 44, 2002). Waste management including sludge management is key to ensuring compliance with P12 and is in the focus of Ministry of environment and the execution partners. Waste management and resource preservation and conservatinis in the core of rainwater harvesting and grey water systems. When choosing the suitable rainwater harvesting system, the water tank for the rainwater Harvesting system comprise more than 80% of the whole system cost, it is highly recommended to optimize the tank size as well to choose the most suitable material which is cheaper and locally available. An increase in the number of the first flushes prior to rainwater collection is needed to remove the accumulated sediments and impediments.

Principle (13): Public Health	– To avoid any potential negative health impacts for this activity frequent sampling by Ministry of health for the collected water storage systems will take place, safety signs will be posted to ensure that vandalism and access of childrent to the tanks does not happen. In line with core labour rights (155 and 187) Occupational safety and health is also assured through the Occupational safety and Health Inspectors of the Ministry of labor who conduct frequent site visits to work sites and locations to ensure that installation workers do not get occupational accidents. Ensuring this takes place will be part of the duties of the environmental, social-health and safety officers overseeing the ESMMP implementation of this project and compliance with this must be in the quarterly reporting – Rainwater is considered to be relatively clean and of acceptable quality for various purposes, even without treatment, if the required hygiene precautions are taken. Despite of this many scientific sources highlight a variety of methods to improve the quality of harvested water based on the end user. Some are as follows: – *Chlorination:* it is a common and a cheap method to treat water and kill pathogens. However, attention should be taken if high concentrations of organic compounds are present in the water since it leads to forming carcinogenic organic compounds. – *Filtration* that is done by either using sand filters or by passing water through narrow pore membranes. – *Ultraviolet light (UV)* to purify the collected water. A common practice that is relatively an expensive one because of its high consumption of energy. However, UV is not efficient option if the concentration of suspended solid materials is higher than 30 mg per litter. – *Cleaning surfaces* or catchment areas before harvesting water – *Allowing water to flow outside the collection tank* at the first storm and preferably, to flush more than once outside the collection tank. Noting that commercial parts are available in the markets that can be installed to automatically send the first flush outside the collection tank. – *Ensuring the construction and installments of collection tank in areas far from animals and cesspools.*
Principle (14): Physical and cultural heritage	Project activities supported by the AF Fund shall be designed and implemented in a way that avoids the alteration, damage, or removal of any physical cultural resources, cultural sites, and sites with unique natural values recognized as such at the community, national or international level. Projects/Programmes should also not permanently interfere with existing access and use of such physical and cultural resources. The Antiquities Law (No. 21, 1988). Under the UNESCO listed Heritage sites there is no site identified in the target areas:3 This component is studied in the ESMMP, it is identified as one of the remotely possible risks or impacts as the systems will be installed in built up buildings (schools and mosques) however it is mentioned that in the

[3] https://whc.unesco.org/en/list/&order=country#alphaG

	case of finding any historical monuments during excavation works the executing company must stop digging and contact the department of antiquities immediately.
Principle (15): Land and Soil Erosion	The installation of Rain water harvesting systems in schools, mosques, municipal buildings and households will have no negative impacts on the soil. The rain water harvesting and grey water systems project activities aim to enhance sustainable land and soil use, especially for agriculture use as the collected water will partly be used for irrigation of landscaped gardens around the buildings. No major excavations will take place In the case of rooftop rainwater harvesting there is a minimum possibility of land degradation as rainwater is clean and using rain water for irrigating gardens & green fields is expected to increase soil humidity & improve the lands quality and contribute to a more diverse and rich ecosystem, Refer to the ESMMP Study for the Rainwater harvesting. – If the collected rainwater is used for irrigation purposes. This will aid in protecting the soil from the accumulation of salts.

Greywater Systems in Mosques in Irbid and Mafraq Governorates

Based on the consultations conducted with target beneficiaries & government representatives at Irbid, Mafraq it was mentioned that most households receive water though piped water networks. However, the water is provided to households only once or twice a week and for limited hours. Beneficiaries must store water in storage tanks for use during the rest of the week and so on. In case there was cuts in water pumped to households or the stored water was not adequate, beneficiaries will have no option but to purchase water from private wells. Water purchased from private wells is delivered through water trucks. As a result, many of the remote communities and DPs residing in North of Jordan are already suffering from water shortages the thing which causes more financial burdens and stress on the communities as well as DPs.

Based on the initial assessment carried out by the experts team, & based on the feedback received from the comprehensive consultations with relevant stakeholders as (DPs, Jordanian & Syrian Refugees Municipal staff, community representatives, farmers, Women & Youth), it was suggested to implement Greywater reuse in public buildings in Irbid as schools and mosques in the following areas: Hashimya, Nuzha, Barha, Rabia, and Al Amanarah. As well as in Mafraq and Zaatari farms around Mafraq.

From an Environmental Perspective one of the main positive environmental impacts of greywater reuse is the reduction in demand for fresh water i.e. savings in the water bill for schools & mosques as well as some household farm owners.

It is expected that the water which will be collected from Mosques will be of high quality since the water from ablutions from the mosque has almost no chemicals, as for the schools drainage water from drinking water faucets will be treated and reused for irrigating ornamental plants. So, one of the assumptions behind the reuse of grey water is that the householders/users take moderate care over what enters the grey water in the first place. If large doses of poisonous chemicals were being deposited into the grey water, then not only might groundwater be at risk, but the plants also would be in danger. However, in case of using strong chemicals weather detergents, soups or any other cleaning agent in the wastewater before treatment this might affect the treated water quality and hence

restrict its end use, some jurisdictions do take risks to groundwater into account when permitting the reuse of grey water.

The main activities of operation and maintenance in YWC are classified under three categories: rationing operation, well maintenance and leakage repair and detection.

Based on the initial assessment carried out by the experts team, & based on the feedback received from the comprehensive consultations with relevant stakeholders as (DPs, Jordanian & Syrian Refugees Municipal staff, community representatives, farmers, Women & Youth), the Following intervention was suggested:

- Grey water reuse in public buildings such as Mosques in the following areas: Hashimya, Nuzha, Barha, Rabia, and Al Amanarha.

    - Mosques: collect water from ablutions of worshippers in Mosques, pump it to a storage tank and filter it and then reuse for irrigation purposes.

    - Capture the drainage water from drinking water faucets and use it to irrigate ornamental shrubs and trees. Since the water will be of high quality, and should contain little solid matter or organics, only a simple screen filter will be used and water to protect the pipe system. The reuse of grey water in such a simple, low cost way, will be used as awareness tool for students.

The ESMMP assess the potential environmental and social impacts of the proposed Grey water treatment Systems to be installed in selected mosques at Irbid & Al Mafraq governorates and to prepare an Environmental, Social Management & Monitoring Plan (ESMMP) which includes necessary mitigation measures. It establishes modalities of implementing the rehabilitation works in line with the Adaptation Fund Environmental, Social & Gender policies as well as complying with the Jordanian Laws & Regulations.

Before constructing any grey water systems, the environmental and social impacts must be evaluated. Generally Grey water Systems do not have a major impact, except if grey water was used to irrigate edible fruits & vegetables which may cause serious health issues. Usually the impact can be either negative or positive. If the negative impacts

exceed the positive impacts, the systems should not be constructed. The list below can be used as a checklist.

Positive Impacts of Grey water Systems	***Negative Impacts of Grey water Systems***
For Grey water Systems in Mosques the water used for ablutions is of a relatively high quality to begin with (it has very little soap content), i.e there is no adverse effects whatsoever on the irrigated plants.	Ground water pollution, untreated grey water seeps to water aquifer
Reducing water-borne diseases by providing improved water supply for domestic use.	Grey water is released into rivers, lakes, Springs
Reducing poverty levels through the income Generating activities.	Contamination of grey water tank from animals or cesspools
The Pressure on Sewage Network is reduced	Bad odor Emissions
Creating a Suitable environment for birds & animals	Irrigating edible Fruits & vegetables with grey water
Saving money for rural families, DPs, Schools & Mosques	Contamination of soil from contaminated or untreated grey water
Irrigating gardens and tree nurseries for generating income and re-planting forests.	

Summary of Impacts for the Installation of Grey Water Systems in Public Buildings (Mosques):

Expected impacts of grey water use on biodiversity & plants health:

Generally one of the major uses of grey water is in plants irrigation, usually users are careful and try to prevent the entrance of harmful substances as substances as (paints, antifreeze, solvents, wastewater from oily rags, chemicals from photo-labs, etc) to grey water before treatment, that's why it is crucial to take plant health into consideration if there were concentrated chemicals in the influent of the grey water system.

Most Cleaning agents and detergents (soups & laundry products) contain sodium compounds. High levels of sodium can cause discoloration and burning of leaves and can

contribute toward an alkaline soil condition. In addition, high sodium can be toxic to certain plants and can prevent calcium from reaching the plants (the UN Food and Agriculture Organization (UNFAO) indicates "no problems" at sodium levels of < 69 mg/l, "increasing problems" at levels of 69 - 207 mg/l, and "severe problems" at levels of > 207 mg/l). Flushing of the soil by freshwater or rainwater from time to time will reduce the buildup of sodium in the soil. Water softeners also introduce sodium-based compounds into the water and should be avoided where grey water is to be reused.

Soaps are less harmful than detergents. However, the use of any soap or detergent product may present problems over periods of sustained grey water application. If salt build-up in the landscape is a concern, it is better to use liquid detergents than powdered detergents. Powdered detergents contain excessive amounts of sodium compounds, which is often used as a 'filler' ingredient not essential to clothes cleaning. Many detergents also contain phosphate compounds, but these are a nutrient to plant growth, and will generally benefit the plants.

Bleaches commonly contain chlorides, which can damage plants, bleaches carry large amounts of chlorine. Therefore, ammonia is often used as a substitute for bleach, as it also cuts grease and is preferable as a household cleaning and deodorizing agent. Ammonia itself may cause damage to plants, although it quickly oxidizes to nitrates and nitrites - themselves plant nutrients - in certain soil conditions. As for organic material and bacteria they are generally broken down in the soil, and do not harm plants.

Recommended Mitigation Measures to Protect Plants health:

Plants irrigated with grey water should be monitored regularly for symptoms of damage. If any signs of plant injury appear, use of grey water should be discontinued or reduced. 'Burning' of leaf edges may be caused by excess salts in the water. Acid-loving plants may experience some chlorosis or yellowing of the foliage, due to the alkaline nature of the grey water.

If plants appear to be injured, the surrounding area should be flushed with fresh water. If possible, application of grey water should be rotated with fresh water for susceptible lawns and fruit trees. In addition, grey water should be applied over a broad area to avoid

buildup of harmful ingredients in one particular location. Applying grey water to the same plants all the time should be avoided. Particular care should be taken with water containing detergents, bleach or boron, and the use of rinse water containing fabric softeners should be avoided whenever possible. Grey water can be used for ornamental trees and shrubs. However, applying the water directly to foliage or stems should be avoided, as most of the feeder roots responsible for absorbing water are located at the base of the plant. Grey water poured directly on the base of trees and shrubs could encourage crown rot. It is best to distribute the water over the whole root system, where it will be most efficiently used.

Grey water should only be used on well-established plants, not on seedlings or young plants as they are more sensitive to the impurities in the grey water. Grey water generally should not be used on potted plants because of possible buildup of contaminants in the soil that can damage the restricted root systems in a confined volume of soil. In addition, grey water should never be applied to root crops or leafy vegetables that will be eaten raw, such as carrots, lettuce, or herbs, and it should not come in contact with the edible portion of fruits and vegetables (for instance, with root vegetables, such as radishes, potatoes, and beets).

According to the Jordanian standards for Grey water reuse (JS 1776: 2013), for all irrigation purposes including cooked or raw vegetables, gardens, green lands and other crops, if grey water is used for irrigating food plants, the water content must meet certain standards in order to be safe when used on food plants or trees, refer to Table (13) to view these requirements.

Its application should be restricted to the soil surface around plants of which only the above ground part is eaten. Grey water should not be poured directly on plant leaves. Sprinklers should not be used in order to avoid contacting the above-ground portion of the plants. Surface irrigation should not be used for food plants, except for fruit trees. Grey water should be cool before being used since hot water can damage plant roots and stems.

Expected impacts of grey water use on soil:

- A tendency to raise soil alkalinity and salinity;
- A reduction in the ability of soil to absorb and retain water.

Soil pH (acidity or alkalinity) is very important because it affects a number of soil properties that directly affect plant growth, and also has a bearing on soil bacteria and nutrient availability. Plants have a range of tolerance to pH, but most plants grow best in soils with a pH between 5 and 7. Plant nutrients generally are most available in the pH range of 5.5 to 6.5, which is also a good range for beneficial soil bacteria. When the soil pH is 5 or below (i.e. strongly acidic), nitrates, phosphates and potassium become less available to plants, earthworms disappear and bacteria become less active. Particularly alkaline soils also lock up vital mineral nutrients needed for plant growth. When the pH is 8 or higher (i.e. moderately or strongly alkaline), iron and zinc become less available to plants. Chlorotic leaves develop, and salt burn from sodium and boron tend to occur. Certain plants will be particularly susceptible to damage from grey water, particularly acid-loving plants.

Alkalinity might increase due to the presence of sodium, potassium or calcium salts in the grey water, particularly from laundry detergents. The effects on plants of variations in the pH of a soil have been discussed above. Water retention also is affected by some forms of sodium - an effect measured by a parameter known as the sodium adsorption ratio - SAR. A sandy, well-drained soil will be less affected by grey water application than a poorly drained clay soil.

If a soil has been irrigated with grey water for an extended period, sodium levels may build up, resulting in poor drainage and potential damage to plants. High levels of sodium may be detected by conducting a pH test of the soil. A pH of 7.5 or above may suggest that the soil has become overloaded with sodium. Some studies recommend the application of gypsum (calcium sulfate) to the soil in order to reduce the pH levels. A rate of 100g per square meter each month is suggested, until the pH of the soil drops to 7.

Fortunately, dilution of grey water by rainfall or fresh water irrigation helps flush the soil of sodium, excess salts, and other soil contaminants that might be building up.

Impacts of grey water on human health:

The main risks to human health arise from physical contact with the grey water, and from eating fruit or vegetables that have been irrigated with the grey water. Some grey water may contain concentrations of human excretions that can be a mode of transmission of infectious disease. Infection theoretically could occur after contact with the eyes and nostrils, inhalation of mist from spray irrigation, or ingestion through crops contaminated by spray or surface irrigation. However, there are no recorded incidents of serious effects to human health from the reuse of grey water.

Human exposure to grey water is also much less an issue than is commonly thought. Firstly, since all domestic grey water was initially produced by humans, most of it already has come into contact with humans. However, it may contain pathogens and contaminants that could be a risk to human health. There may be particular risks to those from outside the public buildings (Mosques) where the grey water was produced. There are two ways to minimize this risk - one is by extensively treating the grey water to remove bacteria and other pathogens. However, this could be expensive to implement. The second way of minimizing risk is simply to eliminate contact between the users and the grey water. For this reason, most sources recommend a grey water collection and distribution system that does not require regular user intervention. Also, irrigation by sprinkler is prohibited, to avoid the danger of airborne grey water coming into contact with people. Some jurisdictions even prohibit surface irrigation, although others do allow it provided quantities are controlled, and soils saturation does not occur. Irrigation of lawns and other areas where children or animals may play, other than sub-surface drip irrigation generally is discouraged, also to reduce the chance of contact. In addition, grey water should not be used to wash down patios, walkways, or driveways. It should also not be used for dust control, cooling, spray irrigation or any other use that would result in air-borne droplets or mist.

Also, large grey water storage containers may pose a safety hazard to children. Therefore, storage containers must be tightly covered to prevent easy access, and to keep away mosquitoes, other insects, and small rodents.

Impacts of grey water reuse on ground water resources:

One of the main environmental risks from grey water reuse is that of groundwater pollution. Depending on the geology of the area in question, it is possible that some of the substances found in grey water could find their way into the groundwater reserves underlying the area of reuse. If the groundwater were to contain substances that would pollute or otherwise have a detrimental effect on the groundwater, contamination may result. Most of the water and nutrients in the gray water will be taken up by the plants themselves. Other substances in the grey water (e.g. organic matter and bacteria) will be broken down by the top soil. Under normal circumstances, very little of the grey water in question will actually reach the groundwater.

If large doses of poisonous chemicals were being deposited into the grey water, then not only might groundwater be at risk, but the plants also would be in danger. If the grey water is of a high enough quality for it to be suitable for plant irrigation, then it is very unlikely to be a serious threat to the groundwater.

However, some jurisdictions do take risks to groundwater into account when permitting the reuse of grey water. For example, in some countries, grey water may only be used in locations where groundwater is greater than 1.5 m below the ground surface.

Recommendations during irrigation with grey water:

As noted earlier, many of the potential risks to human health and other possible unfavorable side-effects of grey water reuse (for example odors, encouraging breeding of mosquitos, etc) are reduced or eliminated by prohibiting the use of sprinkler irrigation, and by the avoidance of surface pooling of the grey water. Different jurisdictions regulate this in different ways, but generally specify irrigation to be by controlled surface flooding or by drip irrigation.

In hot climates, it is generally recommended that irrigation be carried out during the cool parts of the day (or night) to minimize water loss by evaporation. It is important that the grey water be applied no faster than the soil can absorb it, to avoid saturation and pooling of the grey water. Usually, plants are healthier when the soil is allowed to dry out between

irrigations. Therefore, for best results, one should wait until the soil in the root zone is half dried out before re-irrigating.

One important potential issue in using grey water for irrigation is the danger of clogging the irrigation network from particles in the grey water. This can be eliminated by either removing solid particles from the water (by filtering or settlement) or by increasing the diameter of the holes in the irrigation pipe. It is recommended that drip irrigation hoses (with small outlets) are not used for grey water irrigation unless the solid particulates have been removed.

Some sources have reported a buildup of algal growth in the irrigation pipework - the natural result of the presence of nutrients in the grey water. This does not pose a risk to either plants or humans, but should be taken into account in the design of the system. Algae may be removed by periodic chlorination of the grey water, although care should be taken in such circumstances to avoid harm to the plants. Refer to Table (16) to view the Grey water Standards JS 1776: 2013 and Maximum Allowable concentration based on end use (mg/l)

TABLE 16 GREYWATER STANDARDS JS 1776: 2013 AND MAXIMUM ALLOWABLE CONCENTRATION BASED ON END USE (MG/L)

Grey water Quality Characteristics	***Maximum Allowable concentration based on end use (mg/l)***		
	Irrigating cooked vegetables, gardens green lands &other crops [a]	***Irrigating raw eaten vegetables***	***Toilet Flushing***
BOD	60	60	≤ 10
COD	120	120	≤ 20
TSS	100	100	≤10
PH	6-9	6-9	6-9
NO3	70	70	70
T-N	50	50	50
Turbidity	Not Identified	Not Identified	≤ 5
E-coli (Conditioned by using drip irrigation)	10^4	10^3	≤10
Intestinal worms eggs(egg/L)	≤1	≤1	≤1
FOG (Fat oil & Grease)	8	8	8

[A]: Other crops include: Fodder crops, grain crops, oil crops & industrial crops.

Environmental & Social Management and Monitoring System of Grey Water Systems:

The ESMMP outlines the environmental and social management processes and procedures applicable to the project and includes the potential environmental and social issues associated with the proposed interventions and the procedures and mitigation measures that are required to be implemented. The Project Team will utilize this ESMMP during project execution to achieve effective, appropriate environmental and social management strategy.

TABLE 17 ENVIRONMENTAL AND SOCIAL RISKS AND MANAGEMENT AND MONITORING PLAN (ESMMP) FOR THE GREY WATER TREATMENT IN SCHOOLS & MOSQUES:

Issue	*Risk*	*Significance (based on incumbent procedures and expert opinion)*	*Nature*	*Magnitude*	*Reversibility*	*Likelihood without Mitigation*	*Likelihood with Mitigation*	*Duration*	*Extent/ location Within Irbid & Mafraq Governorates*
Water Resources	Increase available water.	High	Positive	Moderate	--------	likely	Very likely	Long-Term	Local
Water Resources	Less Pressure on Sewage Network	High	Positive	Moderate	--------	Likely	Very likely	Long-Term	Local
Water Resources	Grey water is released into rivers, lakes, Springs	High	Negative	High	Irreversible	Likely	Unlikely	Long-Term	Wide spread
Ground water Resources	Ground water pollution, untreated grey water seeps to water aquifer	High	Negative	High	Irreversible	Likely	Unlikely	Long-Term	Wide Spread
Ground water Resources	Less Ground water abstraction	High	Positive	Moderate	--------	Likely	Very likely	Long-Term	Wide Spread
Water Supply and Demand	Help meet the increasing irrigation demands	High	Positive	Moderate	--------	Likely	Very Likely	Long-term	Local
Water Resources	Grey water contamination caused by dumping of pollutants	High	Negative	High	Irreversible	Likely	Unlikely	Long-term	Local
Socio-Economic Conditions	Increasing employment Opportunities	High	Positive	Moderate	--------	Likely	Likely	Temporary	Local

Public Health	Possible transmission of infectious diseases when getting into direct contact with Grey water	High	Negative	Moderate	Reversible	Not likely	Unlikely	Temporary	Local
Public Health	Contamination of grey water tank from animals or cesspools	High	Negative	High	Reversible	Very likely	Unlikely	Temporary	Local
Public Health	Bad odor Emissions	High	Negative	High	Reversible	Likely	Unlikely	Temporary	Local
Public Health	Children being exposed to health risk from large grey water storage containers	High	Negative	High	Reversible	Likely	Unlikely	Temporary	Local
Public Health	Irrigating edible Fruits & vegetables with grey water	High	Negative	High	Irreversible	Likely	Likely	Long-Term	Local
Public Health	Using Strong chemical cleaning agents, paints & pharmaceuticals in grey water sources	High	Negative	High	Irreversible	Likely	Unlikely	Temporary	Local
Soil	Increased Salinity of Soil	High	Negative	High	Irreversible	Not likely	Unlikely	Long-Term	Local
Soil	Increasing Soil Acidity which causes the plants to absorb less nutrients (nitrates, phosphates and potassium)	Medium	Negative	Medium	Reversible	Likely	Unlikely	Long-Term	Local
Soil	Soil becoming more alkaline causing difficulty for the plant to absorb Zinc & Iron	Medium	Negative	Medium	Reversible	Likely	Unlikely	Long-Term	Local
Soil	Contamination of Soil from untreated grey water	High	Negative	High	Irreversible	Likely	Unlikely	Long-Term	Wide spread

Biodiversity	Discoloration and burning of plants leaves from excess sodium in treated grey water	Medium	Negative	Medium	Reversible	Likely	Unlikely	Temporary	Local
Biodiversity	'Burning' of plant leaf edges caused by excess salts in the water	Medium	Negative	Medium	Reversible	Likely	Unlikely	Temporary	Local
Biodiversity	Damaging Plants from chlorides present in bleaches	High	Negative	High	Reversible	Likely	Unlikely	Temporary	Local
Biodiversity	Suitable environment for birds & animals	High	Positive	Moderate	--------	Likely	Very Likely	Long-Term	Local
Biodiversity	Attract birds and other animals near the irrigated garden	Moderate	Positive	Moderate	Reversible	Likely	Likely	Long-term	Local
Biodiversity/ Water Resources	Treated grey water doesn't meet the Jordanian standards (JS 1776: 2013)	High	Negative	High	Reversible	Likely	Unlikely	Temporary	local
Socio-Economic Conditions	Grey water systems not being installed among the Local community & DPs in a fair manner	High	Negative	High	Reversible	Likely	Unlikely	Temporary	Wide spread
Climate Change	Adverse weather conditions affect the schedule for installing the grey water system.	High	Negative	Moderate	Irreversible	Likely	Likely	Temporary	Local
Archeological Resources	Possibility of damaging archaeological sites during excavation works	High	Negative	High	Reversible	Not likely	Not likely	Temporary	Local
Occupational Safety and Health	Construction activities may disturb neighbors through the generated noise	Moderate	Negative	Moderate	Reversible	Likely	Not likely	Temporary	Local

Occupational Safety and Health	Possible injuries related to handling heavy machineries.	High	Negative	High	Irreversible	Very likely	Unlikely	Temporary	Local
Traffic	Increase in the number of vehicles traveling to and from the construction site.	Moderate	Negative	Moderate	Reversible	Likely	Unlikely	Temporary	Wide spread
Public Health	Spread of foreign countries-specific infectious diseases caused by hiring foreign workers without assuring their health clearance.	High	Negative	High	Reversible	Very likely	Unlikely	Long-term	Wide spread
Sanitation	Lack of sanitary facilities onsite will cause health hazards	Moderate	Negative	Moderate	Reversible	Very likely	Unlikely	Temporary	Local
Air Quality	Increased levels of dust during construction activities	Low	Negative	Low	Reversible	likely	Likely	Temporary	Wide spread
Soil	Contamination of soil with machinery oil.	Low	Negative	Low	Irreversible	Likely	Unlikely	Temporary	Local
Vector Breeding	Attract aquatic insects such as mosquitoes, which are known vectors of malaria	High	Negative	High	Reversible	Likely	Unlikely	Long-term	Wide Spread

N.B the risk significance and ratings is based on stakeholders consultation risk assessment sheets synthesis, reported literature, donor and local reported experience and technical consultants input

TABLE 18 PROPOSED RISK MITIGATION MEASURES AND MONITORING PLAN DURING CONSTRUCTION & OPERATION OF GREY WATER SYSTEMS AND THEIR RELATED COMPLIANCE WITH AF ESP PRINCIPLES

AF Principle	***Environmental / Social Issue***	***Possible Impact***	***Proposed Mitigation Measure***	***Responsibilities***	
				Implementing entity	***Monitoring***
Pollution Prevention& Resource Efficiency	Water Resources	Increase available water.	Proper allocation of water should be done	Contractor	YWC/Ministry of Municipal Affairs
Pollution Prevention &Resource Efficiency	Ground water Resources	Ground water pollution, if untreated grey water seeps to water aquifer	A Sampling, monitoring & Evaluation Program as well as an emergency plan is prepared to follow up such incidents,	Operator	YWC/Ministry of Municipal Affairs
Pollution Prevention & Resource Efficiency	Ground water Resources	Ground water over abstraction	Grey water systems is expected to increase water availability & decrease the dependency on ground water resource	Contractor	YWC/MWI and Ministry of Environment
Pollution Prevention &Resource Efficiency	Water Resources	Pressure on Sewage Network	Grey water systems is expected to increase water availability i.e reduce the load on sewage network to treat wastewater.	Contractor	YWC/WAJ
Pollution Prevention & Resource Efficiency	Water Resources	Grey water is released into rivers, lakes, Springs	During Awareness raising, the contractor should alert the Target community on the dangers of releasing grey water to the environment & an emergency plan will be designed to control these risks	Contractor	YWC/WAJ

Core Labour Rights	Socio-Economic Conditions	Increasing employment opportunities	Giving priority to local workers and Syrian Refugees	Contractor	Irbid & Mafraq Municipality as well as MOL
Public Health.	Public Health	Contamination of grey water tank from animals or cesspools	Ensure that the construction & installment of tanks are far from animals or any source of contamination	Operator/household	YWC/WAJ and Municipality
Public Health.	Public Health	Bad odour Emissions	Installing air ventilator on the tank Try to Consume water within 24 hrs	Operator/household	WAJ
Public Health.	Public Health	Irrigating edible Fruits & vegetables with grey water	A capacity building workshop must describe for the community the allowable uses of treated grey water according to Jordanian standards (JS 1776: 2013).	Operator/household	YWC/MWI
Public Health	Public Health	Using Strong chemical cleaning agents, paints & pharmaceuticals to wash hands and showers feeding in grey water systems	During the capacity building workshop, the community must understand how the use of strong chemical cleaning agents affect the treated grey water, hence the water quality may not be used for irrigation	Operator/household	MoEnv/WAJ
Lands and Soil Conservation.	Soil	Increased Salinity of Soil	Sampling programs must be carried out to measure both treated water quality & change in soil content	Operator/household	NARC
Lands and Soil Conservation.	Soil	Contamination of Soil	An emergency & monitoring & evaluation plan will be developed to mitigate such contaminations	Operator/household	NARC
Protection of Natural Habitats	Biodiversity	Suitable environment for birds & animals	Reviving wild life in the target area	Operator/household	MoEnv

Compliance with the law	Regulatory frame work	Treated grey water doesn't meet the Jordanian standards (JS 1776: 2013)	An emergency & monitoring & evaluation plan will be developed to report such incident.	Contractor	WAJ & JISMO
Access & Equity	Socio-Economic Conditions	Grey water systems not being installed among the Local community & DPs in a fair manner	A detailed assessment based on real figures of the most needy community members & DPs in the target areas must be conducted to Justify the selection of the target families.	Contractor	WAJ & Irbid and Mafraq Municipality
Marginalized & Vulnerable groups	Socio-Economic Conditions	Impact of unfair installment of Grey water systems	Several meetings , as a scoping session, focus groups , stakeholders meetings will be carried out to get as much information as possible on the hotspots, study team must select the families based on Justified figures	Contractor	WAJ & Irbid and Mafraq Municipality
Climate Change	Climate Change	Adverse weather conditions affect the schedule for installing the grey water system.	Installation of these components will be carried out during dry season of the year. Work plans for implementation of these activities must comply with this requisite	Contractor	Meteorology Directorate
Physical and Cultural Heritage	Archeological Resources	Possibility of damaging archaeological sites during excavation works	If any suspected archaeological findings were discovered during construction, Department of Antiquities must be informed immediately.	Contractor	MOTA

TABLE 19 COMPLIANCE OF GREYWATER TREATMENT ACTIVITIES & PROJECT WITH THE AF'S ESP PRINCIPLES

Principle (1) Compliance with the Law	The project proposal document provides a description of the legal and regulatory framework for any project activity that may require prior permission (e.g. EIAs) and describes the current status, any steps already taken, and the plan to achieve compliance with relevant domestic and international laws. *Relevant legislation and standards that govern the collection, treatment and reuse of grey water in Jordan:* The first Jordanian standard aims to control the grey water reuse in Jordan was issued in 2008 (JS 1776: 2008) by the Permanent Technical Committee for Water and Wastewater of the Jordan Standards and Metrology Organization (JSMO). The standard was confined to reusing reclaimed grey water in restricted irrigation only (i.e. irrigation of all types of crops, except for fruits, vegetables and plants that their fruits contact the treated water whether eaten raw or cooked). This standard was later modified in 2013 (JS 1776: 2013) for all irrigation purposes including cooked or raw vegetables, gardens, green lands and other crops. In addition, water reuse in toilet flushing and cleaning was added to the modified standard.
Principle (2): Access and Equity	The project activities supported by the AF Fund shall be designed and implemented in such a way that both women and men (a) are able to participate fully and equitably; (b) receive comparable social and economic benefits; be socially sensitive and (c) do not suffer disproportionate adverse effects during the development process. All potential beneficiaries and marginalized and vulnerable groups were initially identified during the preparation of the project proposal & referring to the demographic challenge as well as refugees crises in the main proposal, it was shown that the Northern governorates of Irbid and Mafraq saw the largest influx of refugees relative to the total population, leading to increased demand for public services. As for this specific intervention of Grey water Reuse a stakeholder workshop was held with several governmental, nongovernmental as well as academic institutions to consult with them on the most impacted communities and verify the selection of the targeted communities & vulnerable groups in the North. Specific site visits were conducted by the study team to the targeted Mosques to ensure the need for this system and based on these visits findings new suggestions were added to improve the current status of these buildings, refer to the site visits & meetings report. This issue was also discussed during the stakeholders' workshop. Additionally, comprehensive consultation workshops were held aiming to compile all issues & concerns of all beneficiaries as (Farmers, Refugees, local community, and municipality staff), access & equity was one of the main topics which were discussed and evaluated, further information can

	be found in the comprehensive consultation reports. The project will ensure there be neither discrimination nor favoritism in accessing project benefits equally
Principle (3): Marginalized and Vulnerable Groups:	One of the main reasons of choosing the target areas was after studying the situation and stress on the local community as well as on the Syrian Refugees and DPs. Refer to the main proposal which gives an overview of concrete interventions, beneficiaries, and cost-effectiveness in Jordan. The implementing entity, Ministry of Environment and ESIA consultant assessed and considered particular impacts on marginalized and vulnerable groups. This has been done through identification of these groups and through consultations with these groups The adaptation Fund Gender policy was taken into consideration, also the target areas were chosen according to the most impacted DPs from Climate Change; refer to the main Project Proposal. The stakeholders consultations with these marginalized and vulnerable groups verified the social structure, gender issues and needs, who has the most right to work at the project interventions, local NGOs , women and youth groups, inclusion of people with disabilities, community leaders who should manage community perceptions and alert the project team to sensitivities. The proposed CC Adaptation project will continue to adhere and monitor social changes and be sensitive to the marginalized and vulnerable groups such as Syrian refugees and poor Jordanians in host communities and the expatriate labor force in project locations. Impacts on marginalized and vulnerable groups will be continuously assessed and considered such that they do not experience adverse impacts from the project that are disproportionate to those experienced by others This requirement is part of the ESMMP Study where all possible risks and impacts on marginalized and vulnerable groups from the installation of the Grey water system are assessed, and several mitigation measures are proposed to ensure the safety of these groups.
Principle (4): Human Rights	Jordan is signatory to UN Human Rights declarations and has active NGO s and civil society programs that monitor human rights as well as international organizations doing that. The Project interventions supported by the CC Adaptation Funded Activities shall respect and where applicable promote international human rights and monitoring mechanisms to report to the United Nations system.
Principle (5): **Gender Equity and Women's Empowerment.**	Jordan has witnessed tremendous development in the past few decades in the field of female education and gender equality. Female education is one of the most important social rights and is one of the most important indicators of equality between men and women towards sustainable community development. The project will ensure that gender equality and women's and youth empowerment is ensured for all project activities. This has been done through detailed stakeholder mapping, including identification of specific concerns, needs and benefits of women and youth (see project proposal document). Also, a 'gender' approach and baseline has been developed.

	UN Women and UNICEF have been consulted to specifically identify potential risks and needs of women. The project will ensure women will have equal opportunities and access to project benefits (through quotas) and involve women and promote them as leaders where possible while ensuring their safety through safety measures. The data of the second round of the 2017 Employment and Unemployment Survey indicate that the rate of illiteracy among Jordanian females aged 15 and above was 6.9 per cent. In contrast, the percentage of educated females in the same age group was 93.1 per cent. In terms of women's participation in political life, statistics available on Jordan reveal that 25 women are in leadership positions; 6.6 per cent of ministerial portfolios are taken by women, whose role, in first rank positions, in political parties has exceeded 6 per cent and they occupy 1.5 per cent of leading positions at both private and public sectors. Official figures show that Jordanian female ambassadors account for 11.1 per cent of the total number of ambassadors; that is, one out of nine ambassadors, which is amongst the highest worldwide. Furthermore, the percentage of women stood at 15 per cent of the parliament, 21 per cent in parliamentary committees, 32 per cent in municipal councils, 22 per cent in professional and trade unions, 18.5 in the judicial system and 15 per cent in local councils. Jordan also shows remarkable gender equality in health and education.
Principle (6): Core Labour rights	The project activities to be supported by the CC Adaptation Fund will meet the core labor standards as identified by the International Labor Organization***.*** The project ensures that possible core labour rights issues relevant to all proposed project activities are avoided / mitigated. This has been done through an identification and analysis of relevant international and national core labour rights and by making core labour rights a subject during consultations (see outcomes consultations in part II.I. ILO identified the following: Agriculture: Jordan has not ratified C129 - Labour Inspection (Agriculture) Convention, 1969 (No. 129) Construction: Jordan has not ratified C167 - Safety and Health in Construction Convention, 1988 (No. 167) Migrant workers: Jordan has not not ratified C143 - Migrant Workers (Supplementary Provisions) Convention, 1975 (No. 143) Women: Jordan has not ratified: P089 - Protocol of 1990 to the Night Work (Women) Convention (Revised), 1948 Main potential issue / risk in Jordan: - Convention 81 – labour inspection convention. Although ratified there is limited inspection capacity - Increase in child labour (because refugees often work with whole family) - Safety / harassment issues for women Figures:

	- Not many women in construction, but many in agriculture Improvements and projects: - Collective Bargaining Agreement (CBA) by 2019 - Shawish (mediator) protect wage of Syrian refugees - Flexible work permit for Syrian refugees (not dependent on one employer) Therefore, UN-Habitat need to ensure all contracts include standard clauses to avoid any risks regarding above and that safety measures are taken and inspections conducted. UN-Habitat may work with ILO to do this during project execution.
Principle (7):Indigenous People	The project concept phase has been used to collect data required to map climate change vulnerable hotspots and develop response plans (i.e. identify appropriate measures) to address specific vulnerabilities in these hotspot areas specially the impacts on indigenous peoples. This has been done through a combination of research and a comprehensive consultation process. The project fund shall not support interventions that are inconsistent with the rights and responsibilities set forth in the UN Declaration on the Rights of Indigenous Peoples and other applicable international instruments relating to indigenous peoples. **This is protected under the National Tribal Law of Jordan.** The United Nations Development Fund for Women (UNIFEM) indicated that tribal law in Jordan was abolished in 1975 (UN 2006, 17) **where as** far as the role of the state is concerned it should be noted that Jordan tends to respect tribal law and customs and allows much autonomy to its tribes in conducting their own internal affairs. In fact, the Jordanian legal system informally recognizes the existence of tribal law side by side with civil law. For instance, a conflict between two families would be dealt with in court but at the same time the families would try to solve their case through tribal processes of conflict resolution (temporary truce, mediation, arbitration, compensation, reconciliation, etc.). **It should be noted here that the Beduins in Jordan are not recognized internationally and by GOJ as Indigenous Peoples**
Principle (8): Involuntary Resettlement	Project activities supported by the CC Adaptation Fund shall be designed and implemented in a way that will not support and avoids the need for involuntary resettlement. **No involuntary resettlement is to take place under this project or its activities. All project interventions will strictly take place only on government owned lands and buildings. This was ensured by the review of the data logs provided by the buildings directorate of the Ministry of Awqaf and Islamic Affairs and was used as one of the criteria for selecting locations sub activities for grey water systems to be installed in mosques where the buildings are owned by the government.**

Principle (9): Protection of Natural Habitat	The project Funded activities supported by the CCAF would not involve unjustified conversion or degradation of critical natural habitats, including those that are (a) legally protected; (b) officially proposed for protection; (c) recognized by authoritative sources for their high conservation value, including as critical habitat; or (d) recognized as protected by traditional or indigenous local communities. UN-Habitat checked the IUCN Red list and consulted IUCN regional office (see project proposal document). No protected natural habitats are in the target areas
Principle (10): Conserving Biodiversity	Based on the Environment Impact Assessment Regulatory framework number 37 year 2005 Annex (2), Annex (3), an EIA is not required for this type of project, however the study team has consulted with M. of Environment on this general assessment for any possible impact of this intervention on the biological diversity especially that all project activities related to grey water systems are in already in built up sites/buildings. Project activities supported by the Fund shall be designed and implemented in a way that avoids any significant or unjustified reduction or loss of biological diversity or the introduction of known invasive species. The project ensures no negative impacts on biological diversity will result from project activities. According to the IUCN red list and UNESCO Man and the Biosphere Programme Reserve, no sensitive biospheres are located in the target areas. This is also ensured by the engagement of the Ministry of Environment. For example, the nearest natural reserve (Yarmouk Reserve) is located 50 km to Northwest of the center of the location of all sub-projects' activities.
Principle (11): Climate Change	Project activities supported by the AF Fund shall not result in any significant or unjustified increase in greenhouse gas emissions or other drivers of climate change. The'extra' energy use in pumping of the grey water in the installed systems at mosques will be compensated through Photo Voltaic (PV) systems and solar powered pumping this is to be in compliance with the national and AF requirements and ensures no negative climate change impacts will result from project activities, such as increases in the emissions of greenhouse gasses or in other drivers of climate change
Principle (12): Pollution & Resource Efficiency	Waste management including is key to ensuring compliance with ESP 12 and is in the focus of Ministry of Environment and the execution partners. Soil management will be a core element to ensure management of salinity, again this is in the in house knowledge base within the expertise of the execution entities Additionally, grey water reuse contributes to the protection, efficient use of resources and cost saving in the following ways: – Compensation for extra energy used for pumping by installing solar powered pumps – Reducing pressure on the available domestic water resources by providing an alternative water resource for irrigation purposes and flushing toilets.

	– Reducing pressure on the sewerage network and centralized wastewater treatment plants due to the reduction in the quantity of wastewater generated from households. – Reducing cesspools hydraulic loads leading to decrease the need to empty cesspools thus decreasing the financial cost associated with cesspools. – Decreasing the water bill at the household level by savings (30%-40%) of the total bill based on the estimated grey water consumption.
Principle (13): Public Health	One of the very significant benefits that results from treating and reusing grey water is that it contributes to limiting the risk of groundwater contamination by reducing the amount of wastewater that can seep into groundwater. It is difficult to determine the direct impact of the project in limiting groundwater pollution because there are many factors that affect the possibility of groundwater contamination varying from one region to another. Project activities supported by the AF Fund shall be designed and implemented in a way that avoids potentially significant negative impacts on public and workers health. Public health protection is assured under the Public Health Law (No. 54, 2002). According to the new Public Health Law No.54, issued by a Royal decree in 2002, the Ministry of Health is responsible for all health matters in the Kingdom, and in particular: - Protecting health through providing preventive and curative services as well as monitoring responsibilities. - Organizing and supervising health services provided by the public and private sectors - Providing health insurance for citizens within available resources - Establishing educational and training health institutions managed by the MOH To avoid potential negative health impacts for this activity and other activities safety signs and personal protective equipment and hygiene services such as toilets and wash basins will be provided to construction workers in line with core labour rights (155 and 187) Occupational safety and health is also assured through the Occupational safety and Health Inspectors of the Ministry of labor who conduct frequent site visits to work sites and inspect hygiene services at public buildings such as mosques locations to ensure that users of these buildings (worshippers) and installation workers do not get diseases and that the grey water systems are frequently tested. Ensuring this takes place will be part of the duties of the environmental, social-health and safety officers overseeing the ESMMP implementation of this project and compliance with this must be in the quarterly reporting.
Principle (14): Physical and	Project activities supported by the AF Fund shall be designed and implemented in a way that avoids the alteration, damage, or removal of any physical cultural resources, cultural sites, and sites with unique natural

cultural heritage	values recognized as such at the community, national or international level. Projects/Programmes should also not permanently interfere with existing access and use of such physical and cultural resources as stipulated under the Antiquities Law (No. 21, 1988). Under the UNESCO listed Heritage sites there is no site identified in the target areas:4 As the presence of physical or cultural heritage could only be identified during excavation works to place the Greywater Tanks although most probably they will be plastic tanks above surface, however since the system will be placed in public buildings there is a a very low probability to find any historical ruins since the excavations has already happened for the main buildings. This component is studied in the ESMMP, it is identified as one of the possible risks or impacts, and it is mentioned that in the case of finding any historical monuments during excavation works the executing company muststop digging and contact the department of antiquities immediately as per the antiquities law requirements and general practice in Jordan.
Principle (15): Land and Soil Erosion	Project activities supported by the CC Adaptation Fund shall be designed and implemented in a way that promotes soil conservation and avoids degradation or conversion of productive lands or land that provides valuable ecosystem services. Ministry of Agriculture Law (No. 44, 2002) ensures conservation of land and soils coupled with the provisions under the Environmental Protection Law 52 FY 2006. All proposed project activities aim to enhance sustainable land and soil use, especially for agriculture use. Also no major excavations will take place. In the case of Grey water treatment system there is a minimum possibility of land degradation as the treated grey water will be used for irrigating gardens & green fields which is expected to increase soil humidity & improve the lands quality and contribute to a more diverse and rich ecosystem, Refer to the ESMMP Study Table; Table (17), Table (18) assess the possible impacts of different risks that may arise during the different project phases including the expected impact on the land.

Roles and Responsibilities for ESMMP implementation:

- MIE – lead capacity building for risk screening and identification. For managing the risks and if any change required, will assure risk screening is conducted although this ESIA-ESMMP has done a thorough job of risk screening to avoid missing a potential unidentified risk.

[4] https://whc.unesco.org/en/list/&order=country#alphaG

- EE - Executing Entities and partners. To assure compliance with this ESMMP and to make sure a dedicated person follow up on this during execution

- Ministry of Environment – Participates in and develop competencies to give effect to risk screening and mitigation measures implementation.MoEnv. also facilitates compliance with the law/regulations and pertinent standards

ESMMP Cost Estimate and Schedule:

TABLE 20 THE COST ASSOCIATED WITH IMPLEMENTING THE ESMMP IS ACCOMMODATED BY UN HABITATBUDGET

Activity	*Quantity*	*Unit Rate in US$*	*Total in US$*
1. A UN Habitat Environment Specialist to join the PMU operations team	1	8,000 month (part-time)	32,000
2. Recruit a Specialize Local Environment Consulting Firm to supervise and report on compliance with the ESMP.	1	10,000/year	40,000[1]
3. Gender & Social Specialist assigned from the Ministry of Environment to join the PMU operations team	1 (in Kind GOJ)	1,400/month	67,200[1]
4. Capacity Building and Training for PMU and municipal operations staff and contractors (workshops).	2	10,000	20,000
5. Costs associated with mitigation measures to be added to physical contracts	Multiple	5% of any signed contract value	TBD[1]
6. Miscellaneous.		5,000/year	20,000
Total (GOJ funded)			**147,200**

NOTE: [1]This cost is based on a full-time local consultant assignment for 4 years.

It should be noted that this project is an environmental and social project aimed at adapting to CC. The recommended measures are required only to enhance environmental and social adaptation conditions. Hence, the ESMMP is able to take into

consideration maximum utilization of available and budgeted manpower and financial resources in designing and implementing the mitigation and monitoring measures.

Grievance & Redress Procedures

(UN-HABITAT) as the MIE will establish a Project Management Unit (PMU) with a process in place that is clear and transparent with procedures for receiving grievance and redress, with a clear process of how they will receive and handle complaints. The process should include a clear way of informing the public where to send their concerns (how they advertise this-ie. website, newspaper, application form, banners, etc.), how long it will take the PMU to respond (in a timely manner) and how they plan on responding to complaints (ie. face-to face, meetings, etc.).

During project inception workshops and the component launch workshops, stakeholders will be informed that any concerns relating to the design or management of the project, including social and environmental risks, should be raised with the Executing Entities (EE). Where these are not adequately addressed, these may be elevated to the project PSC and if necessary, the MIE Steering Committee. The (UN-HABITAT) as implementing entity has identified a grievance and redress mechanism that provides people affected by projects that are supported by the Fund with an accessible, transparent, fair and effective process for receiving and addressing their complaints about environmental or social harms caused by any such project. This mechanism will be project-specific and guided by a pre-existing national one under the Diwan Al Mazalem (or Bureau of Injustice).

Grievance Mechanism

The grievance mechanism described in this section includes both complaints and grievances (hereinafter referred to only as ‘grievances’). Grievances raised by stakeholders will be managed through a transparent process, readily acceptable to all segments of affected communities and other stakeholders, at no cost and without retribution.

This grievance mechanism sets out the following steps to be taken to resolve grievances, the role of different staff members involved and timeframes to reach a decision on

grievances. The types of grievances stakeholders may raise include, but are not limited to:

- Lack of access to project benefits (ex: access to project benefits, gender related issues, , training request denied, etc.)
- Health and safety risks; and
- Unacceptable standards of trainings delivered.

It is critical that stakeholders understand that all grievances lodged, regardless of the project phase or activity being implemented, will follow one single mechanism.

The grievance mechanism that will be used by the Ministry of Environment will include two platforms:

1. The Performance, Monitoring and Development Directorate, already established at Ministry of Environment, with direct links to the Social Coordinator (SOCO) for GRM related matters and issues
2. The Prime Ministry's platform of grievance and redress "خدمتكم", where comments received are sent to the relevant ministries in order to respond to comments received. Please refer to this link for further elaboration on the process:

   https://jordan.gov.jo/wps/portal/Home/CMU?lang=en&isFromLangChange=yes

Grievance Redress Process

A grievance redress mechanism (GRM) is presented below to uphold the project's social and environmental safeguards performance. The purpose of the GRM is to record and address any complaints that may arise during the implementation phase of the project and/or any future operational issues that have the potential to be designed out during implementation phase. The GRM is designed to address concerns and complaints promptly and transparently with no impacts (cost, discrimination) for any reports made by project affected people (PAPs). The GRM works within existing legal and cultural frameworks, providing an additional opportunity to resolve grievances at the local, project level.

The key objectives of the GRM are:

- Record, categorize and prioritize the grievances;
- Settle the grievances via consultation with all stakeholders (and inform those stakeholders of the solutions)
- Forward any unresolved cases to the relevant authority.

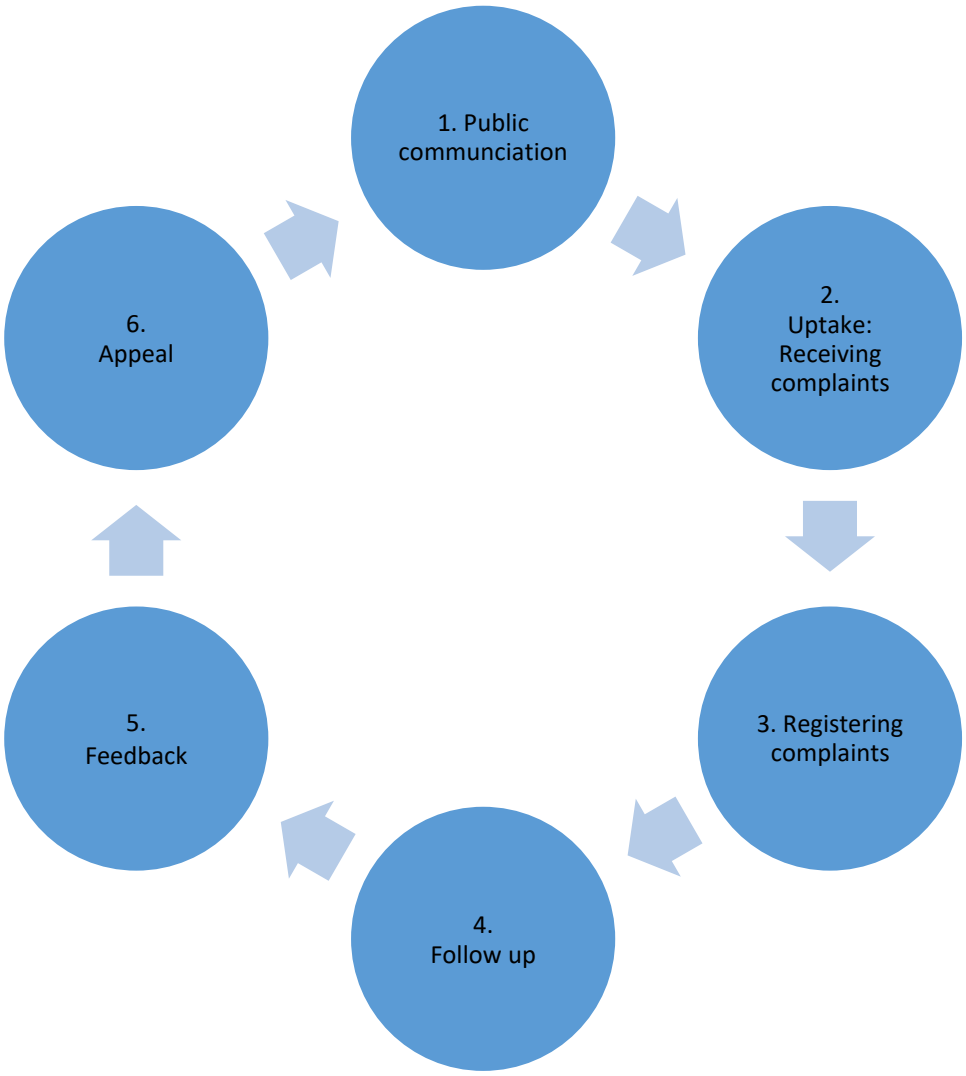

FIGURE 6 GRIEVANCE AND REDRESS MECHANISM KEY PROCESSES

As the GRM works within existing legal and cultural frameworks, it is recognized that the GRM will comprise community level, project level and Jordan judiciary level redress mechanisms. The details of each of those components are described as follows.

There is a need to avoid the shortcomings of the current registration of the complaints in other government entities by ensuring the following:

- Sex-disaggregation of complaints
- Disaggregation by nationality and political status of Arabic speakers (Jordanians, Syrian refugee)
- Disaggregation by type of complaint (issue)
- Disaggregation by geographic location (governorate/directorate)
- All complaints/information requests are recorded
- Categorization of complainants by physical well-being (healthy or /special needs)

Community Level Grievance Redress Mechanism

Local and host communities that encompass Syrian refugees have existing traditional and cultural grievance redress mechanisms. It is expected that some disputes at the community level may be resolved using these mechanisms, without the involvement of the contractor(s), and or Government representatives at local and national level. This is primarily concerned with the extended family members, tribal groups and refugees.

However, regarding disputes that include differences on issues triggered indirectly by a given project activity, the mechanism will involve the governorate Officer and if required, the representative from the Jordan Ministry of Environment and UN Habitat. It is expected that any dispute issues pertaining to access to the Project benefits would be resolved at this level.

Where issues caused by the project are raised and resolved through these existing community level grievance redress mechanisms, it is important that a mechanism for reporting them to the Ministry of Environment is established. Hence, the Ministry Of Environment records all complaints/outcomes, and if it is land disputes, then the municipality will lead and record all complaints/outcomes.

The option of using existing community mechanisms for resolving and reporting project related grievance is recommended.

Project Level Grievance Redress Mechanism

Many project related grievances are minor and site-specific. Often, they revolve around nuisances generated during inaccurate gossip type propaganda, rehabilitation or retrofitting related issues such as noise, dust, vibration, workers dispute etc. Often, they can be resolved easily on the spot or location. Other grievances are more difficult especially when it's about award of subcontracts, or misunderstandings between affected beneficiaries and the Contractor regarding access to project activities/arrangements. Most of these cannot be resolved immediately and on site.

The PMU at UN Habitat will, on receipt of each complaint, note the date, time, name and contact details of the complainant, and the nature of the complaint in the Complaints Register. The PMU complaints division will inform the complainant of when to expect a response. Complainant will then endeavor to address it to the best of his/her abilities, as soon as possible. Should the PMU staff not be able to resolve the complaint to the satisfaction of the affected persons, he/she will then refer the complaint directly to the Ministry of Environment.

Complaints referred to the Ministry of Environment will require him/her to take earnest action to resolve them at the earliest time possible. It would be desirable that the aggrieved party is consulted and be informed of the course of action being taken, and when a result may be expected. Reporting back to the complainant will be undertaken within a period of two weeks from the date that the complaint was received.

If the complaint is not resolved to the satisfaction of the aggrieved party, it will then be referred by the Ministry of Environment Secretary to the Project Steering Committee (PSC). The PSC will be required to address the concern within 1 month.

Should measures taken by the National Steering Committee fail to satisfy the complainant, the aggrieved party is free to take his/her grievance to the "خدمتكم platform, if complainant is not satisfied, it could be referred to the Ombudsman's Office, and the Ombudsman's decision will be final.

It is vital that appropriate signage is posted for public view providing the public with updated project information and summarizing the GRM process, including contact details of the relevant Project Contact Person (PCP). Anyone shall be able to lodge a complaint and the methods (forms, in person, telephone, forms available in written Arabic or English languages) should not inhibit the lodgment of any complaint.

The Complaints Register will be maintained by the PCP, who will log the: i) details and nature of the complaint; ii) the complainant name and their contact details; iii) date; iv) corrective actions taken in response to the complaint. This information will be included in Ministry of Environment's progress reports to the Bank.

The project level process can only act within its appropriate level of authority and where appropriate, complaints will be referred on to the relevant authority such as those indicated.

The PMU will have a process that is clear and transparent for receiving grievance of stakeholder and redress, with a clear vision of how they will receive and handle complaints. The process should include a clear way of informing the public and stakeholders where they can send their concerns (Ministry of Environment or PMU advertise this at their website, newspaper, application form, banners, etc.), stating how long it will take the Ministry of Environment to respond (in a timely manner) and how the it plans on responding to complaints (ie. face-to face, meetings, etc.).

During project startup inception workshops/community meetings, stakeholders should be informed that any concerns relating to the service delivery or relationship of a given stakeholder with the Project including social and environmental risks can be submitted through the Project GRM. Stakeholders can also be informed of the CCAF grievance redress mechanism.

Judiciary Level Grievance Redress Mechanism

The project level process will not impede affected persons access to the legal system. At any time, the complainant may take the matter to the appropriate legal or judicial authority as per the laws of Jordan.

TABLE 21 GRIEVANCE REDRESS PROCESS AT PROJECT LEVEL

Stage	Process	Duration
1	The Aggrieved Party (AP) will take his/her grievance to the responsible officer who will endeavour to resolve it immediately. Where AP is not satisfied, the officer will refer the AP to the Project's Contact Person (PCP). For complaints that were satisfactorily resolved by the officer, he/she will inform the PCP and the PCP will log the grievance and the actions that were taken.	Anytime
2	On receipt of the complaint, the Project PCP will endeavour to resolve it immediately. If unsuccessful, he/she then notifies PMU Project Manager	Immediately after logging grievance
3	The PMU Project Manager will endeavour to address and resolve the complaint and inform the aggrieved party. The Project Manager will also refer to the Ministry of Environment Project Manager other unresolved grievances for his/her action.	Any time
4	If the matter remains unresolved, or complainant is not satisfied with the outcome at the project level, the Ministry of Environment Project Manager, will then refer to matter to the Project Steering Committee (PSC) for a resolution.	1 month
5	If it remains unresolved or the complainant is dissatisfied with the outcome proposed by the PSC, he/she is free to refer the matter to the Ombudsman's Office at "خدمتكم".	Anytime
6	If the issue remains unresolved through the Ombudsman's decision or the Minister's decision, then the ultimate step will be for the Courts respectively to deliberate. Any such decisions are final.	Anytime

UN Habitat Project Management Unit (PMU) which will implement the role of monitoring the risks outlined above. Issues/Risks will be raised to project management and unresolved risks will be shared with PSC for resolution where these risks will be discussed and mitigation measures identified for Implementation. The current strong political commitment of Ministry of Environment is already evident which will limit risks from materializing and being unresolved.

There are risks associated with the implementation of the project some of which are of political nature due to the prevailing regional turmoil and Arab Spring, institutional related to policies and to the need for funding, job creation and competition amongst beneficiaries, and capacity building.

These risks have been taken into account in the project design, with a view to minimizing or mitigating them. Based on the overall outlook, this project can be classified as being of a “moderate” risk category and can be controlled via monitoring and mitigation measures as well as national controls.

During the project preparation/design and formulation phase, key risks underlying the project were analyzed and qualitatively assessed in connection with the context of the planned outcomes. Ministry of Environment will be the ultimate responsible entity with regards to monitoring and oversight of all social, environmental, labor, financial risks, coordination and oversight and the right of cessation of activities, or withdrawal of funding in the event of risks that cannot be otherwise managed.

Some potential risks with an assessment of the degree of each risk, and the mitigation measures identified to mitigate such risks are presented in the table below:

TABLE 22 POTENTIAL RISKS AND MITIGATION MEASURES

No.	Risk	Classification	Measures for Addressing Risks
1	Weak interaction of project staff with target groups, Syrian refugees local communities and institutions to project services and interventions.	Moderate	Embedding effective capacity building and training measures of project staff to ensure effectiveness and sustainability at the all levels.
2	Delays in project measures and infrastructure rehabilitation resulting in delays of tasks execution and continued stress.	Moderate	GOJ line ministries (Ministry of Environment, MoE, and MoAwqaf) organize modalities that support activities execution.
3	Weak incentives for stakeholders, Syrian refugees and local communities to cooperate due to time lag in seeing service enhancement results, may reduce stakeholder cooperation.	Moderate	Service delivery enhancement measures to address adaptation to climate change are to be governed by performance indicators to monitor activities will yield immediate benefits for Communities in terms socio economic livelihoods of beneficiaries with inclusion of the women, youth, Syrian refugees and marginalized groups community enhancements, awareness, skill development. This has to be emphasized during inception phase.
4	Recruitment delays by Ministry of Environment for project PMU and task teams may affect initiation of service delivery.	Low	High level coordination will be assured by Ministry of Environment inception phase. Position descriptions and key staff position TORs will be prepared in company prefeasibility
5	Potential for unsatisfactory performance of Ministry of Environment.	Low	Set up of the Project PSC (Chaired by Ministry of Environment Minister, with membership of M of Education , M of Awqaf , M of Local administration and NGOs as members representing line ministries

			and would ensure close monitoring and limit this risk.
6	Required coordination of Ministry of Environment with National and donor/ lender funded ongoing projects fails	Low	Under the MDGs Jordan and donors are coordinating and harmonizing projects for alignment with national developmental plans. MOPIC has a strong hold on the coordination mechanism and through Ministry of Environment's and UN Habitat's roles and participation in the donor lender coordination and funds mainstreaming and national planning coordination will ensure solid coordination and avoidance of duplication of efforts.
7	Cabinet changes and reshuffles in the government may impact Ministry of Environment's performance thrust and momentum	Low	Ministry of Environment must keep line ministers and agency ahead of project progress and developments.
8	Regional political instability may impact Ministry of Environment implementation plans or cause delay.	low	The GOJ institutional and financial systems have shown admirable resilience to various political stalemates; however, the risks will be monitored.
9	Failure to involve adequate representation of vulnerable communities, particularly youth, women, people with special needs and Syrian refugees resulting in failed governance.	Low	The Ministry of Environment will ensure engagement of stakeholders, youth, Syrian refugees, vulnerable groups and women and will adopt a gender-sensitive approach in equitable distribution of project benefits and staffing. The PMU will adopt a two-way communication approach to create transparency, community ownership and buy-in of interventions. The development of execution plans has been undertaken in a participatory manner, encouraging input from all stakeholders, Youth, refugees Syrian and women and those living in targeted governorates.

Consultation and Participation Mechanisms

Purpose and timing of stakeholder engagement program

The purpose of stakeholder engagement for this project is as follows:

1. Create public awareness among stakeholders on the objectives and immediate action plans of the project at hand (on-going).
2. Consult on the project detailed design (e.g. as inputs to the Terms of Reference for Service Providers) (early implementation phase)
3. Obtain feedback on implementation and adapt as needed (periodic, throughout implementation phase)

The Ministry of Environment will set the milestones below as they relate to the current purpose of this ESMMP. More concrete timings will be included in the PMU roll-out.

The EEs will report any unintended social and environmental risks that are detected through the project monitoring, evaluation and reporting processes to the MIE via the PSC, together with a proposed risk management plan that shows how these risks will be mitigated. In response to this, the MIE and PSC may propose the redirection of project funds to risk management activities, or the withholding of the next tranche of payment until satisfactory risk management actions are determined and agreed.

For the purpose of compliance with the AF, annual project/ performance reports and the mid-term and terminal evaluation reports will be modified to track any required environmental and social risk management plans. Implementing entities shall screen compliance with this policy on a project-by-project basis.

Roles and Responsibilities:

- EE, Executing Entities and partners – risk screening.
- PSC – Risk screening oversight.
- MIE – Capacity building, risk screening scrutiny and verification

Complaints regarding projects or their related activities can be filed with the secretariat at the following address:

Adaptation Fund Board secretariat

Mail stop: MSN P-4-400

1818 H Street NW

Washington DC

20433 USA

Tel: 001-202-478-7347

afbsec@adaptation-fund.org

The secretariat will respond promptly to all such complaints. Where appropriate, the secretariat will refer complainants to a grievance mechanism identified by the implementing entity as the primary place for addressing complaints.

Monitoring, Reporting & Evaluation

(UN-HABITAT) as the multilateral implementing entity will hold the ultimate responsibility for ensuring that monitoring, reporting and evaluation of (sub-)projects in order to address all environmental and social risks identified in the ESIA's ESMMP during project assessment, design (and execution if needed) and in compliance with the AF ESP guidance document.

Monitoring will be done to ensure that actions are taken in a timely manner and to determine if actions are appropriately mitigating the risk/impact or if they need to be modified in order to achieve the intended outcome or if further risks screening is needed take place if corrective actions are required. These reports shall include a section on the status of execution of the pertinent activity level environmental and social management plan, including those measures required to avoid, minimize, or mitigate environmental and social risks.

The reports shall also include, if necessary, a description of any corrective actions that are deemed necessary. The mid-term and terminal evaluation reports shall also include an evaluation of the project performance with respect to environmental and social risks.

Reporting: Executing entities will be required to submit detailed quarterly reports that include risk forecasting to the MIE that are built up from anticipated project activities. All Component and sub-component team leaders will be expected to do the same for their respective EE.

In an effort to strengthen risk screening, and to ensure that no unintended negative impacts are caused or not mitigated, all Component and sub-projects Leaders' will be trained and required to submit a basic environmental and social risk screening table with their forecasts. These tables will need to be submitted to the (UN-HABITAT) PMU as part of the forecast approval process.

In the lead up to project inception, the MIE will revisit and modify the ESIA's ESMP Risk Management Plan Schedules for this purpose. All potential risks already identified will be included, but the table will be elaborated upon to create a set of clear and easy to understand activities that will need to be cross checked only for proposed corrective actions needed to sub projects. This risk screening process will ensure compliance with the principles of the AF ESP and National legislation. Proposed project activities that pose social or environmental risks that are not easily mitigated will not be approved during the detailed quarterly forecasting process.

Mid-term, Annual and Terminal Evaluations: The PMU's quarterly and annual project performance reports shall include a section on the status of implementation of any environmental and social management plan, including those measures required to avoid, minimize, or mitigate environmental and social risks. The reports shall also include, if necessary, a description of any corrective actions that are deemed necessary.

Mid-term, annual and terminal evaluations will include a focus on environmental and social risks and ensure compliance with no-risk assessments in terms of the AF ESMP. Particular attention will be given to the monitoring of unanticipated environmental and social risks in the quarterly reporting process. The EE will be expected to scrutinize Executing Entity reports for such risks, and to provide the PSC and MIE with their appraisals for verification. The MIE will work closely alongside the EE to ensure that PMU staff have the capacity to undertake the required screening, and to provide the necessary scrutiny.

Quarterly Forecast Reviews and Risk Assessments

All quarterly forecasts, including risk assessments, will be reviewed by the PMU with support of the Gender and Social (Monitoring and Evaluation Expert). These reviews will be tabled with recommendations to the PSC and MIE for approval.

A commitment by the (UN-HABITAT) PMU as implementing entity to oversee and ensure that executing entities implement the management plan will be reflected in the monitoring and reporting plan for these projects.

Roles and Responsibilities:

- Ministry of Environment Consultants – for overall risk evaluation.
- Executing Entities and partners – risk management responses (in the unlikely event that these should arise).
- PSC – risk management oversight.
- MIE – risk management verification.
- Direct Financial costs (operational, monitoring and institutional costs) were identified under each project operational costs while indirect costs will be borne by the executing entities.

ANNEX (1): RISK SCREENING SHEETS

ANNEX (2) EIA REGULATIONS IN JORDAN
PROJECTS WHICH NEED A COMPREHENSIVE EIA STUDY IN JORDAN

ANNEX (2): Projects, which need a comprehensive EIA, study:

1- Raw petroleum Refining.
2- Electricity generating plants.
3- An establishments designed as permanent stores
or as landfills for the irradiant nuclear wastes.
4- Iron and steel factories.
5- Establishments for extracting, treatment, conversion the asbestos and the substances which
asbestos part of its structure.
6- Integrated chemical industries such as:
- *Petrochemicals.*
- *Fertilizers, pesticides and peroxides industries.*
- *Chemical products, petrochemicals and petroleum storage facilities.*
7- Roads, airports and rails constructing projects.
8- Hazardous wastes treatment plants and disposal from these wastes.
9- Establishing the industrial cities.
10- Extraction industries:
- The excavating processes for water and the geo- thermal digging except the digging for
investigating the soil.
- Mining processes and relevant industries.
- Natural fortunes extraction.
11- Generating energy industries.
- The industrial establishments which producing electricity, vapor, hot water.
- The industrial establishments which conveying gas, vapor, hot water and electrical
energy.
- *Natural gas surface storage.*
- *Flammable gases storage under ground surface.*
- *Fossil fuels surface storage.*
12- Tanning (leathers) factories.
13- Sugar factories.
14- Yeast factories.
15- Building up Marine ports.
16- Establishing ships and boats for industrial and recreational purposes.
17- Sea dumping for using the land in industrial and recreational uses.

ANNEX (3): PROJECTS WHICH NEED AN INITIAL EIA STUDY IN JORDAN

18- Glass factories.

19- Establishing slaughterhouses (abattoirs).

ANNEX 3: Projects need initial EIA study

1- Agriculture Projects:

- Poultry Farms if the capacity exceed 30.000 birds,
- Caws Farms if the capacity exceed 50.000 caws.
- Sheep Farms Caws Farms If the capacity exceed 1.000 sheep.

2- Minerals treatment projects:

Iron and steel works including galvanizing, varnish factories.

Establishments producing non-irony minerals including production, purification (washing), liquefying, demonetizing (pulling) and galvanizing processes.

- Compressing Bullions.
- Treatment of minerals surfaces and covering (coating).
- Boilers, cisterns, tanks, industrialized from minerals plates.
- Establishments for felting and scorching (roasting). Raw minerals
- Complexes industry and aligning (collecting).

3- Food Industries:

- Oils, animal and vegetarian fats.
- Bottling, Packaging the animal and vegetarian products.
- Milk products industry.

4- Fabric, leather, wood, papers and tissues industries.

5- Rubber industry.

6- Infrastructure projects including housing projects.

7- Other projects:

- Municipal landfills
- Landfill for disposal from junk.
- Sports activities centers.
- Junk storage establishments.

8- Any additions, amendments on the projects that mentioned in this annex.

ANNEX (4): PROJECT PERTINENT NATIONAL STANDARDS

GREY WATER REUSE STANDARD JS 1776: 2013

WASTEWATER REUSE STANDARD JS 893/2006

اقعةد فنية

ذهه الوثيقة إلزامية الطتبقيد

Technical Regulation

This document is mandatory

هايملا ــ يمها الصرف لاصيحد لامنزلية لامستصلحة

Water – Reclaimed domestic wastewater

فاوــلجم قــسسؤم ةرادإ سـفصاوملا تمـييقملاو تلـمقر هتسلجب س ٢٠٠٦/٦ قعنمللـخيراتب ةد ٢٠٠٦/١١/١٣

لعى اعتامد لاوماصفة القياسية قرــم ٢٠٠٦/٨٩٣ اقكعدة فينة لإزمية التطبيق واعبتاهرا سارية وعفملال نم يراتــخ

٢٠٠٧/٣/١٧ لوخملا تايحلاصلا ًادانتسا كلذوــة كـةداملا بجومب ه (٨) قفـةر (ب) فصاوملا نوناق نمــتا

مقر سييقملاو ٢٢/٢٠٠٠.

ؤمسسة المواصفات والمقاييس

لاممكة الأردنية هلااشمية

JS 893:2006

أ ق م ٢٠٠٦/٨٩٣

Third edition

صدلإادار الثاثل

وماصفة قياسية أردنية

هايملا ــ يمها الصرف لاصيح لامنزلية لامستصلحة

Water – Reclaimed domestic wastewater

ؤمسسة المواصفات والمقاييس

المملكة الأردنية الهاشمية

لمحاتويات

لجلداول

لماقدةم

ؤمسقس لماواصفات ندرلأا ني سييقتلا تمينطولا تقيطها يه تمينمدرلأا سييلقلاو، دلدعإ متيح ثيح لماواصتلف لقياسية

ـح ناجلالا مذه نوكتو .تمينف ناجل للاخ نم تمينمدرلأا لك لذو ـعوضوم تمينعلا تميسيئرلا تلهجلا ينلئم عاضعأ نمةلكشمةدا تقفصاولما لجأ نم، تقفصاولما مذه لوح تلظحلاو يأرلا ءلدبإ ني قلحا تقفصاولما عوضوم تمينعلا تلهجلا عيمجل نوكيو، يئلهنلا عورشلما ميمعت متر تف علنئآ، فصاولما لعجاًيعسنلكملإا ردق تيلوللا تلفصاوملل تمئاوم تمينمدرلأا تما زإالة العوائق الفينة من أمام التجارة وتسهيل انسياب السلع بين الدول.

يقتلا تيريدلم نيفلا لمعلا لي للدلاًقفو تمينمدرلأا تميسايقلا تلفصاولما تغايصو تلكيه متتسي ١-٢/٢٠٠٥، لجلاغ ٢: وقعلد هيكلة وصيغلة المواصتلف القياسية لأاردينة.

علنبوً ساردب تمدلعلا مليلاو مليملل تمئالدلا تمينفلا تمنجلالا تلماع تدقف لك لذ ىلعـسايقلا تقفصاولما لي دعتو تمينمدرلأا تمية ٢٠٠٢/٨٩٣ **مايلاب** تصالخا ـــ ينمدرأ تمينف تدعاقك لهادلمتعاب تلصوأو **تحلصتسلا تميلترلا ي حصلا فرصلا مايمة**

٢٠٠٦،/٨٩٣ تدلملاًدانتسا لك لذو (٥) لمنب)أ (قرقف (١) تقلاو تلفصاولما نوناق نمقر سييلم ٢٢ كنسة ٢٠٠٠.

مواصفة قياسية أردنية للمياه المعالجة للاستعمالات المنزلية

١- المجال

تختص هذه المواصفة القياسية الأردنية بالاشتراطات الواجب توفرها في مياه الرصف الصحي المستصلحة والخارجة من محطات معالجة المياه العادمة المنزلية والتي يتم تجميعها عن طريق شبكات الرصف الصحي العامة وذلك للاستعمالات المنزلية المختلفة.

٢- المراجع

يعتبر التطبيق لهذه المواصفة القياسية الأردنية مراجع الاشتراطات الواجب توفرها في مياه الرصف الصحي المستصلحة والخارجة من محطات معالجة المياه العادمة المنزلية والتي يتم تجميعها عن طريق شبكات الرصف الصحي العامة وذلك للاستعمالات المنزلية المختلفة، (ما لم تنص أي اشتراطات واردة في هذه المواصفة القياسية الأردنية على خلاف ذلك).

- كتاب الطرق القياسية لمحلول المياه والمياه العادمة الصادر عن الجمعية الأمريكية للصحة العامة والجمعية الأمريكية لأشغال المياه، ٢٠٠١.

٣- التعاريف والمصطلحات

لأغراض هذه المواصفة تستخدم المصطلحات والتعاريف الواردة أدناه:

٣-١

مياه الرصف الصحي العامة تشير إلى المياه العادمة المنزلية الناتجة عن شبكات الرصف الصحي العامة وفق تعليمات الربط الصادرة عن الجهات الرسمية للمياه الناتجة عن الاستعمالات

٣-٢ محطة معالجة مياه الرصف الصحي

المنشآت المعدة لمعالجة مياه الرصف الصحي والتي تتضمن المحطات الكبيرة والصغيرة

٣-٣

محطات معالجة مياه الصرف الصحي في التجمعات السكانية الصغيرة

المحطات المعدة لمعالجة مياه الرصف الصحي والتي تنقل إليها المياه بواسطة الصهاريج ذات الوزن البرتقالي

٣-٤

المياه المستصلحة

يعاه الرصف الحصي المعالجة والمنوي استخدامها حسب ما هو وارد في هذه المواصفة القياسية الأردنية ما لم تختلط بمياه من مصادر أخرى

٣-٥

المساحات الخضراء

منطقة تصميمية يرغب تجميلها وتحسينها بالأشجار والشجيرات والمتسلقات والمتساقطة الأوراق والمتعرشات والمتسلقات والمتساقطة الأوراق والمتعرشات

٣-٦ تجميع المعالجة الثانوية

الأنظمة التي تستخدم الطرق الآلية لمعالجة المياه كالحمأة المنشطة والأقراص البيولوجية الدوارة والمرشحات البيولوجية وغيرها

٣-٧

أنظمة المعالجة التجميعية

الأنظمة التي تعالج المياه طبيعياً بواسطة البرك التخزينية التهوية أو اللاهوائية أو برك الإنضاج أو غيرها

٣-٨

التطهير

عملية التخلص أو خفض أعداد الميكروبات المرضة أو الدالة على التلوث الممكن تواجدها بالمياه من خلال استخدام أو أكثر من الطرق التالية مجتمعة أو منفردة أو متزامنة أو متعاقبة بما يجعل المياه صالحة للاستعمال المسموح به من الجهات الرسمية المختصة

٣-٩

المحاصيل الصناعية

المحاصيل التي تستخدم للغايات صناعية مثل الأخشاب والزيتون

٣-١٠

المحاصيل الحقلية

المحاصيل التي تزرع بمساحات واسعة وتحصد مرة واحدة سنوياً وتتضمن:

٣-١٠-١

المحاصيل العلفية

المحاصيل التي تزرع من أجل الحصول على مجموعها الخضري (السيقان والجذور) لاستخدامها في تغذية الحيوانات مثل البرسيم والذرة العلفية وحشيشة السودان والفصة والحلبان وغيرها

٣-١٠-٢

المحاصيل الحبوب

وتشمل جميع المحاصيل التي تزرع لحبوبها الغنية بالنشويات والتي تستخدم في تغذية الإنسان والحيوان وتشمل القمح والشعير والشوفان والذرة الرفيعة (البيضاء) وغيرها

٣-١٠-٣

المحاصيل البذور الزيتية

المحاصيل التي تزرع بقصد الحصول على بذورها بعد تجفيفها مثل العدس والحلبة والترمس وغيرها

٣-١٠-٤

المحاصيل الألياف

المحاصيل التي تزرع بقصد الحصول على أليافها مثل القطن والكتان وغيرها

٣-١٠-٥

المحاصيل الزيت

المحاصيل التي تزرع بقصد استخراج الزيت منها مثل السمسم وفول الصويا والزيتون وغيرها

٣-١٠-٦

المحاصيل السكر

المحاصيل التي تزرع بقصد الحصول على مادة السكر منها مثل الشمندر السكري وقصب السكر وغيرها

٣-١١ الخضار الورقية

البقدونس والكزبرة والخس والسبانخ والملوخية والأرضي شوكي وغيرها

٣-١٢ الخضار الثمرية

تشمل الخضار التالية: الباذنجان والكوسا والخيار والفقوس والفلفل والملفوف والبصل والجزر والفجل والخس والبقدونس والنعنع والجرجير والكزبرة والبقلة وكذلك الفراولة والبطيخ والشمام وقصب السكر وغيرها

٣-١٣ الأزهار والنباتات الزينية

الورد والقرنفل والجاردينيا والأبصال وغيرها

٤ – قرصتخلا تاحلطصلاو زومرلا

لأغراض هذه المواصفة تحمل المصطلحات المختصرة المذكورة دأناه الرموز التالية.

صلاطلح خلاتصر	لارمز
Aluminium	Al
Arsenic	As
Beryllium	Be
Bicarbonate	HCO_3
Biological Oxygen Demand (Five Day)	BOD_5
Boron	B
Cadmium	Cd
Calcuim	Ca
Chemical Oxygen Demand	COD
Chloride	Cl
Chromium	Cr
Cobalt	Co
Colony Forming Unit	CFU
Copper	Cu
Cyanide	CN
Dissolved Oxygen	DO
Escherichia Coli	*E.coli*
Fat, Oil and Grease	FOG
Fluorine	F
Iron	Fe
Lead	Pb
Lithium	Li
Magnesium	Mg
Manganese	Mn
Mercury	Hg
Methylene Blue Active Substance	MBAS
Molybdenum	Mo
Most probable number	MPN
Negative logarithm of H^+ concentration	pH
Nickel	Ni
Nitrate	NO3
Phosphate	P (as PO_4)
Residual Chlorine	RCl_2
Selenium	Se

صلماطلح خلاتصر	لارمز
Sodium	Na
Sodium Adsorption Ratio	SAR
Sulphate	SO_4
Total Dissolved Solids	TDS
Total Nitrogen	T-N
Total Suspended Solids	TSS
Vanadium	V
Zinc	Zn

٥ – ةماعلا تاطارتشلاا

٥–١ نيسيئر نيئزج ىلإ ةحلصتسملا هايملا ةفصاوم مسقت:

أ) المياه المستصلحة للغيتا الطحر لىإ السيلو أو لأاودية أو المطسحتا المائية.

شلاالتراطتا ولخاوص الموضحة لكل زجء وحسب سلاالتدخما النهائي ب) المياه المستصلحة للغيتا إاعدة سلااتعملا.

٥–٢ ةحلصتسملا هايملا ةيعون ةقباطت نأ بجي

لماخطط له.

٥–٣ هطلاخ قيرط نع ةحلصتسملا هايملا فيفخت مدع بجيقيقن هايمب ةجلاعلا ةطحم عقوم يف ةلـ □ يقحت فـــــق

شلاالتراطتا الواردة في ذهه المواصفة القياسية لأاردينة.

٥–٤ ثم (ةيندرلأا ةيسايقلا ةفصاوملا هذه يف ةركذملا ضارغلأا ريغل ةحلصتسملا هايملا مادختسا لاح يف عمأ لـ ـلـا

للتبريد أو الإطافء) عتتلم مواصتاف أو إرشادتا قياسية خاةص بكل ساتعملا وبعد إجراء الدراستا اللازمة على أن

وتوطير مطتا تنقية ماعلجة المياه اللعدمة السعي دوامً ؤيخذ البعد الصحي والبيئي بعين لاعبتار من قبل الجهة المستخدمة.

ثملأا مادختسلاا ةيغب ةيندرلأا ةيسايقلا ةفصاوملا هذه يف **٥–٥** لمتشي ىلع ةمئاقلا ةصاخلاو ةيئيبلا ةينعملا تاهجلا ىلع

تلحسين نوعية المياه الملاعةج لمعايير ربما تفوق تلك الواردة

للمياه المستصلحة والحافظ على البيئة.

٥–٦ لا ةينانكسلا تاعمجتلا يف يحصلا فرصلا هايم ةجلاعم تاطحم نم ةحلصتسملا هايملا مادختسا لاح يفو قيرغصلا،

يجب أن لا تؤثر سلباً على نوعية صمادر المياه الجوفية والطسحية والبيئة.

٦ – ةيسايقلا تاطارتشلاا

٦–١ ةيئاملا تاحطسملا وأ ةيدولأا وأ ليوسلا ىلإ حرطلا تاياغل ةحلصتسملا هايملا

٦–١–١ فلوتت امدنع ةيئاملا تاحطسملا وأ ةيدولأا وأ ليوسلا ىلإ ةحلصتسملا هايملا حرطب حمسيتيعون ةـمـ ـاـهـع

لودجلا يف ةدراولا ريياعملاو صاوخلا ١ ةبقعلا جيلاخ ىلإ ةيدؤملا ةيدولأا ىلإ حرطلا عنميو.

الجدول ١ - متطلبات المياه المعالجة وأولويات استخدامها لري الحدائق العامة

المعايير	الرمز	الحد المسموح به مغ/ل (باستثناء المشار إليها)
الأكسجين المستهلك حيوياً	BOD_5	٦٠ (أ)
الأكسجين المستهلك كيماوياً	COD	١٥٠ (ب)
الأكسجين الذائب	DO	> ١
المواد العالقة الكلية	TSS	٦٠ (ب)
الأس الهيدروجيني	pH	من ٦ إلى ٩ (ج)
النترات	NO3	٨٠ (د)
النيتروجين الكلي	T-N	٧٠ (د)
الإشيريشيا كلاوي	*E. coli*	١٠٠٠ (هـ)
بيوض الديدان المعوية	Intestinal Helminthes Eggs	٠,١ (و)
الدهون والزيوت و الشحوم	FOG	٨,٠
الفينول	Phenol	< ٠,٠٠٢
المنظفات	MBAS	٢٥
المواد الصلبة الذائبة الكلية	TDS	١٥٠٠
الفوسفات	P (as PO_4)	١٥
الكلورايد	Cl	٣٥٠
الكبريتات	SO_4	٣٠٠
البيكربونات	HCO_3	٤٠٠
الصوديوم	Na	٢٠٠
المغنسيوم	Mg	٦٠
الكالسيوم	Ca	٢٠٠
نسبة امتصاص الصوديوم	SAR	٦,٠
الألمنيوم	Al	٢,٠
الزرنيخ	As	٠,٠٥
البريليوم	Be	٠,١
النحاس	Cu	٠,٢

لودجلا ـــ١ (تمتة)

المعايير	الرمز	الحد المسموح به مغ/ل (باستثناء المشرا إيلها)
فلالورايد	F	١,٥
الحديد	Fe	٥,٠
الليثيوم	Li	٢,٥
المانغنيز	Mn	٠,٢
والمبلدينوم	Mo	٠,٠١
ينالكل	Ni	٠,٢
الرصاص	Pb	٠,٢
السيلينيوم	Se	٠,٠٥
الكادميوم	Cd	٠,٠١
الخاراصين	Zn	٥,٠
الكروم	Cr	٠,٠٢
الزئبق	Hg	٠,٠٠٢
فلالاناديوم	V	٠,١
الوكبالت	Co	٠,٠٥
بالورون	B	١,٠
السيانيد	CN	٠,١

[أ] نمبسم تميقة BOD_5 دعب إجارء تيلمع رتلاشيح لماطت تيقنتلا تيعيبطلا وأ تيلا تشمتل ىلع ربك لقص.

[ب] مسيح بضعف تميقلا لماطت تيقنتلا تيعيبطلا وأ تيلا تشمتل ىلع ربك لقص.

[ج] قدحو.

تيرغصلا تينلكسلا تاعمجتلا تاطلخ [د]، قرطالما مايلأا ةئ ١٠٠ ل/غم.

[هـ] قرمعتسم نيوكت قدحو وأ لالمتحا رثكلأا ددعلا/١٠٠ لم.

[و] يوبضة لكل رتل.

٦-١-٢ تيفوج تيئام ضاوحأ لإ يدؤت وأ ولعت قطانم ةحلصتسلا مايلا روورم دنع، مزلالا ريبلتلا نانئا مبيجة نلع تسرب المياه المستصلحة لإ المياه الجوفية.

٦-١-٣ مـ رشابلا سلمتلا ةضرعم ةيئاملا تلاحطسم وأ ةيدوأ وأ لويسلا لإ ةحلصتسلا مايلا حرط نمنعلا عـينطلو تستخدم إحدى عمليتا التهطير المناسبة حافظاً على الحصة الملعة وعند ساتخدما الكلورين كمطهر يجب لاأ يتجاوز افئاض الكلور الحر في المياه المستصلحة عن ١,٠ ل/غم.

الهوصو **٦-١-٤** يلا حرط نمنع يلاوك لايشيرشيلإا دلدعأب ةصالخا ميقلا زوابز ةيعيبطلا ةيقنتلا تلاطلا حمسيـيدوأ لإ ملـة عيبطـودس لإ ةيدؤم ةد يتم تخزين المياه فيها وتستخدم ميهاها بلكلما لأغراض الري. أما في حالة ساتخدما المياه قبل دودسلا لإ، حو لامعتسلاا ةداعإ تايالغ ةحلصتسلا يرلا مايم ةفصاول ةصالخا يريلعلاب مازتلالا ةيفـبـس سلاا تخدما.

٦-٢ لامعتسلاا ةداعإ تايالغ ةحلصتسلا مايلا

٦-٢-١ يرلا تايالغ ةيفولجا مايلا ضاوحلأ ةيعانطصلاا ةينغتلا ضارغلأ ةلهاملا مدختسا داعلا ةحلصتسلا مايلا

٦-٢-١-١ يفولجا مايلا ضاوحلأ ةيعانطصلاا ةينغتلا ضارغلأ ةحلصتسلا مايلا لامعتسا ةداعإب حمسيـنع تامـد لودلجا في ةدراولا يريلعلا عم لهتيعون قفاوتة ٢.

لودلجاـــ٢ ةينغتلا ضارغلأ لهملمدختسلا حومسلا مايلا ةيعون صاوخو يريلعلا ه حومسلا مدلحا لانطصعاية لأحواض لمياه الجوفية

لمعايير	لارمز	لحالد لمسموح به مغ/ل (باستثناء المشار إليها)
لأكسجين المستهلك حيوياً	BOD_5	١٥
لأكسجين المستهلك كيماوياً	COD	٥٠
لأكسجين الذائب	DO	٢ <
لمواد اللعلقة لكللية	TSS	٥٠
لأس الهيدرويجني	pH	نم ٦ لى إ ٩[أ]
ردجة العكورة	Turbidity	٢[ب]
لتنرتا	NO3	٣٠
لأمونيوم	NH_4	٥,٠
نلايتروجين الكلي	T-N	٤٥
الإيشيريشيا كلاوي	*E. coli*	٢,٢>[ج]
يبوض الديدان المعوية	Intestinal Helminthes Eggs	١[د]

لودجا ـــ٢ (تمتة)

المعايير	الرمز	الحد المسموح به مغ/ل (باستثناء المشرا إيلها)
للدهون والزيوت و الشحوم	FOG	٨,٠
فالينول	Phenol	< ٠,٠٠٢
المنظفات	MBAS	٢٥
لوالماد اصللقبة الذائقبة الكلقي	TDS	١٥٠٠
فالوسفات	P (as PO_4)	١٥
الكلورايد	Cl	٣٥٠
الكبريتات	SO_4	٣٠٠
بيالكربونات	HCO_3	٤٠٠
صالوديوم	Na	٢٠٠
المنغييسوم	Mg	٦٠
الكاليسوم	Ca	٢٠٠
سنقبة ادمصاص الصوديوم	SAR	٦,٠
المألينوم	Al	٢,٠
الزرنيخ	As	٠,٠٥
البريليوم	Be	٠,١
نالحاس	Cu	١,٥
فاللورايد	F	٢
لحاديد	Fe	٥,٠
الليثيوم	Li	٢,٥
المانغنيز	Mn	٠,٢
والمبلديوم	Mo	٠,٠١
ينالكل	Ni	٠,٢
الرصاص	Pb	٠,٢
السيلييوم	Se	٠,٠٥
الكادميوم	Cd	٠,٠١

لودجلا ٢ (تمتة)

المعايير	الرمز	الحد المسموح به مغ/ل (باستثناء المشار إليها)
الخارصين	Zn	٥,٠
الكروم الكلي	Cr	٠,٠٥
الزئبق	Hg	٠,٠٠١
الفناديوم	V	٠,١
الكوبالت	Co	٠,٠٥
البورون	B	١,٠
السيانيد	CN	٠,١

أ) وحدة.

ب) نيفليومتر.

ج) ١٠٠/ مل.

د) بويضة للكلتر.

٦-٢-١-٢ تعينت تايلغلا تيفولجا ماميلا ضاوحلأ تيعانطصلاا تعينتلا ضارغلأ تحلصتسلا ماميلا مادختسابب حمسي لا حأواض المياه الجوفية المستغلة لأغراض الشرب.

٦-٢-١-٣ تيفولجا ماميلا ضاوحأ تعينت ضارغلأ تحلصتسلا ماميلا مادختسا لبق تمزلالا تينفلا تاساردلا ءارجإ بجي لمصصخة للري ليبان دعم تأثيراه على لأحواض المليئة الجوفية المصصخة للشرب.

٦-٢-٢ يرلا ضارغلأ مادختسا دعاقلا تحلصتسلا ماميلا

٦-٢-٢-١ عومجم لاثمي ينتيسيئر ينتعومجم يرلا ضارغلأ تحلصتسلا ماميلا لمادختسا ةداعإ مدنب نمضتيريايعلا ة لقياسية ومجموعة سلاتشرادتا.

٦-٢-٢-٢ أب تيسايقلا يريايعلا تعومجم فرعت لودجلا يف ةدراولا ضاوخلا يريايعلا تعومجم ا ٣ ىلع بجوتي تيلاو لجاهتا التشغيلية لاالتزما لا لإنتاج مياه ماطبقة وحسب سلاتلدختسا الواردة يف ذه المواصفة القياسية لأاردينة.

لودلجاـــ٣ مازتلالا بجاولا تيسايقلا يريامعلاو صاوخلا ييرلا ضارغلأ ةمئاقلا ةدعاسملا ةحلصتسملا ميلمللا

المعايير والخواص	الحدود القصوى المسموح بها حسب أوجه الاستخدام مغ/ل (باستثناء المشار إليها)			
	الخضر المطبوخة نتاوــتاهز والملاعب وجوانب الطرق داخل المدن	شلأالمجر المثمقر جووناب الطرق الخارجية والمسطحات الخضراء	المحاليص القحلقية والمحاليص الصناعية وشلأالمجر الخارجية	رود الطقف
	أ	ب	ج	
الأكسجين المستهلك حيوياً	٣٠	٢٠٠	٣٠٠	١٥
الأكسجين المستهلك كيماوياً	١٠٠	٥٠٠	٥٠٠	٥٠
الأكسجين الذائب	٢<	-	-	٢
المواد العالقة الكلية	٥٠	٢٠٠	٣٠٠	١٥
الأس الهيدروجيني	٦ إلى ٩ [أ]	٦ إلى ٩ [أ]	٦ إلى ٩ [أ]	٦ إلى ٩ [أ]
درجة العكورة	١٠ [ب]	–	-	٥ [ب]
النترات	٣٠	٤٥	٧٠	٤٥
النيتروجين الكلي	٤٥	٧٠	١٠٠	٧٠
الإيثيريثيا كولاي	١٠٠ [ج]	١٠٠٠ [ج]	-	١,١ [ج]
يبوض الديدان المعوية	١ [د]	١ [د]	١ [د]	١ [د]
الدهون والزيوت والشحوم	٨	٨	٨	٢

[أ] قدحو.

[ب] رتمومليفيذ.

قرمعتسم نيوكت قدحو وأ لاالمتحا رئكلأا ددعلا [ج]/١٠٠ مل.

[د] يوبضة لكل رتل.

٦-٢-٢-٣ أ ب تاداشرتسلاا ةعومجم فرعت لودلجا في ةدراو ةيلالتساً لمية ا ٤ ىلع بجوتي اهزوانج ةلاح في ليبلاو ةماعلا ةحصلا ىلع ماليلا لكلت يرثأت جيضوت لإ ةفدالها ةيملعلا تاساردلا ءارجإ ماليلا لكلتل ةمدختسلا ةهجلا وقلتحار الإجراءات العلمية لكلفيقلا بتجنب الإضرار بأي منهما.

لودجلا ٤ يرلا ضارغلأ تحلصتسلا مايلا لامعتسلا ةصالخا ةيداشرتسلا ميقلا

ا موعة ب	لارمز	لودجلا في ةدراولا(ج+ب+أ ٣) مغ/ل	رووط الطقف مغ/ل
لافنيول	Phenol	< ٠,٠٠٢	< ٠,٠٠٢
لمنظافت	MBAS	١٠٠	١٥
لمواد الصلبة الذائبة لكللية	TDS	١٥٠٠	١٥٠٠
لافوسفتا	P(as PO_4)	٣٠	٣٠
كلاولمرايد	Cl	٤٠٠	٤٠٠
كلابرتيتا	SO_4	٥٠٠	٥٠٠
لليبكربونتا	HCO_3	٤٠٠	٤٠٠
لاصوديوم	Na	٢٣٠	٢٣٠
لماغينسيوم	Mg	١٠٠	١٠٠
كلاالسيوم	Ca	٢٣٠	٢٣٠
سنبة دامصاص الصوديوم	SAR	٩,٠	٩,٠
لألمينوم	Al	٥,٠	٥,٠
للزرينخ	As	٠,١	٠,١
لابريليوم	Be	٠,١	٠,١
لنحاس	Cu	٠,٢	٠,٢
لافولمرايد	F	٢	٢
لحلديد	Fe	٥,٠	٥,٠
لليثيوم	Li	٢,٥(٠,٠٧٥ تايضمحلا)	٠,٠٧٥
لمانغينز	Mn	٠,٢	٠,٢
لمولبدنيوم	Mo	٠,٠١	٠,٠١
لاينكل	Ni	٠,٢	٠,٢
لراصص	Pb	٠,٢	٠,٢
لاسيلينيوم	Se	٠,٠٥	٠,٠٥
كلالادميوم	Cd	٠,٠١	٠,٠١
لخارصين	Zn	٥,٠	٥,٠

لودلجاــ٤ (ةمتت)

ا موعة ب	للرمز	لودلجا في ةدراولا(ج+ب+أ ٣) مغ/ل	رود الطقف مغ/ل
كلالروم لكللي	Cr	٠,١	٠,١
للزبئق	Hg	٠,٠٠٢	٠,٠٠٢
لللفناديوم	V	٠,١	٠,١
كلالوبالت	Co	٠,٠٥	٠,٠٥
لليورون	B	١,٠	١,٠
لليسيايند	CN	٠,١	٠,١

٦-٢-٢-٤)ةئيز (ةخوبطم يرغ لكؤتيلا راضلخا يير ةحلصتسلا ماليلا لامعتسابحمسي لا.

٦-٢-٢-٥ تاشاشرلابيرلا مدختسابحمسي لا، بيجتاشاشرلا مدختسا منعو فلوغلا بعلام يير علنثتسابنأ يتم الري ليلا وباستخدام الشراشتا المترحكة وغير المعرضة للاستخدام ارا.

٦-٢-٢-٦ نجل يبقيرلا فلقيإبيجراجشلأا يير تاياغلا ةحلصتسلا ماليلا لامعتسا منع ينعوبسأب لوصلا ي لماثرمة عم سلبتاعد الثمار السقاقط والملامقس للتربة.

٧- ةيعونلا ةبقارم

تتم رمقلبة النوعية كالتالي:

٧-١ نلا يحصلا فرصلا ماليم ةيقنت ةطخ عورشلا ةكلالما ةهجلا ىلعةحلصتسلا ماليلا ةيعون ةقباطم نم دكأتلا ةيلز لمواصتلاف المعتمدة وحسب سلالتعملا النهائي لها وعليها القيما بإجراء الحفصوتا المخبرية اللازمة عم ضروةر فتح سجلات رسمية لتوثيق التنائج المخبرية وإبرازاه للجهتا الراقيبة الحكومية عند طلبها.

٧-٢ قدلمو ينتعاس لكمعقاوبعمنجقبكرم تانيع ذخأ ةيليغشتلا ةهجلا لىوتة ٢٤ ني نضولما ةيرابركتلا قفو ةعاس لودلجا ٥ ةبسانم اهارتيتلا ةيفيكلابتانيع عجم ةيباقرلا تاهجلا لىوتة لمنيب.

٧-٣ لودلجا ني دراو وه ام بسح ةيليغشتلاو ةيباقرلا تاهجلا تانيعلا عجم ةيرابركتة نوكتة ٥.

لودجلا ٥ــ ةيئايميكلا ليلحتلا عاونأو ميقتلاو ةيعونلا ةبارتلا تايانغلا لهعم بجوتلا ةحلصتسلا مايلا تانيع ددع فلاويزيائية والبيولوجية التي تتطلب إجراؤها على تلك العلنيات

نمط المعالجة	مركتارة يمع العانيت		فترة التقييم
نوعها	الجهة التشغيلية	لجاهة الرئابية	
الميكانيكية	ةينيتورلا تاصوحفلا: ٨)ةبكرم ةنيع(ًايرهش تانيع ةيئايميكلاو ةيئايزيفلا صلاولخا: ٣)ةيدرف(اًيموي تانيع ةيوعلا نلديدلا ضويب : ٤)ةبكرم ةنيع(ًايرهش تانيع يلاوكلا ميشيبرشيلإا: ٨)ةيدرف(اًيرهش تانيع	فلالحوصتا الروتينية: عنيتان شهرياً لخاصلو الفيزيائية والكيميائية: عينتان هشرياً يبوض الديدان المعوية: عينتان شهرياً الإيشيريشيا كلاوي: عينتان شهرياً	٣ أروهش)
الطبيعية	ةينيتورلا تاصوحفلا: ٤)ةبكرم ةنيع(ًايرهش تانيع ةيئايميكلاو ةيئايزيفلا صلاولخا: ٣)ةيدرف(اًيموي تانيع يبوض الديدان المعوية: عيتنان شهرياً (عيقة مركبة) يلاوكلا ميشيبرشيلإا: ٤)ةيدرف(ًايرهش تانيع	فلالحوصتا الروتينية: عينة شهرياً لخاصلو الفيزيائية والكيميائية: عيقة هشرياً يبوض الديدان المعوية: عينة شهرياً الإيشيريشيا كلاوي: عيقة شهرياً	٦ بروهش)
المتجمعات السكانية الصغيرة	ةينيتورلا تاصوحفلا: ٤)ةبكرم ةنيع(ًايرهش تانيع ةيئايميكلاو ةيئايزيفلا صلاولخا: ٣)ةيدرف(اًيموي تانيع يبوض الديدان المعوية: عيتنان شهرياً (عيقة مركبة) يلاوكلا ميشيبرشيلإا: ٤)ةيدرف(ًايرهش تانيع	فلالحوصتا الروتينية: عينة شهرياً لخاصلو الفيزيائية والكيميائية: عيقة الديدان المعوية: عينة شهرياً هشرياً الإيشيريشيا كلاوي: عيقة شهرياً يبوض	٦ بروهش)

)طابش –لوأ نونا(لوصفلا بسح أ)، (رايأ –راذآ)، (بآ–نارزح)، (ًالذ نيرشت–لولياً).

عاتش واًفيص ج) (لوأ نيرشت–رايأ ةيلدب نم اًفيص، عاتشً: نلسين–ًالذ نيرشت ةيلدب نم).

ملاحظة: وحفلالصات ةينيتورلا:NO3, BOD5, COD, TSS, NH4, T-N صلاوخلالو ةيئايزيفلا ةيئايميكلاو : pH, DO, RCl_2, Turbidity, Temperature

٧–٤ مداعلا مايلاو مايلا صحفل ةيسايقلا قرطلا بلاتك في دراو وه ام بسح لهليلتو لهلقنو لهظفحو تانيعلا ذخأ ةيتهط ةيأو ةتلايدعتو لهثولتلا ةباقرو مايلا ثاباولأ ةيكيرمألأا ةيلارديفلا ةيعمجلاو ةمادلا ةحصلل ةيكيرمألأا ةيعمجلا نع ردانصلالقر تحليل متعددة أخرى إذا لم تتوفر في المرجع المشار إليه.

٧-٥ يعيطلا ةيقنتلا تاطلسلو لقصلا لكرب ىلع يوتحت يلا ةيكينالكيلا ةيقنتلا تاطلسلا ةبسنلابب ةحتاملا مهتسبلا لأاكسجين المستلهك حيوياً بعد إجراء عملية الفلترة.

٧-٦ مهيقت دنع يلاوكلايشيبرشيلإا وأ ةرارحلا ةمولقلا نولوقلا تايصع جئاتن بالاستحلا يسدنطلا لدعلا مدختسي ونعية المياه المستصلحة.

٧-٧ يلكلا ينجورتينلا نم ةحلصتسلا ةمدلعلا ماليلا ىوتحي مهيقت مهتي، تانيعلا دعب لقي لا ثيحو لدعلا بالاستحابة لماشمولا في حسابه عن خمس عنيتا.

٧-٨ رفوت مدع دنع يلاوكلايشيبرشيلإا صحف جئاتن نعلايدب ةرارحلا ةمولقلا نولوقلا تايصع صحف جئاتن برتعت الإمكاينتا الفينة اللازمة للحفص.

٧-٩ ةسسؤم لإ عوجرلا مهتي ةيندرلأا ةيسايقلا ةفصاولما مذه في ةدراو يرغ قدجتسم يريامع ديدحت لإ ةجالحا ةلاح في لماواصتلاف والماقييس لاتخاذ الإجراء اللازم.

١٠-٧ ضرملا ةيوعلا ميثارلجا نع يربحتلاب مايقلا ةيليغشتلاو ةيباقرلا تاهلجا ىلع ةيئابولا تلالحا ةيكملا ةحن وتاجلاه في المياه.

٨- مهيقتلا ةيلآ

لأاوجه المنيبة في نذهه المواصفة القياسية لأاردينة تعتمد غلأاراض نذهه المواصفة القياسية لأاردينة تبتع آلية التقييم التالية:

٨-١ بسح ةمدختسلاو ةحلصتسلا ماليلا ةيعون مهيقت تايلغا
لودلجا في نضولما ةينمزلا تارتفلا ٥.

٨-٢ مهتي ةيئالما تاحطسلا وأ لويسلا وأ ةيدولأا ةحلصتسلا ماليلا حرطب ةصالخا يريامعلا نم يأ في زيابج روهظ دنع خأذ ةحلصتسلا ماليلا نم ةيفاضإ ةيديكأت ةنيع، فإذا نيبت النتائج المخبرية وجود تجاوز في العتنيين يتم شإلمعر الجقه

لمعينة بضروةر صتويب الوضع بالسرعة الممكنة موتابعة الإجراءتا المتنخة عولى الجقه المعينة بيان الإجراءتا لتصويبية.

٨-٣ ةيديكأت ةنيع ذخأ مهتي لمعتسلا ةداعإ تايلغا ةحلصتسلا ماليلا في ةصالخا يريامعلا نم يأ في زيابج روهظ دنع حيفي لماليلا نم ةيفاضإ صحت ةحلصتسلا، هجلا رامعشإ مهتي ينتنيعلا في زيابج دوجو ةيبرخلا جئاتنلا تنيبو اذإفينعلا ةحتسلا ماليلا لمعتسلا فلقيإ مهتي رهشأ ةثلاث زواجتة قدلو زواجتلا رمتسا اذإو عضولا بيوصتةحلصم سلاالتدخما الذي تم تجاوز الملعيير الخقصو به لحين ستقرار نوعية المياه.

المصطلحات

في الأغراض هذه المواصفة تحمل المصطلحات العربية المذكورة أدناه المعنى للمصطلحات الإنجليزية المقابلة لها.

رقم البند	المصطلح العربي	المقابل الإنجليزي
٣-١	الأكسجين المستهلك حيوياً	biological oxygen demand (Five Day)
٣-١	الأكسجين المستهلك كيميائياً	chemical oxygen demand
٥-٣	عينة مجمعة	composite sample
٣-١	الأكسجين الذائب	dissolved oxygen
٧-٦	صفيات القولون المقاومة للحرارة	thermotolerant coliforms
٣-١	مرشح	filter
٣-١	الإشيريشيا كولاي	escherichia coli
٥-٣	عينات منفردة	grab sample
٣-١	بيوض الديدان المعوية	intestinal helminthes eggs
٣-١	المواد العالقة الكلية	total suspended solids
٣-١	المواد الصلبة الذائبة الكلية	total dissolved solids
٣-١	النيتروجين الكلي	total nitrogen
٣-١	وحدة تكوين المستعمرات	colony forming unit
٣-١	العدد الأكثر احتمالاً	most probable number

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ANNEX (5): STAKEHOLDERS & COMMUNITY CONSULTATION SESSIONS REPORTS

ANNEX (6): OFFICIAL STAKEHOLDERS, AGENCIES AND DONORS CONSULTATIONS REPORT