



WATER SECTOR



Green Growth National Action Plan 2021-2025



Ministry of Water and Irrigation



Ministry of Environment



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His Majesty King Abdullah II Ibn Al Hussein

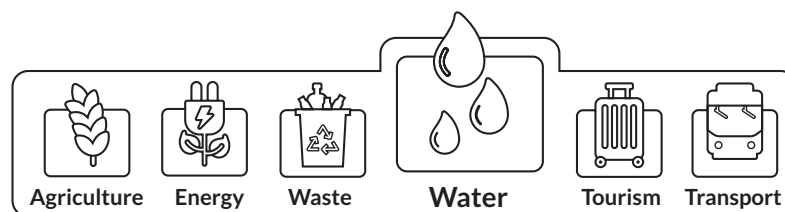
Economic leadership is by definition forward-looking. And forward-looking engagement will send a powerful message, a message of hope for my people and for yours.



WATER SECTOR



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Ministry of Water and Irrigation



Ministry of Environment



Foreword by the Minister of Environment

The Ministry of Environment has been taking solid action to support Jordan's green growth transformation. In 2017, the Cabinet approved the National Green Growth Plan, which established green growth as a top national priority. Jordan's green growth vision – economic growth which is environmentally sustainable and socially inclusive – puts a strong emphasis on the importance of building resilience. This is needed for our economy to be able to absorb external shocks such as the negative consequences of COVID-19, and the ability to restore itself and continue growing.

In this context, I am proud to present the next step in implementing this vision, the Green Growth National Action Plan 2021-2025. The development of this plan lies at the heart of our continuous efforts and ambitions to support environmental and climate action in Jordan, while also achieving our sustainable economic growth objectives.

During the process of developing this plan, the Ministry of Environment has taken impressive efforts to strengthen its partnerships with the government institutions responsible for governing the six green economy sectors identified in the Jordan Vision 2025. These include: Agriculture, Energy, Waste, Water, Tourism and Transport. Through a deeply collaborative approach, we were able to identify 86 priority enabling policy actions and projects that can trigger green growth. Many of these actions are ready for the support of donors, partners, and private sector investors.

Our world is facing the most challenging economic circumstances in a century as we work to contain the COVID-19 pandemic and adapt to a new normal way of life. As for our Kingdom, I am proud to say that the government acted decisively to stop the spread of the virus, implementing measures that saved potentially thousands of lives. However, response has come at a cost, with our economy and the economic security of our citizens once again at risk.

While infrastructure investments and donor support will be critical to stabilize this risk, private sector investment in the green growth vision is equally important. In many ways, the world is already moving toward a greener future. The spread of renewable energy, electric transportation, technology that saves water and energy resources, and innovations that promote the circular economy are taking off globally. The task for Jordan is harnessing these green developments into growth and employment-creation opportunities.

I would like to express my gratitude to the Global Green Growth Institute for their partnership and technical support in the process of developing Jordan's green growth agenda. The Ministry of Environment is committed to supporting green growth implementation in the 2021-2025 period, and beyond.



Dr. Saleh Al-Kharabsheh
Minister of Environment

Acknowledgements

The Green Growth National Action Plan 2021-2025 (GG-NAP) was developed by the Ministry of Environment with the support of the Global Green Growth Institute (GGGI), under the leadership of H.E. Dr. Saleh Al Kharabsheh, Minister of Environment and benefited significantly from the effective directions of H.E. Eng. Ahmad Al Qatarnah, the Secretary General of the Ministry of Environment. Tremendous support was provided by the Technical Advisor to the Minister and Director of the Green Economy Unit, Dr. Jihad Alsawair.

Special acknowledgment goes to the sector focal points at the six key line ministries for their extensive input and coordination support throughout the development process. Appreciation also goes to the GGGI for their technical assistance throughout the project and their continued commitment to support Jordan's transition to a green economy.

The GG-NAP required a vast amount of expertise, research, consultation, and effort to complete. The finalization of the document would not have been possible without the dedication of all the individuals and organizations who worked together throughout the development process. We would like to express our deepest appreciation to those who have worked on shaping and guiding this action plan over the past two years.

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Lastly, special thanks to the hundreds of individuals who participated in meetings, workshops, reviews, etc. for providing valuable information and feedback during the drafting process. This contribution in the interest of supporting the Government of Jordan and its green growth ambitions is sincerely appreciated.

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List of Abbreviations

ADC	Aqaba Development Corporation	MoAg	Ministry of Agriculture
BOT	Build Operate Transfer	MoEnv	Ministry of Environment
CO₂	Carbon dioxide	MoF	Ministry of Finance
CBO	Community based organization	MOLA	Ministry of Local Administration
CIP	Clean-in-place	MOPIC	Ministry of Planning and International Cooperation
DOS	Department of Statistics	MtCO₂e	Million metric tons of CO ₂ e emissions
DPs	Displaced peoples	MWI	Ministry of Water and Irrigation
EBRD	European Bank for Reconstruction and Development	NARC	National Agriculture Research Center
EbA	Ecobased	NDC	Nationally Determined Contribution
EE	Energy efficiency	NGO	Non-Governmental Organization
EU	European Union	NRW	Non-revenue water
FSM	Fecal sludge management	NWS	National Water Strategy 2016-2025
GAM	Greater Amman Municipality	O&M	Operation and maintenance
GCF	Green Climate Fund	PPP	Public-private partnerships
GDP	Gross Domestic Product	RE	Renewable energy
GG-NAP	Green Growth National Action Plan	RECP	Resource Efficient and Cleaner Production
GGGI	Global Green Growth Institute	RO	Reverse osmosis
GHG	Greenhouse gas	RSS	Royal Scientific Society
GIS	Geographic Information System	RWH	Rainwater harvesting
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit	SDC	Swiss Agency for Development and Cooperation
GoJ	Government of Jordan	SDGs	Sustainable Development Goals
ISSRAR	Sanitation Solutions for Underserved Communities in Jordan	SMEs	Small and medium-sized enterprises
IUCN	International Union for Conservation of Nature	TBD	To be determined
ROWA	Regional Office for West Asia	tCO₂e	Metric tons of CO ₂ e emissions
JICA	Japan International Cooperation Agency	TEST	Transfer of Environmentally Sound Technology
JVA	Jordan Valley Authority	UNICEF	United Nations Children's Fund
JWP	Joint Work Programme	UPMU	Utility Performance Monitoring Unit
LID	Low Impact Development	WAJ	Water Authority of Jordan
M&E	Monitoring and evaluation	WASH	Water, Sanitation and Hygiene
MCM	Million cubic meters	WWT	Wastewater treatment
MENA	Middle East and North Africa	WWTP	Wastewater treatment plant
MITS	Ministry of Industry and Trade and Supply	ZCI	Zarqa Chamber of Industry

About the Green Growth National Action Plan 2021-2025

Jordan's primary national development strategy *Jordan Vision 2025* has set high ambitions for the country's socioeconomic development in the 2015-2025 period. With this strategy, Jordan hopes to achieve an economic growth rate of 7.5% in 2025, while striving to bring the poverty and unemployment rates as low as 8% and 9.17%¹, respectively. To achieve this vision, the government has defined a set of priorities and actions based on strong private sector development and resilience to external economic shocks. While the environment and climate change are not central features in the *Jordan Vision 2025*, several environmental priorities are addressed, including climate change adaptation, water and energy efficiency, waste management and natural resource protection. Importantly, the document calls for the development of the green economy in six targeted sectors: Energy, Transport, Water, Waste, Agriculture and Tourism.²

Throughout 2018 and 2019, Jordan's economy experienced a steady but low growth, with real GDP at just under 2.0%. Substantial efforts have been taken to address the central government's debt, which reached 99.1% in 2019, including through introducing fiscal reforms such as the passage of the 2019 Income Tax Law.³ However, in early 2020, Jordan, like the rest of the world, was shaken by the global COVID-19 pandemic. The implementation of public health measures to limit the spread of the virus brought the economy to a standstill, leaving many Jordanians worse-off.⁴ This new economic situation poses a significant risk to Jordan in the short term. With an unemployment rate of 19%⁵ at the end of 2019 and a slowdown of business-as-usual economic activity, families and small business will struggle

to make ends meet.⁶ High public debt and a likely reduction in foreign investment and tourism sector revenues will further test the long-term resilience of the economy. The economy is now estimated to shrink by about 3.5%, unemployment is expected to exceed 20%, and pressures on natural resources (particularly water) and vulnerable communities to intensify.⁷

This unprecedented set of circumstances is a serious challenge in the short term, but it presents an opportunity for the Government of Jordan to refocus its efforts on designing an economic growth approach that will foster long-term resilience. Green growth is one strategic approach that can support this effort. The Ministry of Environment began developing the Green Growth National Action Plan 2021-2025 in late 2018 as a next step toward implementation of the recommendations in the National Green Growth Plan, under the request of the Cabinet of Ministers. The GG-NAP outlines sector-level green growth frameworks and actions for the Agriculture, Energy, Tourism, Transport, Waste and Water sectors to support implementation of Jordan's green growth vision and strengthen future ability to recover and contain shocks from catastrophic events such as COVID 19.

The Green Growth National Action Plan 2021-2025 lays out pathways for sustainable development that will increase resilience, strengthening Jordan's capacity to contain shocks and recover from catastrophic events such as COVID-19.

¹ GoJ. "Jordan 2025: A National Vision and Strategy," 2015.

² GoJ. "Jordan 2025: A National Vision and Strategy," 2015.

³ The World Bank. "Jordan's Economic Update – April 2020," 2020.

⁴ Reuters. "Many Jordanians struggling as country emerges from COVID-19 lockdown, U.N. agency says," 2020.

⁵ Department of Statistics, 2019.

⁶ UNDP. "Impact of COVID-19 on Households in Jordan," 2020.

⁷ The World Bank. "Jordan's Economic Update – April 2020," 2020.

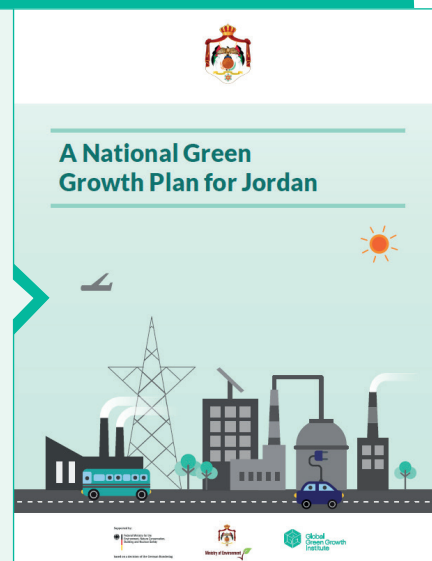
Green growth, defined as “**Economic Growth that is environmentally sustainable and socially inclusive**”,⁸ is a multi-sector development approach that is aligned with both the 2030 Sustainable Development Agenda and Jordan’s Nationally Determined Contributions (NDC) under the Paris climate change agreement of 2015. In 2017, as a first step towards achieving green growth in Jordan, the Cabinet of Ministers

approved the report “A National Green Growth Plan for Jordan” (NGGP). Having received a special mention by the League of Arab States for being a best practice example to be replicated in the region, the NGGP assesses Jordan’s green growth potential and creates a roadmap to achieve a green economy transition in Jordan through strategic direction and recommendations (Box 1).

BOX 1 About the National Green Growth Plan for Jordan

The NGGP charts out a plan for Jordan to achieve an expanding yet sustainable and resilient economy that ensures the creation of green jobs for its citizens and increased investment in green projects. The NGGP uses a cost-benefit analysis approach to identify the challenges and opportunities for project implementation and focuses on tackling these barriers in the six green growth sectors: Agriculture, Energy, Tourism, Transport, Waste and Water. **Four driving principles of green growth are identified and mainstreamed across the actions in the Green Growth National Action Plan 2021-2025:**

- Transparent governance processes and enforcement of legislation
- Mechanisms to incentivize green growth
- Integrated planning processes that value societal impacts
- Behavior shifts and capacity building



To achieve the strategic vision laid out in the NGGP, the Ministry of Environment (MoEnv) worked in partnership with key national stakeholders to develop the **Green Growth National Action Plan 2021–2025** (GG-NAP). The GG-NAP is presented through a series of six national action plans that serve as sector-level green growth agendas. Each GG-NAP provides implementable actions to achieve the five national green growth objectives and embody the four driving

principles of green growth implementation (see Box 2). Detailed descriptions of priority policy and investment actions are included in the sector action plans, which will serve as the core of Jordan’s green growth, climate change and sustainable development agendas in the 2021 to 2025 period. Some of these are already under consideration by donors and investors. Many are included in Jordan’s NDC Action Plan and are climate finance opportunities.

⁸ Global Green Growth Institute. “GGGI’s Strategy 2030.” 2019.

BOX 2

Why the Green Growth National Action Plan 2021-2025?

The next step towards implementing the recommendations of the National Green Growth Plan for Jordan, the Action Plan for Agriculture, Energy, Tourism, Transport, Water, and Waste sectors:

1 **Elaborates and mainstreams green growth, climate change and sustainable development objectives into sectoral strategic frameworks.** This will encourage formulation of greener projects, and the implementation of policies that will strengthen the enabling environment for greener investment and private sector development. These priorities are aligned with the SDGs and the NDC Action Plan⁹ as well as national sector-level priorities, which will further prepare the government to mainstream sustainable development into the post-*Jordan Vision 2025* national development plan.

2 **Strengthens cross-sector collaboration.** Multi-stakeholder coordination and collaboration is central to designing and implementing green growth actions, as it can maximize co-benefits. The overall development process and the actions in each sectoral plan were intentionally designed to enhance such collaboration. Such activities lead to increased awareness and behavior change among decision makers, which can further strengthen the enabling environment for future investment in green growth.

3 **Emphasizes the importance of improving the enabling environment for green growth.** During the initial phase of green growth implementation in Jordan, substantial focus on the enabling environment is needed. Each action description identifies the enabling actions (such as supporting technical assistance programs) required for the responsible institution to be more successful in securing investment for implementation – either from public budget, private sector investors or donors.

The development of the action plan was undertaken through a highly collaborative approach between the Ministry of Environment and the line ministries responsible for guiding each sector. Sector-level green growth focal points were established and ministerial leadership was engaged through the Higher Steering Committee for Green Economy to secure endorsement. This experience demonstrated the important and growing role the Ministry of Environment plays in facilitating action across different issue areas. The network of green growth and climate action advocates developed in recent years is a powerful tool for implementing green growth in Jordan.

The GG-NAPs were developed with technical support from the Global Green Growth Institute (GGGI), who worked with the Ministry of Environment to conduct wide-ranging stakeholder consultations in 2018 and 2019. The strategic objectives, sector sub-objectives and actions were identified and formulated through an iterative process linked as closely as possible to existing sectoral priorities. Non-government stakeholders and experts were also consulted to ensure alignment with broader sectoral priorities, and to bridge local context and international best practice.

⁹ Clima-Med EU. "[Jordan approves NDC Action Plan to achieve the implementation of its commitments to the Paris Agreement.](#)" 2019.

Figure 1 shows a summary of the green growth planning and implementation in Jordan.



FIGURE 1
 Green Growth Planning and Implementation in Jordan

Executive Summary

The **Water Sector Green Growth Action National Action Plan 2021-2025 (GG-NAP)** outlines a green growth framework and actions for the sector aligned with the National Green Growth Plan (NGGP), Jordan Vision 2025, and Nationally Determined Contributions (NDCs) under the Paris agreement.

At the heart of the green growth approach lies the leveraging of the sector's resilience through economic growth that is environmentally sustainable and socially inclusive. The GG-NAP outlines five national green growth objectives on which the *Agriculture Sector GG-NAP* was developed:

1. Enhance Natural Capital
2. Sustainable Economic Growth
3. Social Development and Poverty Reduction
4. Resource Efficiency
5. Climate Change Adaptation and Mitigation

From these five national objectives, the *Water Sector GG-NAP* identifies 16 sector sub-objectives that serve to mainstream the overarching green growth objectives into water sector policies and investments.

Extreme water scarcity is one of Jordan's greatest sustainability challenges, threatening its economic growth potential, environmental sustainability, and social development. Jordan is one of the most water scarce countries in the world¹⁰, as a result of naturally low occurring water resources, recurring droughts, overconsumption of water, and inefficiencies in distribution. Climate change is exacerbating this situation, linked to a decrease of 20% in annual precipitation over the last few decades and severe water shortages. Water pollution, limited surface water supplies, and over abstraction have all taken a toll on ecosystem services.¹¹

The current *National Water Strategy 2016-2025*¹² and the *Water Sector Capital Investment Plan*¹³ have set the pace for national efforts to manage water and recognize the need for critical reforms and a shift towards more sustainable water planning, allocation, and demand management. The green growth approach promotes testing and innovation, market-based or decentralized approaches to create opportunities from these challenges – including green jobs, improved sector financial sustainability, and resilience to climate

change, as well as long-term economic growth. The water sector's performance is closely linked to that of other sectors. For example, addressing inefficiencies in water pumping can reduce energy consumption at pumping stations. Implementation of water efficiency technologies on farms and installation of water harvesting at large scale can reduce the pressure on water networks.

The *Water Sector GG-NAP* has been developed with these aims in mind, and would lead to the following transformational impacts:

- Addressing key challenges related to both management on the supply and on the demand side, through implementation of infrastructure and building community stewardship of resources;
- Introducing incentives and financing mechanisms to reduce the overall cost burden of water resource management on public resources;
- Increasing access to water and sanitation for vulnerable members of society, including school children and displaced persons;
- Increasing the capacity of public sector decision makers to use incentive structures, data, and policy innovations in water sector management.

The Ministry of Environment (MoEnv) and the Ministry of Water and Irrigation (MWI) worked in partnership with the support of national stakeholders and the Global Green Growth Institute (GGGI) in order to identify 19 priority actions aimed at accelerating green growth through the water sector (Table 1). The implementation of these actions is estimated to cost USD 964,290,000, which will require a mix of public, private sector and donor support for implementation. The actions include:

- **13 investment preparation and demonstration actions.** These projects are at various levels of readiness: some require feasibility analysis, while others are investment-ready. Many are suitable candidates for public-private partnerships or direct private sector investment, and others are opportunities to leverage climate finance.

¹⁰ MWI. "Water Reallocation Policy 2016," 2017.

¹¹ IWMI. "Groundwater Governance in Jordan: The case of Azraq Basin," 2017.

¹² MWI. "National Water Strategy 2016-2025," 2016.

¹³ MWI. "Water Sector Capital Investment Plan 2016-2025," 2016.

▪ **6 enabling policy and institutional reform actions.** Given the current gaps in available fiscal resources, these actions intend to attract investment by addressing policy barriers and capacity gaps that lead to higher costs, risk levels or uncertainty in decision making. These include programs to support innovation, institutional reform and coordination.

9 out of 19 of these actions contribute to the objective of Climate Change Adaptation and Mitigation, which are considered to be “Climate Action Priorities”. In addition, some of them can also be found in Jordan’s NDC Action Plan and forthcoming Green Climate Fund Country Programme.

TABLE 1
Summary of Jordan’s Water Sector Green Growth Action Plan 2021-2025

#	Action Title	Total Estimated Implementation Cost (USD)	Relevant Green Growth Objectives				
			Enhanced Natural Capital	Sustainable Economic Growth	Social Development and Poverty Reduction	Resource Efficiency	Climate change Mitigation and Adaptation
WR01	Implement capacity building program for evidence-informed investment decision making in the water sector	760,000		x			x
WR02	Establish a rainwater harvesting project financing facility to support projects that argument rural and urban water supply	15,000,000	x		x		x
WR03	Implement Key Wastewater Treatment Projects to improve Water Supply Augmentation	69,400,000		x			
WR04	Establish incentives for pollution prevention with industry in the Zarga River Basin	950,000	x				
WR05	Construct dams and implement a parallel community water resource stewardship program for several communities in the Jordan Valley	66,900,000		x		x	x
WR06	Technical Assistance to support water efficiency in businesses, industries and commercial activities (Based on SwitchMed Experience)	4,140,000		x		x	x
WR07	Implement Water Supply Improvement Project for Balqaa Governorate	2,300,000		x	x	x	x
WR08	Improve irrigation efficiency in the Jordan Valley (Mid-Ghors)	28,500,000		x		x	x
WR09	Increasing willingness of end user stakeholder to accept wastewater reuse in Jordan	1,000,000		x	x		
WR10	Construct an industrial wastewater treatment plant in Zarqa	27,700,000	x	x	x		x
WR11	Enhance the Energy Efficiency in the well fields and Pumping Stations	71,000,000		x		x	x
WR12	Increase the resilience of displaced persons and host communities to climate change-related water and climate change challenges	7,000,000		x	x		x
WR13	Programming to increase the availability of WASH in Schools and strengthening WinS standards for climate change impacts	1,500,000	x		x	x	

WR14	Improve implementation of decentralized water supply and sanitation solutions in Al-Azraq	5,640,000	x		x		
WR15	Implement a program of Performance-based Contracts to Achieve Non-revenue Water (NRW) Reduction	66,000,000		x	x	x	x
WR16	Reduce water losses and increase water savings in King Abdullah Canal	500,000	x	x		x	x
WR17	Expand the As Samra Wastewater Treatment Plant (Phase III)	325,000,000	x				
WR18	Undertake feasibility studies to explore storm water systems and groundwater filtration	15,000,000	x				x
WR19	Undertake Desalination of Seawater at the Gulf of Aqaba through Renewable Energy Sources	255,000,000			x	x	x



1. A Green Growth Framework for the Water Sector

Green growth is a new strategic approach for the Government of Jordan (GoJ) that integrates principles of inclusive, sustainable economic growth into the existing national context and priorities. Implementing this green growth approach will allow Jordan to achieve its socioeconomic development targets while simultaneously addressing environmental risks and climate change – all of which are critical to achieving the Sustainable Development Goals (SDGs), as shown in Figure 2 below. At the outset of the green growth planning process, visioning exercises and consultations were held with national stakeholders through which **five national green growth objectives** were established.¹⁴ These objectives reflect Jordan’s

unique institutional setup, political and economic realities, and long-term growth ambitions. National-level plans and strategies were reviewed and used as inputs to guide and shape the objectives, which were later developed into sector-level sub-objectives (see Chapter 3). The **Water Sector Green Growth National Action plan (GG-NAP) 2021-2025** was developed as a partnership between the MoEnv and the MWI, with green growth focal points established within the latter, and technical support from the Water Authority of Jordan (WAJ) and Jordan Valley Authority (JVA) in order to ensure consistent feedback from the technical and management levels. Figure 3 shows the process for developing the water sector GG-NAP.



FIGURE 2
 Relationship between the Five National Green Growth Objectives and SDGs

¹⁴ This process reflected and built on the 5 green growth outcomes proposed in the National Green Growth Plan.

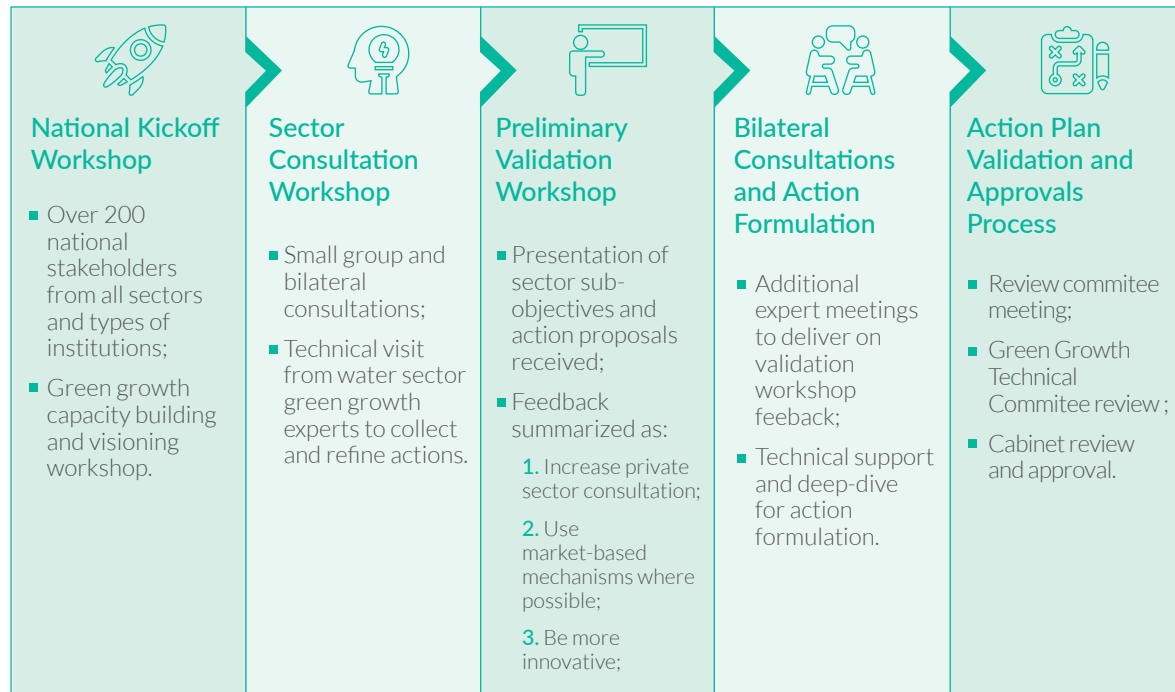


FIGURE 3
Process for Developing the Water Sector GG-NAP

The water sector is governed under the policy agenda laid out in the National Water Strategy 2016-2025 (NWS), which covers issues of water supply, water governance, and the economic, environmental, and social context in which water is used. This includes the public management of water resources, the private sector

(commercial, industrial, and agricultural), as well as municipal and domestic consumption of water resources. The following sections describe the relationship between each of Jordan’s national green growth objectives and the water sector in a general sense, while a situation analysis for the Jordan context is available in Chapter 2.

1.1 Enhanced Natural Capital

Jordan’s first national green growth objective is to enhance the country’s natural capital. For that purpose, it aims to improve the quality and quantity of natural resources used to generate economic growth and provide ecosystem services that support economic activities.

There are two main sources of water to support economic growth and ecosystem services: surface water and groundwater. Across the globe, both surface water and groundwater are fast becoming a scarce resource, despite its high value to economic activities as a growth enabler. From a quality standpoint, the water resource base is degraded due to pollution and over-abstraction. Unregulated industries that dump waste, agricultural run-off, and mismanaged solid waste leachate further deteriorate local water quality. In areas with declining water supply, pollution creates a vicious cycle (as sufficient flows can replenish the water quality), and this can be costly (if not impossible) to remediate, especially in the case of groundwater. While there is broad recognition of the importance of water as an enabler of economic activity, its contribution to sustaining ecosystem services is often

ignored. Green growth seeks to leverage opportunities for economic development and poverty alleviation without degrading a country’s natural capital, in this case, working to enhance both the quantity and quality of water. National policy making (strategies, plans, laws, regulations, etc.) and investment planning processes can be improved by assessing the tradeoffs associated with natural resource use, and ensure that the water’s economic value is accounted for, and any loss of environmental resources is costed and/or mitigated against in implementation.

Sustainable Development Goals: 6 (Clean Water and Sanitation), 14 (Life below Water), 15 (Life on Land).

1.2 Sustainable Economic Growth

Jordan's second national green growth objective is to ensure sustainable economic growth. In particular, the aim is to improve the enabling environment for the creation of long-term, inclusive socioeconomic development, as detailed in the Jordan Vision 2025.

The cross-cutting nature of a wide range of water issues places it at the center of the paradigm for green growth. Water is an engine for growth and sustainability, and it plays a critical role in enabling green growth. Because water is a key input for many sectors, the sector's financial sustainability promotes national economic growth and long-term economic sustainability. For example, successful investment in water infrastructure and water security ensures that households, businesses, industry, and farms have the adequate access they need to be productive, healthy citizens. Water is also a driver of employment: UN-

Water has estimated that 78% of jobs constituting the global workforce are dependent on water. In the Arab region, water scarcity remains a structural challenge that hinders sustainable development. Here, water scarcity can have a domino effect on communities, leading to declines in local commerce, reduced income, reduced tax revenues, and increased migration due to a lack of employment opportunities, which can cause overcrowding of major cities. Poor water quality can also set back economic growth as it constrains health and productivity, reduces the ability of establishing economic activities, reduces the value of property and assets, and increases water treatment costs.

Sustainable Development Goals: 8 (Good Jobs and Economic Growth), 9 (Industry, Innovation and Infrastructure), 16 (Peace, Justice and Strong Institutions).

1.3 Social Development and Poverty Reduction

Jordan's third national green growth objective is to achieve social development and poverty reduction. To this end, it aims to increase the equity by distributing the benefits of economic development and access to services across the society.

Social development and poverty reduction are central concepts to Jordan's long-term development agenda and are a core component of inclusive green growth. Achieving this objective requires special attention to reducing inequalities in society, unlocking access to opportunity to experience the benefits of growth for all members of society. Gender equality and women's empowerment are policy agendas that help support social development and poverty reduction, and they are a critical part of overall economic growth. A 2015 McKinsey study found that women generate only 37% of global Gross Domestic Product (GDP), but that closing this gap could add between USD 12 and 28 trillion to the global economy¹⁵. In the Middle East and North Africa (MENA) region, women generate only 18% of GDP, suggesting greater inclusion is a major economic growth opportunity. Furthermore, access for marginalized groups and those excluded from markets, services and spaces are required for sustainable growth. Accordingly, green growth

recognizes women and men with a sense of equity, and the poor and marginalized as not simply vulnerable, but as active agents of change for more sustainable growth. Access to water is essential for health, education, gender equality, and personal security, and is a necessary enabler of social development and poverty reduction. Inadequate access to water supply traps households and communities in a state of vulnerability and poverty. Lack of access to safe, and indeed to significant quantities of water in sufficient quality for productive uses contributes to poverty and has clear impacts on poor people's livelihoods, health, and vulnerability to crises of all sorts. Providing equal access to drinking water for the general public, especially the poor and marginalized, is a means to improve human health, livelihoods, gender equality, and economic development. Neglecting water can have potentially catastrophic impacts on economies and livelihoods, and could reverse hard-won gains in poverty reduction, job creation, and development.

Given the existing context of social inequities, water scarcity and climate change are likely to have more disproportionate impacts on women, children, refugees and displaced communities. These groups will suffer the

¹⁵ McKinsey Global Institute. "How advancing women's equality can add \$12 trillion to global growth" 2015.

most from the shortage of water, difficulty of securing clean water as well as the sanitation for households and farms, which consequently will affect negatively the society in these areas and their way of life. Increasing water scarcity will render marginalized groups, refugees and women as extremely vulnerable. Green growth aims to address social and gender dimensions through focusing on climate resilience and building capacity among vulnerable groups to allow them to adapt better to climate change and water scarcity.

Sustainable Development Goals: 1 (No Poverty), 4 (Quality Education) 5 (Gender Equality), 10 (Reduced Inequalities).

1.4 Resource Efficiency

Jordan's fourth national green growth objective is to achieve resource efficiency. This can be defined as improving the efficiency – reducing the wastefulness – of the economy by achieving a higher efficiency in the production and consumption of economic outputs.

Traditionally, economic growth has been characterized by an initially high rate of natural resource consumption per capita, followed by a period of declining natural resource consumption past a certain rate of economic growth. However, with extreme population growth and the looming threat of global climate change, the global community has recognized the need to shift the economic growth trend towards more sustainable consumption and production – greater shared prosperity with less waste. To achieve resource efficiency and natural resource decoupling substantial shifts in technology, policies and behaviors are necessary. Reshaping traditional processes of natural resource consumption and realigning incentives is critical. This will require visionary leadership in government and business, and well-coordinated efforts across all segments of society.

Jordan is a resource scarce country, with very low availability of water resources, few energy resources (petroleum oil or natural gas) and a relatively small percent of arable land and soil compared to the total land mass. At the same time, growing population and urbanization are placing pressures on resource use and generating high volumes of waste, which is expensive and increasingly difficult to manage. Governments can leverage these pressures into opportunities by increasing resource use efficiency at all points across

water resource provision and use - from extraction, to transport, consumption, disposal, treatment, and retransmission for reuse. By doing so, government and private sector investors can achieve cost savings, economic efficiency, and long-term sustainability.

Improving water efficiency allows countries to reduce water scarcity and maximize the benefits provided by existing water infrastructure. It also frees up water for other uses, such as additional commercial or business activities, drinking water for communities or providing ecosystem services, reducing environmental degradation. Without efficiency gains, global demand for water will outstrip currently accessible supplies by 40% by 2030¹⁶. Improving water efficiency means increasing water productivity by reducing the intensity of water use and level of pollution from socioeconomic activities. In principle, this can be achieved by maximizing the value of water, improving the allocation of water among competing water uses so as to obtain greater socioeconomic value per drop of water, ensuring environmental flows, and improving technical efficiency of water services and the management efficiency of their provision over the complete life cycle. In practice, water efficiency can be improved using many approaches, including investing in better physical infrastructure and technology, fostering changes in user behavior, and developing integrated approaches to water management.

Sustainable Development Goals: 7 (Affordable and Clean Energy), 9 (Industry, Innovation and Infrastructure), 12 (Sustainable Consumption and Production).

¹⁶ [2030 Water Resources Group](#), 2009.

1.5 | Climate Change Adaptation and Mitigation

Jordan's fifth national objective is to achieve climate change adaptation and mitigation, which is expressed as improving Jordan's resilience to the effects of climate change and decreasing the country's total greenhouse gas (GHG) emissions. This objective is consistent with the Paris climate change targets, which is the global community's plan to respond to the global climate crisis. Actions taken to address climate change adaptation and mitigation can also be found in Jordan's National Determined Contribution (NDC) to the Paris Agreement.

Global climate change is poised to make the issue of water scarcity and its intensity much more critical in the coming decades. The water sector is an especially important player in the area of climate change adaptation, because water is the primary medium

through which climate change impacts will be felt by the Earth's ecosystems and people's livelihood and well-being. With the expected decrease in total water availability that climate change will bring to the Arab region, and to bridge the rapidly increasing gap between demand and supply, several soft- and hard-path solutions to manage water are being explored, led, and facilitated by the government. Prioritization and climate-proofing of all water solutions is important for adopting a greener approach to water management and making the sector an integral part of national SDG implementation.

Sustainable Development Goals: 7 (Affordable and Clean Energy), 11 (Sustainable Cities and Communities), 13 (Climate Action).



2. Assessing Green Growth in Jordan's Water Sector

2.1 | Water Sector Green Growth Situation Analysis

Natural Capital. Water is naturally scarce in Jordan, and studies confirm that it will continue to grow scarcer due to climate change. At the current rate of extraction and consumption, the available water supply is insufficient to sustainably support economic activities while at the same time providing critical environmental services. In 2017, the estimated water demand for industry, agriculture, and municipal use was 1,412 million cubic meter (MCM) while sustainable supply averaged around 875MCM. With a growing population and underinvestment in water efficiency measures and water scarcity as results of climate change, at current rates of use, there will simply not be enough water to both continue economic growth and ensure environmental sustainability.

There are two main sources of water to support economic growth and ecosystem services: surface water and groundwater. Surface water contributes around 27% of Jordan's total water supply from the Jordan (shared with Israel), Yarmouk (shared with Syria), and Zarqa Rivers. However, as two of the three rivers are transboundary with Jordan as a downstream country, upstream diversion and pumping have directly affected water availability in Jordan. At the same time, water quality has deteriorated sharply, with high levels of salinity and pollution as a result of agricultural fertilizer use and infiltration of untreated wastewater upstream from Israel and the West Bank.

The Zarqa River is the only major river completely within Jordan's jurisdiction, and its waters are also highly polluted. The Zarqa Governorate is Jordan's most industrially populated area, housing around 15.3% of the country's small to medium-sized industries¹⁷.

Few, if any, of these industries have preventive plans to treat contaminated industrial wastewater before it is dumped into the Zarqa River.¹⁸ At the same time, about 80% of the river's flow comes from the As-Samra wastewater treatment plant (WWTP) during dry weather, making it a major component of the total water supply.¹⁹ The protection and rehabilitation of the Zarqa River is a matter of environmental sustainability, but the formal lack of recognition of the economic impact of water for environmental services has led to a lack of action to restore and protect key water bodies like the Zarqa River, major watersheds, and aquifers.

Because of the gaps in the quantity, reliability, and quality of surface water sources, the Jordanian population relies mainly on groundwater for its domestic water supply. Farmers use groundwater to irrigate crops, leading to competition from municipal and agricultural sectors, with withdrawal exceeding the safe yield. It is estimated that groundwater resources are being heavily exploited and over-abstracted at twice the rate of replenishment. The consequences of these actions are serious and include a permanent lowering of the groundwater table, salinity, and deteriorating quality of groundwater.

The environmental impact of current water practices was estimated at 71.3 million JD in 2017 alone.²⁰ Rehabilitating a degraded water resource base is, at best, costly, and potentially impossible, as they are intrinsically linked to other natural capital, such as land and forests. Failure to sustain and protect water resources, for example, threatens the long-term sustainability of the agriculture sector which, in turn, threatens food security, livelihoods, and life. These

¹⁷ Economic and Social Council. "State of the country Report," 2011.

¹⁸ Mohsen, Mousa S. "Water Strategies and Potential of Desalination in Jordan," *Desalination* 203, no. 1-3 (2007): 27-46.

¹⁹ Al-Zahiri, Abed. "Assessment of Performance of Wastewater Treatment Plants in Jordan," *International Journal of Civil and Environmental Engineering*, no. 893 (2015): 1-6.

²⁰ MWI. "Jordan Water Sector Facts and Figures 2017," 2017.

interlinkages are often overlooked in traditional water resource planning, and in Jordan they are typically only considered during the environmental impact assessments of projects, rather than during long-term economic planning. Ensuring that the economic value of water across sectors is properly assessed requires that the value of water in providing ecosystem services is understood and that actions are taken to ensure sustainability. While this may lead to difficult short-term trade-offs, it can also foster innovation, awareness, and pave the way toward a more sustainable approach to water resource management.

Jordan will increasingly face the need to make trade-offs with how it allocates and uses its limited water resources. To do so, it will be critical to maintain strong systems for data to be used for decision making and effective protocols, ensuring fair, efficient, and transparent resource allocation. Innovations in acquiring and saving water in a sustainable way, such as reusing treated wastewater for irrigation and developing policies and strategies to manage demand, are being implemented. Policies that result in water allocation based on its full economic value, investment in decentralized water storage options that do not lock in too much capital (such as rainwater harvesting (RWH)) and widespread awareness and behavior change campaigns can still be explored and scaled. Investment in WWTP upgrades that allow for reuse can further catalyze a shift from a linear to a circular economy.

Sustainable Economic Growth. Economic growth within Jordan is highly dependent on the water sector, given the sector's close relationship with the agriculture sector and its high energy consumption. The key threats to sustainable economic growth from within the water sector include a historical overemphasis on water supply (while achieving a low return on this investment), challenges to the financial sustainability of the water utilities, and a number of policy gaps and incentive structures that make the sector a drag on fiscal resources and growth.

Jordan has made impressive achievements in expanding access to drinking water and sanitation to near-universal levels. While this is a great advancement for social development purposes, incentive structures and subsidies have also perpetuated access to low-cost water for agricultural and industrial intensification. The government has

focused on supplying this demand through large-scale infrastructure investments. To finance this infrastructure, significant foreign aid in the form of loans is often required, which has contributed to the ballooning of Jordan's public debt, currently standing at 94.4% of the GDP²¹. MWI's Capital Investment Plan suggests that this sector's financing needs will continue to grow.

However, the financial sustainability of sector's utilities is a more serious threat to the country's ability to achieve sustainable economic growth. Utilities continue to struggle to achieve cost recovery, and, as a result, fiscal resources are required. In 2018, the sector's revenues only covered two-thirds of its costs, which were equal to 1% of the GDP. The gap in its ability to pay resulted in an increase of the sector's budget deficit to over 300 million JOD at the end of 2018.²² One source of the strain is the high level of non-revenue water (NRW) – water that is supplied to distribution networks but is unbilled to end-users. NRW is the result of a combination of factors, including illegal extraction, leakages in the system infrastructure, under-registration and inability to collect payments. NRW has steadily increased since 2007, standing at 48%²³ in 2017, equal to around 65 liters per capita per day²⁴. While the government aims to reduce NRW to 25%, performance against this target has not been strong (Figure 4).

Jordan's three utility companies are owned by WAJ, and efforts have been taken to corporatize their operations. The Aqaba Water Company (AWC) has reduced NRW levels significantly, while Miyahuna (Amman) and the Yarmouk Water Company (YWC) have recorded continuing high losses. Although the government has made progress in reducing losses and theft, further reforms are needed to comply with the Government's Structural Benchmark Plan, a sovereign debt-reduction plan which aims to improve operation and maintenance (O&M) cost recovery in the water sector by 2021. To this end, Miyahuna Company has expanded their jurisdiction to cover both Irbid and Zarqa. The government is working with utilities to more quickly identify leakages in physical infrastructure through the use of technologies such as SCADA and leak detection systems. WAJ is also working to improve the enforcement regimes around illegal water extraction, working with communities to quickly identify and stop water theft.

²¹ EBRD. "Jordan Country Strategy 2020-2025," 2020.

²² The Jordan Times. "Water Ministry reform path introduces green energy sources to sector," 2019.

²³ MWI. "Jordan Water Sector Facts and Figures 2017," 2017.

²⁴ MWI. "Water Reallocation Policy," 2016.

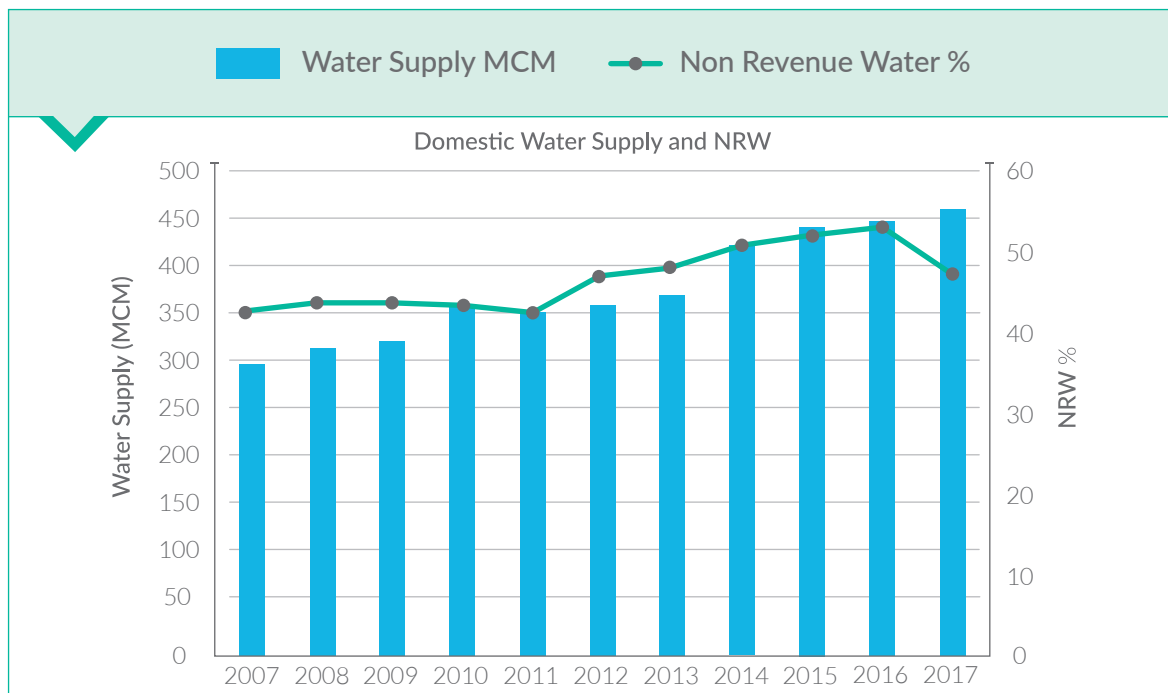


FIGURE 4
Trend analysis of NRW (2007-2017) – (MWI, 2017).²⁵

Compounding the issue of NRW is the sector's large and growing power bill. Many consumers are geographically distant from water resources, and the challenging hydrogeology and topography require high energy consumption for pumping. For example, 90% of the drinking water supplied to the capital Amman comes from sources distanced 125 to 325 km away and elevated up to about 1,200 meters with 5 pumping stages. In 2019, the total electricity cost for water consumption amounted to about 17% of the country's total energy bill, with electricity costs for the water sector totaling JOD250 million.²⁶ One

driver of this cost is the low efficiency of pumping, due at least in part to the lack of capacity at utilities to properly maintain the pumps. Efforts have been taken - as both GHG emissions and cost-reduction measures - to increase the use of renewable energy (RE) for water pumping and increase the efficiency through technology upgrades and repairs. While the government and donors continue to work toward a long-term solution for this complex situation, it has severely impacted Jordan's short-to-medium term economic growth trajectory.

²⁵ MWI, "Jordan Water Sector Facts and Figures 2017," 2017.

²⁶ The Jordan Times, "Water Ministry reform path introduces green energy sources to sector," 2019.

Finally, on top of the water utilities' financial situation, there remain serious structural distortions in water allocation and price in Jordan. For example, agriculture has remained the dominant consumer of water resources (52% in 2017²⁷), receiving subsidies to bring the user cost to 0.3% of the total cost of supply incurred by JVA.²⁸ This subsidization costs the government substantial fiscal resources, while the sector contributes only roughly 5.5% of GDP²⁹ (see Figure below). The municipal sector has modestly increased its share of consumption, and, in 2017, subsidies for the price of domestic drinking water cost the government JOD 348 million.³⁰ The government's basic responsibility to supply for rural communities and citizens' water is understandable. However, the cost of supplying this, together with the high level of consumption, is unsustainable, both ecologically and economically.

Over the last two decades, the government has pivoted towards demand side management, introducing strategies and reforms. However, these efforts have yet to effectively narrow the worsening water deficits and protect groundwater resources.³¹ One reason for this is low political will for undertaking major reforms or introduce incentives that might increase the cost of water for certain users. However, allowing market forces to guide investment and committing to evidence-informed planning and decision-making is critical for long-term environmental and economic security. Innovative financing arrangements and the development of a strong market of private sector-based services to promote water use efficiency can reduce the burden on fiscal resources, while creating jobs and catalyzing innovation. It is of the interest of all of Jordan to try to turn its water sector challenges into long-term growth opportunities.

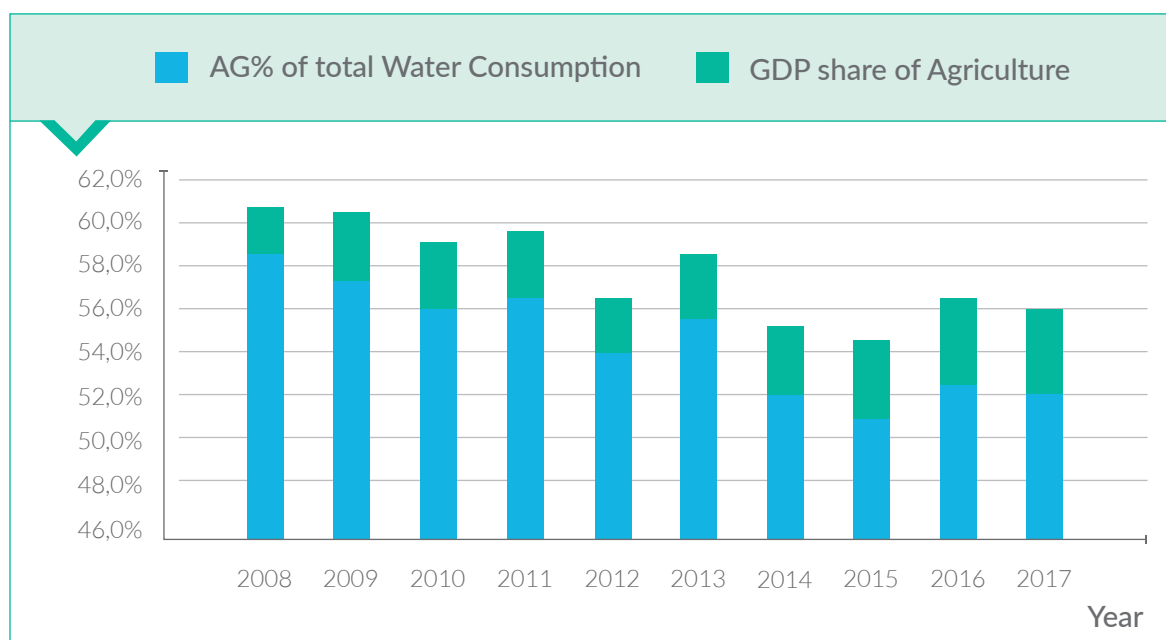


FIGURE 5
Ag sector water consumption vs. GDP contribution for the period (2008-2017) – (MWI, 2017) & (The World Bank & Department of Statistics (DOS), 2017)

Social Development and Poverty Reduction. Despite extreme water scarcity and challenging economic conditions, Jordan has prioritized access to water for social development and poverty reduction purposes. As a result, the government has made substantial achievements in providing almost universal access for drinking water and improved sanitation. The proportion of population with access to improved water supply through networked systems exceeds

94%, and the population which has access to safe sanitation is 93% (of which 63% is through sewer systems, and 30% is through other safe sanitation methods). Supply remains lower, and access intermittent, in areas with poor services.³²

Jordan continues to struggle with the fallout of the Iraqi and Syrian refugee crises, which despite a local population growth rate of 2.2%, has led to a total

²⁷ MWI. "Jordan Water Sector Facts and Figures 2017," 2017.

²⁸ EBRD. "Jordan Country Strategy 2020-2025," 2020.

²⁹ The World Bank. "Agriculture, forestry, and fishing, value added (% of GDP) - Jordan," 2019.

³⁰ MWI. "Jordan Water Sector Facts and Figures 2017," 2017.

³¹ MWI. "Jordan Water Sector Facts and Figures 2017," 2017.

³² MWI. "National Water Strategy 2016-2025," 2016.

population increase from 6.7 million in 2010 to over 10.5 million in early 2020.³³ According to the UNHRC, Jordan currently hosts over 750,000 refugees of more than 60 nationalities, making it the second-largest refugee host in the world. 83% of these refugees are concentrated in large urban areas, and roughly 123,000 Syrian refugees continue to live in refugee camps in Zaatari, Azraq, and the Emirati Jordanian Camp.³⁴ This influx has led to increased demand for public services, particularly in the governorates of Irbid, Mafraq, and Zarqa.³⁵ It is estimated that supplying water to Syrian refugee camp residents costs the public sector an estimated 620 USD per person per year, a difficult fiscal burden given the other challenges facing the sector.³⁶ Although MWI has developed a new coordination mechanism to address the emerging needs of the host communities, and the Jordan Response Platform for the Syria Crisis (JRPSC) has created a Water, Sanitation, and Hygiene (WASH) task force to plan and help improve WASH services in Jordan and in specific host communities, further actions are needed to integrate refugees into the social fabric of Jordan. Ensuring their access to water and sanitation services will provide them with greater economic opportunities and the ability to live dignified lives.

In these areas and other underserved locations, substantial pressure on water and sanitation services impacts critical vulnerable populations such as those in schools and health centers.

Access to water and sanitation services is particularly important for women, since the presence or absence of a safe and sufficient water supply, as well as improved sanitation facilities, can have a disproportionate effect on the lives of women and girls. Gender-sensitive approaches can thus help improve the suitability, sustainability, and reach of water and sanitation services by focusing on and involving women in the facilities' design, implementation, and management, especially at the local level. Addressing the water sector's gender and social dimensions will thus be a critical part of achieving green growth in Jordan. Gender-sensitive approaches have a vital role in making sure that proper water and sanitation services are suitable, sustainable, and within reach for women and girls. These approaches need to focus on women, involving them in the facilities' design, implementation and management, while embedding gender and social equity into policy and projects at all levels will be crucial.

In terms of governance, several ministries and institutions share the responsibilities for sanitation

and drinking-water services. The Ministry of Health leads local hygiene promotion initiatives and has several responsibilities in sanitation and water. There is still no national policy or strategy for health and hygiene awareness, so there are also no stated targets or clear understanding of investment needs. However, this will become a growing challenge given the scale of the refugee crisis.

Resource Efficiency. In Jordan, achieving water use efficiency is one of the most critical components of achieving green growth and is at the top of government's priorities. Without addressing the demand for water, sustainable development will be difficult to achieve. The economic sectors reliant on water include agriculture (the primary user, using roughly 51% of the total water supply), municipal uses (45%), and industry (roughly 4%). There is no explicit allocation for environmental uses. The government, through the Ministry of Water and Irrigation (MWI), the Water Authority of Jordan (WAJ), and the Jordan Valley Authority (JVA), is responsible for engaging with all users to address demand, and works closely with the utilities to reduce inefficiencies in the distribution of water resources through infrastructure upgrades.

Agriculture sector water use is one of the greatest hotspots of resource inefficiency. The overall economic return from using a unit of water (at gross output level) is about 1.2 JOD per cubic meter. This level of return cost the government roughly JOD 3.5 per cubic meter in 2017.³⁷ The return is highly dependent on the selling price of agricultural products, especially fruits and vegetables, and improving this will require several agriculture sector-based policy reforms. However, the water resource implications have not received the same level of attention as the export promotion. While drip irrigation is increasingly common in the Jordan Valley, more investment is also needed to increase the efficiency of JVA's distribution networks. Increased application of treated wastewater is another opportunity. Regulations exist to allow the application of treated wastewater for certain crops and for landscaping purposes. The government continues to struggle to convince farmers to use this water, even though there are areas of the country where it has already been used for agricultural purposes.

Although the subsidization of water in the Jordan Valley is done to ensure access for poor farmers, in order to promote rural development, the end result is the promotion of overconsumption.³⁸ While the dominant irrigation system used in Jordan Valley

³³ Jordan Department of Statistics. 2020.

³⁴ UNHCR (2020).

³⁵ UNDP. "Socio-Economic Inequality in Jordan," 2015.

³⁶ MWI. "Jordan Water Sector Facts and Figures 2017," 2017.

³⁷ FAO and European Bank. "Jordan - Water along the Food Chain: An Analytical Brief of Selected Food Chains," 2015.

³⁸ EBRD. "Jordan Country Strategy 2020-2025," 2020.

is drip irrigation, studies have indicated that as much as 30% of farmers still prefer to use traditional approaches, such as water-intensive surface irrigation.^{39,40} The use of modern production and irrigation technologies is dependent on financial realities and farmer knowledge, so improving engagement and awareness with water users directly, as well as addressing the price of water, affordability and access to finance for water efficient technologies is critical. Improving water efficiency in agriculture, through continuing the practice of drip irrigation and application of treated wastewater, could potentially reduce water consumption by up to 168 MCM per year in Jordan. Further aligning water-sector practices and agricultural trade policies to promote strategic import substitution of water-intensive crops could save an additional 52.5 MCM per year.⁴¹

Commercial and industrial sector activities that require water, such as food and beverage, hotels, and other tourism facilities are responsible for a smaller proportion of water consumption. These private sector actors are supplied water primarily from the municipal water systems, paying a commercial consumption tariff higher than for residential users. The cost of water consumption for the commercial sector, however, is still quite low. Efforts could be taken to increase the cost of water for these uses, and investments in resource efficiency can be made to ensure that the private sector is a reliable steward of Jordan's water resources.

Climate Change Adaptation and Mitigation. In Jordan, the impacts of climate change are most likely to manifest in water shortages; an issue which is already considered high priority and that can have direct consequences for water security and economic growth⁴². Present climate change scenarios indicate that Jordan could suffer from reduced agricultural productivity and water availability, among other negative impacts⁴³. Jordan's National Climate Change Policy 2013-2020 mentions that 'Jordan faces potential serious impacts on its natural ecosystems, on its river basins and watersheds, on biodiversity - then cascading to impacts on food productivity, water resources, human health, public infrastructure, and human settlements.'⁴⁴ Moreover, the country's NDC observes that climate change is anticipated to affect sustainable development, economic growth, and society through significant decreases in rainfall, as well as significant increases in temperature, humidity, and extreme weather events.⁴⁵

Indeed, water-related climate change impacts are already being experienced in the form of more severe and more frequent droughts. Meteorological studies over the last four decades revealed that an average of two years of drought occur each 10-year cycle. Based on an updated analysis for rainfall distribution over the period 1937-2001, it was indicated that drought frequency over 10 years is 2.43 or about five drought years every 20 years⁴⁶. Higher average temperatures, changes in precipitation and temperature extremes are projected to affect the availability of water resources through changes in rainfall distribution, soil moisture, glacier and ice/snow melt, and river and groundwater flows. These factors are expected to lead to further deterioration of water quality as well. Building on the results of the different climatic models and the trend analysis (Jordan's Third National Communication on Climate Change, 2014), climate change scenarios in 2050 and 2100 were developed for the different basins in Jordan. The most plausible scenario suggests an increase in air temperature of 1.5°C and a 15% decrease in precipitation by the year 2050. This climate change trend is likely to worsen the degradation of land in the arid, semi-arid, and sub-humid areas in the country⁴⁷. Moreover, climate change will have serious implications on the country's efforts to eradicate poverty and realize sustainable development for current and future generations, ultimately making climate change an issue of intergenerational equity. The poor, women, and refugees, who are the most vulnerable, are also likely to be the most affected, resulting in an issue of equity.

Given this context, the water sector has developed a **Climate Policy for a Resilient Water Sector**⁴⁸ which provides the background, concept, solutions, and implementation mechanisms for building resilience. Appropriate adaptation measures will include sustainable water management practices and climate resilient agriculture, which can ensure that, in the case of droughts, food security and economic development will not be threatened. Such sustainable and climate-resilient practices include traditional water storage, aquifer recharge and groundwater storage, soil water storage, water harvesting in combination with supplementary irrigation for droughts, and climate-proofing and increasing the water use efficiency of primarily rain fed agriculture, which is practiced on 60% of Jordan's cropland.

³⁹ Molle, Francois, Jean-Phillipe Venot, Youssef Hassan, M Shatanawi, A Fardous, N Mazahrih, and M Duqqah. "Water Demand Management Unit, Ministry of Water and Irrigation." *Agricultural Water Management* 95, no. 2 (2008).

⁴⁰ Allam M.N., El Gamal F., Hesham M. "Irrigation Systems Performance in Egypt." *Series A - Mediterranean Seminars*, No. 52, Irrigation Systems Performance 131 (2005): 85-98.

⁴¹ WANA Institute. "Decoupling National Water Needs for National Water Supplies: Insights and Potential for Countries in the Jordan Basin". 2017.

⁴² GIZ. "National Adaptation Plan to Climate Change in Jordan," 2018.

⁴³ GIZ. "National Adaptation Plan to Climate Change in Jordan," 2018.

⁴⁴ MoEnv. "The National Climate Change Policy of the Hashemite Kingdom of Jordan 2013-2020," 2013.

⁴⁵ GoJ. "Intended Nationally Determined Contributions (NDCs)," 2015.

⁴⁶ ICARDA. "Land Degradation in Jordan - Review of Knowledge Resources," 2012.

⁴⁷ MoEnv. "The Aligned Action Plan National to Combat Desertification in Jordan," 2015.

⁴⁸ MWI. "Climate Change Policy for a Resilient Water Sector," 2016.

In terms of mitigation, GHG emissions within the water sector are primarily originated by the use of energy for water pumping and distribution, as well as in the operation of wastewater treatment (WWT) facilities. WWT facilities offer the opportunity of generating energy from waste, which can be used to operate the facilities and offset the cost of energy. Such projects,

including the as-Samra WWTP biogas reuse project, energy-efficient pumps, and the introduction of RE projects to power pumping have been identified in the governments' investment plan and can be replicated. Appropriate technology partners and private operators for such projects are generally required for these effective mitigation actions in the water sector.

2.2 | Current Water Sector Strategic Priorities

Jordan Vision 2025. This document is the country's primary economic and social development strategy, addressing the economic, social, and governance challenges affecting Jordan's ability to transform into a more developed economy. In the Vision, water is considered a critical locus for poverty reduction and economic enabling. The assessment of Jordan's water sector and recommended interventions suggests that the government is attempting to achieve substantial structural reform in the sector and hopes to achieve improve resource efficiency and conservation to ensure an adequate supply for the long run.

National Water Strategy (NWS) 2016-2025. This strategy is the country's guiding policy document and strategic plan for ensuring a resilient and sustainable water sector within the period of the Jordan Vision 2025. The strategy takes a comprehensive approach incorporating social, economic, and environmental sustainability in the development of Jordan's water sector. NWS is aligned with the SDGs and places a strong emphasis on coordination and integration of the many water sector stakeholders, as well as stakeholders in most key green growth sectors, to ensure effective stewardship of the country's limited water resources. There are 8 sub-policies associated with this strategy, as well as a Capital Investment Program and an Action Plan to Reduce Water Sector Losses, which are listed in table 2 below. Emphasis is placed on major sector reform, including revision of the institutional and legal frameworks and use of financial mechanisms and cost recovery interventions to create viability through resource efficiency. The implementation and monitoring and evaluation (M&E) responsibilities for the NWS fall under MWI. MWI is supported by WAJ, JVA, and the water utility companies in the implementation of this strategy.

Key objectives of the **targeted scenario by 2025** include:

- Reducing expenses and costs;
- Increasing operating revenue;
- Achieving sustainability of the current sources and reduce over-pumping of groundwater;
- Maximizing the use of shared water resources;
- Increasing the capacity and quality of water supply;
- Improving and developing water supply and distribution networks and systems for domestic purposes;
- Enhancing the efficiency of irrigation systems;
- Expanding sanitation and re-use services;
- Creating awareness among citizens and decision makers about the current water situation and lay the foundations for policy change;
- Conducting research and development;
- Developing an integrated and coherent institutional framework to regulate the water sector.



TABLE 2
Green Growth Priorities found in Existing National Documents

Relevant strategies for Water Sector	Green Growth Dimension				
	Natural Capital Enhancement	Sustainable Economic Growth	Social Development & Poverty Reduction	Resource Efficiency	Climate Change Adaptation & Mitigation
SDG 2016-2025	X	X	X	X	X
Surface Water Utilization Policy 2016	X				X
Water Substitution and Re-Use Policy 2016	X			X	
Groundwater Sustainability Policy 2016	X			X	
National Strategy and Action Plan to Combat Desertification	X				
National Biodiversity Strategy and Action Plan	X				
Water Reallocation Policy 2016		X	X		X
Water Demand Management Policy 2016		X		X	
Action Plan to Reduce Water Sector Losses (Structural Benchmark)		X		X	
Decentralized Wastewater Management Policy 2016		X			X
Jordan Economic Growth Plan (2015 - 2025)		X			
Jordan Response Plan for the Syrian Refugee Crisis			X		
Energy Efficiency (EE) and RE in the Water Sector Policy 2015				X	
Climate Change Policy for a Resilient Water Sector 2016					X
Water Sector Policy for Drought Management					X
Jordan's Nationally Determined Contribution (2015)					X

2.3 | Water Sector Stakeholders

MWI is the lead government institution responsible for strategic planning and guiding the development of Jordan's water sector. MWI works closely with the regulatory body, WAJ, to align strategy and policy making with technical and regulatory oversight for water infrastructure across the country. MWI is also responsible for maintaining irrigation networks, and for liaising with major water users, except in certain areas, such as the Jordan Valley, where the JVA supports farmers to develop and maintain water networks. WAJ and MWI work closely with the water utilities including Miyahuna, Yarmouk, and Aqaba water companies. Key water institutions include:

- Ministry of Planning and International Cooperation (MOPIC)
- Ministry of Water and Irrigation (MWI)
- National Agriculture Research Center (NARC)
- Royal Committee for Water
- Royal Scientific Society (RSS)
- The Miyahuna Co. – Central Region
- Union of Farmers
- Water Authority of Jordan (WAJ)
- Water Users Associations
- Yarmouk Water Co. – Northern Region
- Zarqa Chamber of Industry (ZCI)

Key Stakeholders

- Aqaba Special Economic Zone Authority (ASEZA)
- Aqaba Water Co. – Southern Region
- Jordan Chamber of Industry
- Jordan Hashemite Fund for Human Development (JOHUD)
- Jordan Valley Authority (JVA)
- Ministry of Environment (MoEnv)
- Ministry of Finance (MoF)
- Ministry of Health
- Ministry of Local Administration (MOLA)

Key Sector Donors and Development Partners

- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
- European Investment Bank (EIB)
- European Bank for Reconstruction and Development (EBRD)
- Japan International Cooperation Agency (JICA)
- Bank aus Verantwortung (KfW)
- Swiss Agency for Development and Cooperation (SDC)
- United States Agency for International Development (USAID)



3. Water Sector Sub-Objectives and Action Selection

3.1 | Water Sector Green Growth Sub-Objectives

Water resource management is one of the most important green growth challenges facing Jordan, and is at the center of many economic and environmental issues. Jordan's water sector priorities are clearly laid out in the [National Water Strategy 2016-2025](#), and water has been recognized, along with energy, as a priority sector to address both climate change mitigation and adaptation. The water sector itself is not a major source of economic growth or employment, but access to water is a prerequisite for social development, with water being a critical natural resource that underpins the economy. Water use efficiency and demand management are top priorities of MWI and are mainstreamed into agriculture sector strategies and policies, which are closely linked to the five national green growth objectives.

Further operationalizing the five national green growth objectives described in Chapter 1 and assessed in Chapter 2, **water sector sub-objectives**

for each national objective were determined. These sub-objectives serve as a sustainable water sector agenda which can be continually developed by national stakeholders.

Close coordination and collaborations with MWI, WAJ, JVA, and MoEnv ensured alignment with sector priorities as laid out in the National Water Strategy 2016-2025, and other sector-specific policies and plans. Special emphasis was also given to establishing linkages with the country's cross-cutting environment and socio-economic strategies and plans, including the NDC. Where specific green growth concepts were not prominently mainstreamed into policies and strategies, global green growth best practices were incorporated into the objective and action levels.

The five national green growth objectives are translated into 16 sector sub-objectives for Jordan's water sector as detailed in Table 3.

TABLE 3
Water Sector Green Growth Sub-Objectives

National Green Growth Objective	Water Sector Green Growth Sub-Objectives
Enhanced Natural Capital	<ul style="list-style-type: none"> a. Augmenting water supply for priority economic activities through decentralized infrastructure solutions, such as rain water harvesting (RWH) or reclaimed wastewater; b. Ensuring a reliable supply of water to protect and restore critical water-related ecosystems, including forests, wetlands, rivers, aquifers, and lakes; c. Improving the quality of surface and ground water by enforcing laws to prevent dumping/pollution, and/or offering incentives for clean-ups/restoration.
Sustainable Economic Growth	<ul style="list-style-type: none"> a. Introducing demand management measures such as efficiency improvements, loss reduction, water reallocation, and incentive structures to save/conserves water; b. Strengthening the capacity of the public sector in managing water sustainably and efficiently; c. Improving the sector’s financial sustainability through measures including NRW reduction, revised water tariffs, innovative and market based-business models etc.;
Social Development and Poverty Reduction	<ul style="list-style-type: none"> a. Ensuring equitable, reliable, and affordable access to clean water and sanitation services for all; b. Building resilience to climate-change related water challenges among vulnerable groups; c. Supporting and strengthening the participation of local communities, women, and marginalized groups in improving water management.
Resource Efficiency	<ul style="list-style-type: none"> a. Increasing water-use efficiency across all sectors including agriculture, industries, and municipal sectors; b. Reducing water losses and leakages in municipal water services and in conveyance systems to improve their efficiency in delivery; c. Improving EE in water operations such as water and WWT and pumping systems; d. Increasing the quantity of water and wastewater treated for further recycling and reuse.
Climate Change Adaptation and Mitigation	<ul style="list-style-type: none"> a. Improve drought resilience by expanding decentralized supply and introducing demand management measures across sectors; b. Improve flood resilience through flood risk management measures, through appropriate flood mitigation infrastructure and measures to respond effectively to floods; c. Reducing GHG emissions in the water sector through use of RE and EE in water production and distribution systems.

Climate Action Priority. Climate action – policies and investments which lead to climate change adaptation and mitigation – are key priorities for the Government of Jordan. Actions which are noted to contribute to the strategic objective of “Climate Change Adaptation and Mitigation” represent sectoral priorities that can also be found in the NDC Action Plan and/or the *National Adaptation Plan*⁴⁹. These documents, along with the GG-NAP, guide the MoEnv in planning and implementing its international climate change commitments, for which it aims to achieve 14% overall GHG emissions reductions by 2030, including 1.5% unconditional reduction against the baseline, with a 12.5% additional reduction target being conditional upon receiving financial and technical support from international donors and development partners.

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



Hashemite Kingdom of Jordan

Intended Nationally Determined Contribution (INDC)¹

Jordan’s INDC Summary

Jordan nationally determines to reduce its greenhouse gas emissions by a bulk of 14% until 2030. This contribution of GHGs reduction will be unconditionally fulfilled at, maximally, 1.5% by the Country’s own means compared to a business as usual scenario level.

However, Jordan, conditionally and subject to availability of international financial aid and support to means of implementation, commits to reduce its GHGs emissions by additional, at least, 12.5% by 2030.

The outcome targets above are accompanied by a diverse combination of numerous GHGs cut-oriented actions in all involved sectors of emissions in addition to the adaptation actions in targeted sectors. These actions (policies, strategies, legislations, measures, etc) are articulated in this document. The methodological approaches underlying Jordan’s INDC are included in this communication as well.

Jordan’s Nationally Determined Contribution

14% | GHG emissions reduction by 2030
 1.5% unconditional | 12.5% conditional

⁴⁹ These priorities have been developed for MoEnv with the support of NDC Partnership and GIZ programs in Jordan.

3.2 | Translating Green Growth Priorities into Actions

Taking into account the priorities of stakeholders, the gap analysis performed and the strategic planning exercises conducted, a prioritized list of investments and enabling actions were identified and validated by the MoEnv, MWI, and the Global Green Growth Institute (GGGI). Ideas were solicited through an open call for ideas with key government and non-government stakeholders. Action proposals were received and reviewed using a multi-level screening tool from which priority interventions (policies, programs and investments) were selected and presented at a national preliminary validation workshop in December 2018. The findings of this workshop revealed the preference by stakeholders to prioritize those with:

- Strong links to national green growth objectives;
- High levels of innovation or novelty in concept;
- Likelihood to attract private sector investment or develop the private market.

Bilateral and small-group consultations were conducted through 2019 to prioritize and formulate the actions proposed by sector stakeholders. This process included the assessment of feasibility, risks, and alignment with government priorities as per the feedback received in 2018, which improved the depth of analysis, input from private sector actors and local technical experts. The zero draft of the action plan was reviewed by an ad-hoc Transport Sector Green Growth Review Committee, hosted by the MWI. Endorsement was received by sector leadership in the MoT, and approval was received by the Cabinet of Ministers in early 2020.

For the purpose of this action plan, actions are presented in three ways: as **enabling actions**, as an **investment**, and as a combination of the two.

- **Enabling Actions.** These are considered to be any actions that will enable stakeholders (government and/or others) to be more prepared for future green growth policy or investment implementation. They are policy, strategy, research, and capacity building-oriented in nature. They can be implemented through a mixture of donor and government support. Donors would typically support implementation on a grant basis through technical assistance funds. Each action description contains the detailed rationale and strategic orientation which will allow Action Leads to develop funding proposals for these actions as priority green growth programs.
- **Investment Actions.** These are priority investment projects that support the achievement of national green growth objectives. Investments must be proven feasible from a technical, financial, and environmental standpoint. As such, they require proof of concept, a business model showing that an attractive return on investment (ROI) is possible.

For enabling actions that do not lead to an investment, the estimated budget and status of financing of the action are noted in the action description in Chapter 5 of the action plan. In these cases, the “No” box is checked under the “Action Leads to Investment” section of the action description. It is important to note that some technical assistance actions may lead to investment. However, for the purposes of this action plan, all actions that do not include feasibility analysis for a specific project or investment are assumed to not lead to an investment.

Estimated Budget for this Action	
Financing Secured	<input type="checkbox"/> Yes <input type="checkbox"/> No
Potential Source of Funding	
Action Leads to Investment	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> This action is an Investment opportunity
Estimated Investment Size	

For many green growth investments, limited feasibility analysis is available. In these cases, the action includes the development of the required analysis (feasibility studies, technical assistance, etc.) directly related to a potential or known investment opportunity. The “Estimated Budget for this Action” is noted in the action description, and the “Yes” box is checked in the “Action Leads to Investment.” In the case of investment opportunities that have feasibility analysis completed and are considered ready for investment,

the box “This action is an investment opportunity” is checked. In both cases an estimated budget for the implementation of the project/investment is given, based on the available information (such as a feasibility study, consultation with project designers, or best estimation).

Table 4 shows the types of actions found in the GG-NAP 2021-2025.

TABLE 4
Types of actions found in the GG-NAP 2021-2025

Action Type	Description of Activities to be Implemented
Enabling Action	<p>Any action that will enable stakeholders (government and/or others) to be more prepared for future green growth policy or investment implementation.</p> <p>Activities, outputs, and milestones might include:</p> <ul style="list-style-type: none"> ▪ Policy analysis, recommendations, and reform ▪ Capacity building programs, public campaigns that increase awareness among a set of key stakeholders ▪ Knowledge exchange and learning ▪ Reforms to processes, procedures, and institutional setup ▪ Technical studies and analysis
Investments	<p>Any action that will lead to investment in a specific project that will support the achievement of one or more of the sector green growth sub-objectives.</p> <p>For demonstration or pilot projects, activities, outputs, and milestones might include:</p> <ul style="list-style-type: none"> ▪ Investment analysis and preparation activities ▪ Clarify the proof of concept (technical and financial aspects) of implementation of green growth projects ▪ Reform of specific policies or regulations required to attract investment ▪ Develop service models and business plans ▪ Inform replication or scale up <p>Investment-ready projects are considered ready for implementation between 2021 and 2025 based on available feasibility analysis.</p>

Action Priority Level. Actions that were considered low priority for green growth were not included in the action plan, and action descriptions were not developed. From the numerous ideas received, a limited number of detailed action descriptions were prepared and assessed according to the criteria below.

Sector review committees and green growth focal points at the relevant line ministries were asked to evaluate and validate the level of priority, and this is noted in each action form presented in Section 4.4.

Table 5 shows the prioritization criteria for GG-NAP 2021-2025.



TABLE 5
Prioritization criteria for GG-NAP 2021-2025

Priority Level	Description
Low	<p>Low-priority actions are those which do not meet the adjusted criteria after the Preliminary Validation Workshop, meaning they:</p> <ul style="list-style-type: none"> ▪ Lack clear and substantial links to national green growth objectives ▪ Lack innovation and do not demonstrate added value to existing sector objectives, as outlined in national/sectoral policy documents ▪ Cannot be reasonably implemented given the available resources or capacity at the sector level in the 2021-2025 period <p><i>Low-priority actions have not been included in this action plan.</i></p>
Medium	<p>Action which:</p> <ul style="list-style-type: none"> ▪ Positively contributes to at least one of the national green growth objectives and sector sub-objectives ▪ Adds value to existing sector objectives (as outlined in national/sectoral policy documents)
High	<p>Action which meets all the “Medium” criteria, plus:</p> <ul style="list-style-type: none"> ▪ Encourages changes to the prevailing ‘business as usual’, triggering long-term, sustainable green growth transformation ▪ Impacts a large geographical area or segment of the population
Very High	<p>Action which meets all the “High” criteria, plus:</p> <ul style="list-style-type: none"> ▪ Considered a key milestone for future implementation of green growth actions, i.e., enabling actions that lead to improved and quantifiable green growth policies and investments ▪ Has strong private sector orientation, interest and/or ownership ▪ Resources have been identified for implementation (public, private, donor)



4. Implementation Arrangements

4.1 Action Implementation

Green Growth Implementation Principles. Successful implementation of this plan will require sector-level policy and institutional reform measures. The goal of these measures is to achieve:

- Greater strategic alignment and coherence among existing plans and strategies;
- Improved coordination between government institutions and stakeholders;
- More meaningful and frequent engagement of private sector, Non-Governmental Organizations (NGOs) and other non-government actors;
- Stronger investment and strategic planning systems and processes, leading to stronger return on investments made in national development and economic growth;
- Technical capacity development within government institutions.

Roles and Responsibilities. Green growth is a unique development approach that will require a high level of collaboration between national stakeholders, which has been called out as both a

key challenge and opportunity in the GG-NAP. MWI is the leading institution responsible for overseeing the implementation of all policies and strategies for the water sector, but most of the actions in this action plan require joint preparation and implementation across institutions, stakeholders and sectors. The private sector, civil society actors and government agencies – such as WAJ, JVA, Greater Amman Municipality (GAM), water utility companies, and many more – are included as action implementation leads and support. Donors, development agencies and local NGOs are needed to provide financial support, technical expertise, and knowledge of local needs and context.

Table 6 shows the roles and responsibilities of various stakeholders for green growth implementation in Jordan.

TABLE 6
Roles and Responsibilities of Various Stakeholders for Green Growth Implementation in Jordan

Stakeholder	Roles and Responsibilities
Action Lead	<ul style="list-style-type: none"> Ensuring the action is successfully implemented within the planned time frame. This may include additional preparatory actions such as further consultations, resource mobilization (identifying potential donors, writing funding proposals, preparing project documents), coordinating stakeholders, and facilitating implementation (disbursing funding, etc.). Provide progress status reports as needed to the relevant focal ministry for M&E purposes. For investments, the Action Lead is the project owner.
Action Support	<ul style="list-style-type: none"> Support the Action Lead by providing technical feedback, in-kind or financial support, drafting and ideation support, and other collaborations during all phases of action planning and implementation.
Sector Green Growth Focal Points at the MWI	<p>Action Implementation</p> <ul style="list-style-type: none"> Serve as focal point for communications and reporting on sector action plan implementation progress. Support action implementation by supporting Action Leads with resource mobilization, coordination, data collection, etc. Ensure the policy/regulatory environment supports action implementation (with donor support if required). <p>Mainstreaming</p> <ul style="list-style-type: none"> Support mainstreaming activities and approaches that support green growth implementation into sector-level policies and investments. Serve as technical advisor to line ministry leadership on an ad-hoc basis (especially Secretary General sitting on the Higher Steering Committee for Green Economy). Facilitate partnerships with private sector and civil society institutions to support green growth planning and implementation. <p>Monitoring/Reporting</p> <ul style="list-style-type: none"> Provide quarterly status updates on the implementation of the action plan to MoEnv, Green Economy Unit (noting any challenges and requesting any needed support).
Ministry of Environment (MoEnv)	<p>Green Economy Unit</p> <ul style="list-style-type: none"> Work closely with Action Leads to provide policy analysis (undertaking policy review, cost-benefit analysis, supporting pre-feasibility analysis, conducting consultations to change policies or regulation) as needed to support implementation. Guide Jordan's green growth planning and implementation activities and facilitating collaboration amongst all stakeholders. Support line ministries with cross-sector coordination to support project design and implementation. <p>Technical Units</p> <ul style="list-style-type: none"> Multiple directorates working on cross-cutting green growth agendas (climate change, biodiversity and natural resources, and waste regulation) support line ministries with cross-sector coordination to support project design and implementation. <p>Policies Unit</p> <ul style="list-style-type: none"> Support with resource mobilization and partnerships. <p>Higher Steering Committee for Green Economy (composed of Secretaries-General of each of the key line ministries)</p> <ul style="list-style-type: none"> Responsible for reviewing and approving a results report on a bi-annual basis, and for submitting this to the Prime Ministry. <p>Green Growth Technical Committee (composed of technical level focal points)</p> <ul style="list-style-type: none"> Responsible for supporting action plan preparation and for reviewing and addressing implementation gaps and challenges on an ad hoc basis.

Stakeholder	Roles and Responsibilities
Ministry of Planning and International Cooperation (MOPIC)	<p>Evaluation and Institutional Development Unit</p> <ul style="list-style-type: none"> ▪ Reporting against the Jordan Vision 2025 and annual Executive Development Programs, economic growth and investment planning, and sustainable development planning. ▪ Ensure mainstreaming of green growth into the next national development plan (post-2025) and other cross-cutting national plans (Jordan Response Plan, Jordan Economic Growth Plan, etc.). <p>Directorate for International Cooperation</p> <ul style="list-style-type: none"> ▪ Coordinate with donors to link national priorities (projects and programs) with development assistance (grants, loans, public-private partnerships, etc.). <p>Department of Statistics (DOS)</p> <ul style="list-style-type: none"> ▪ Collect data to report against KPIs. <p>Higher National Committee for Sustainable Development</p> <ul style="list-style-type: none"> ▪ Provide guidance and follows up on all decisions, priorities and recommendations related to the 2030 Agenda.
Prime Ministry	<p>Public-Private Partnerships Unit</p> <ul style="list-style-type: none"> ▪ Determine which actions (or which components) are suitable and priority for developing public-private partnerships. Special emphasis is given to those investments that require strong government oversight, or where ability to generate revenues is weak in the initial payback period. ▪ Review and approve of implementation progress reports. <p>Progress Unit</p> <ul style="list-style-type: none"> ▪ Review and approve of progress reports against the Executive Development Plan and other national and sector-level plans, strategies, and projects.
Ministry of Finance (MoF)	<ul style="list-style-type: none"> ▪ Determine what level of contribution the government can make to action implementation at the sector level.
Jordan Investment Commission (JIC)	<ul style="list-style-type: none"> ▪ Coordinate with the line ministries to develop relevant actions into investment proposals and promote the projects to potential foreign investors. ▪ Facilitate foreign direct investment to achieve green growth implementation.
NGOs	<ul style="list-style-type: none"> ▪ Support future action formulation by providing local context and technical expertise as needed. ▪ May be responsible for implementing actions in coordination with government or private sector.
Private sector	<p>Private sector associations</p> <ul style="list-style-type: none"> ▪ Support the development of market assessments/analysis to formulate better business models or revenue models for investment actions. ▪ Participate in regular public-private dialogue to identify gaps in regulatory environment or other barriers to investment and suggest solutions. <p>Investors</p> <ul style="list-style-type: none"> ▪ Provide feedback on project proposals and potentially invest in actions by providing grants, loans, or equity finance.

Coordination. Weak coordination between stakeholders is a green growth implementation barrier affecting all sectors and threatening the sustainability of green growth interventions. This fact has been well-documented in the Jordan Vision 2025, the Jordan Economic Growth Plan 2018-2022, the National Green Growth Plan, and through the consultation process for the development of this plan. To encourage greater future coordination and collaboration between sectors and institutions (public and private) all stakeholders must commit to developing a culture of knowledge exchange, innovation, sharing and collaboration. The government can play a leading role on the establishment of this culture through:

- Consolidating governance bodies where overlap exists, removing duplicate committees or governance units for the same issues;
- Upholding the highest standards of transparency and knowledge exchange, committing to sharing information as needed and following standard procedure for policy and project development;
- Hosting regular, inclusive sector-level donor and development partner consultations, and more frequent public-private-civil society dialogues on key policies and investments;
- Conducting more public outreach and awareness of government successes and lessons learned.

Financing Implementation. An estimated budget for implementation of each action is included in each action description in Chapter 5. This estimate is considered a starting point for detailed action planning. In some cases, implementation can be achieved at a lower cost, while others can be bundled with other programs/initiatives. The specific components of these programs and projects will likely differ during implementation. Line ministries implementing sectoral action plans are responsible for identifying the financial resources required for green growth action implementation, including using public budget where available and with sector donors. As implementation facilitators, MoEnv and MOPIC will support identification of off-budget resources for implementation to support SDG achievement and NDC implementation.

Official development assistance and climate finance are two sources of international finance that can

be applied to green growth implementation. While technical assistance programs and demonstration/pilot projects may be easily financed by donors on a grant basis, investment in projects is a more resource intensive process. Infrastructure projects typically require substantial up-front costs, which tend to be financed with debt under long payback periods. Consequently, most of these investments will be owned either by the government or large institutional investors or a mixture of ownership through PPP. These will require cost-benefit-analysis and investment planning in advance of implementation. Project implementers will work directly with the MWI to ensure that the necessary investment conditions can be reached.

Capacity building and Institutional Development.

The mainstreaming of green growth planning and implementation at the sector level will require continuous learning through capacity building and institutional development. The green growth analysis, objectives, implementation actions and results framework can be strategically mainstreamed at the sector level during sectoral planning exercises. Continuous development of the concept and its ramifications on sectoral development is needed for technical- and management-level government staff. MoEnv will aim to play an increasing role in supporting capacity building and institutional development with its partner ministries in the area of green growth and climate change.

Monitoring and Evaluation. Several donor-funded actions are included in the action plan, each with specific logic models and corresponding performance indicators as part of standard donor requirements. These will refer to and align with the overall results framework for the GG-NAP. Whenever possible, common indicators will be used to increase alignment and reporting schedules will be synchronized with the government of Jordan's fiscal year. Ongoing monitoring of the performance of individual sector actions will be the responsibility of the line ministry for the sector, as below, in coordination with the identified action "owner". Sector leads and the appropriate Action Leads will communicate any issues uncovered as part of their ongoing performance monitoring with MoEnv's Green Economy Unit.

Implementation Tracking. Implementation will be tracked jointly by the Green Economy Unit at the MoEnv, the relevant monitoring focal point at the sector ministerial level, and the Evaluation and Institutional Development Unit at the Ministry of Planning and International Cooperation (MOPIC). Key roles and responsibilities of all stakeholders responsible for pushing implementation are outlined below. Efforts will be taken within the first year to ensure sector-level commitment to implementation. MOPIC and MoEnv will work with action leads to

ensure sufficient access to financial and technical assistance for implementation.


Communications. MoEnv will work to ensure effective communication across government institutions about the status of implementation of the GG-NAP. Projects that contribute to green growth will be entered into the Green Growth Tracking System developed by MoEnv, and the Ministry commits to ensuring regular updates on implementation.

4.2 | Future Planning and the next phase (post-2025)

Sectoral Planning. Sector decision makers at the relevant line ministry and the MoEnv will seek to continuously support green growth mainstreaming at the sector level. This means using the objectives outlined in the action plan to guide implementation of sectoral policies and investments. Further, MoEnv will work with MOPIC to continuously seek to find and feature green growth actions under implementation in Jordan. Many existing or future actions that do not appear in the GG-NAP can still be considered green growth actions, and their impacts will be accounted for in green growth reporting. Lessons learned from these projects and programs will be compiled and reflected into the design of future projects and programs.

Phase II Green Growth Action Planning. Action planning in the next phase will be less complex given the

experience of developing this first action plan. The preparations for this shall begin in the fourth quarter of 2024, with ample time for consultation and review of lessons learned in Phase I. The implementation period for Phase II is expected to be 2026-2030, and, as such, will be closely aligned to the Sustainable Development (2030) Agenda and the NDC. Green growth action planning for Phase II can also be aligned with the next long-term national development plan developed by MOPIC, the follow-up to the Jordan Vision 2025. For this process, MoEnv and MOPIC will work together to undertake consultations at the sector level, provide capacity building and strategic visioning workshops, and support green growth action ideation and formulation. Advance consultation with donors to the extent possible, and identification of public budget for green growth implementation, is needed.



5. Water Sector Green Growth Actions 2021-2025

The following 19 priority actions have been identified as described above for implementation in the 2021-2025 period. These interventions will cost an estimated USD 964,290,000, and include:

- **13 investment preparation and demonstration actions.** These projects are at various levels of readiness: some require feasibility analysis, while others are investment-ready. Many are suitable candidates for PPP or direct private sector investment, and others are opportunities to leverage climate finance.
- **6 enabling policy and institutional reform actions.** Given current gaps in available fiscal resources, these actions intend to attract investment by addressing policy barriers and capacity gaps that lead to higher costs, risk levels or uncertainty in decision making. These include programs to support innovation, institutional reform, and coordination.

Implementation of these actions will contribute to the Water Sector Green Growth Sub-Objective as well as to:

- Addressing key challenges related to both supply and demand side management, through implementation of infrastructure and building community stewardship of resources;
- Introducing incentives and financing mechanisms to reduce the overall cost burden of water resource management on public resources;
- Increasing access to water and sanitation for vulnerable members of society, including school children and displaced persons;
- Increasing the capacity of public sector decision makers to use incentive structures, data and policy innovations in water sector management.

Table 7 shows the water sector green growth actions and can be used by action owners to begin project proposal formulation for the purpose of mobilizing public budget or external grants, loans or other financial support for implementation. It is understood that detailed implementation approach, outputs, timeline, budget, and stakeholders may change depending on the source of finance during the process of implementation.

TABLE 7
Water Sector Green Growth Actions 2021-2025

#	Action Title	Page #	Total Estimated Implementation Cost (USD)	Relevant Green Growth Objectives				
				Enhanced Natural Capital	Sustainable Economic Growth	Social Development and Poverty Reduction	Resource Efficiency	Climate change Mitigation and Adaptation
WR01	Implement capacity building program for evidence-informed investment decision making in the water sector	28	760,000		x			x
WR02	Establish a rainwater harvesting project financing facility to support projects that argument rural and urban water supply	31	15,000,000	x		x		x
WR03	Implement Key Wastewater Treatment Projects to improve Water Supply Augmentation	34	69,400,000		x			
WR04	Establish incentives for pollution prevention with industry in the Zarga River Basin	36	950,000	x				
WR05	Construct dams and implement a parallel community water resource stewardship program for several communities in the Jordan Valley	38	66,900,000		x		x	x
WR06	Technical Assistance to support water efficiency in businesses, industries and commercial activities (Based on SwitchMed Experience)	40	4,414,000		x		x	x
WR07	Implement Water Supply Improvement Project for Balqaa Governorate	42	2,300,000		x	x	x	x
WR08	Improve irrigation efficiency in the Jordan Valley (Mid-Ghors)	44	28,500,000		x		x	x
WR09	Increasing willingness of end user stakeholder to accept wastewater reuse in Jordan	46	1,000,000		x	x		
WR10	Construct an industrial wastewater treatment plant in Zarqa	48	27,700,000	x	x	x		x
WR11	Enhance the Energy Efficiency in the well fields and Pumping Stations	50	71,000,000		x		x	x
WR12	Increase the resilience of displaced persons and host communities to climate change-related water and climate change challenges	52	7,000,000		x	x		x
WR13	Programming to increase the availability of WASH in Schools and strengthening WinS standards for climate change impacts	54	1,500,000	x		x	x	

WR14	Improve implementation of decentralized water supply and sanitation solutions in Al-Azraq	56	5,640,000	x		x		
WR15	Implement a program of Performance-based Contracts to Achieve Non-revenue Water (NRW) Reduction	58	66,000,000		x	x	x	x
WR16	Reduce water losses and increase water savings in King Abdullah Canal	61	500,000	x	x		x	x
WR17	Expand the As Samra Wastewater Treatment Plant (Phase III)	63	325,000,000	x				
WR18	Undertake feasibility studies to explore storm water systems and groundwater filtration	65	15,000,000	x				x
WR19	Undertake Desalination of Seawater at the Gulf of Aqaba through Renewable Energy Sources	67	255,000,000			x	x	x

WR01 | Implement capacity building program for evidence-informed investment decision making in the water sector

Description

The water sector is quite centralized, with little or no roles attributed to municipalities or governorates for project planning and development, or for the delivery of water services. Currently, the MWI is mandated to conduct water resource plans and strategies and oversee their implementation, in addition to its responsibilities for the regulation and protection of Jordan's surface and groundwater resources, water supplies and sewerage services, setting tariff rates and technical review of all water projects. Due to the extreme scarcity of water resources and the need to provide reliable access, while important new policies and regulations have passed, these two entities have been focused on developing and implementing large, capital-intensive water infrastructure projects. However, considering the government's debt status, and the directive to reign in government spending, a renewed focus on policy innovation, enforcement, and efficiency (through incentives, for example) is needed in the coming 10 years. Activities to achieve these objectives will include greater assessment of policy effectiveness, identification of alternatives, and gaps in implementation.

Inside MWI there is a dedicated Utility Performance Monitoring Unit (UPMU) which is responsible for monitoring the utilities' performance as well as setting the minimum service standards, targets, and benchmarks. It is also responsible for promoting and developing private sector participation in the water sector, and for tasks related to project planning and execution. Many of the goals and policies of the water sector are well-aligned with green growth objectives, such as resource efficiency, cost recovery, carbon emissions reduction, and protection of ecosystems and sustainability. However, these concepts are not clearly embedded in the investment criteria for government projects, or in the decision-making process for new policies or regulations. Green growth metrics, such as productivity per liter of water, and the use of cost-benefit analysis are also not built into the planning methodologies or tools currently used by the government. The Jordan Water Project model is designed for assessing infrastructure investment, water management, and regulatory policy options, or combinations of these, under various scenarios of the future. The tool's representation of Jordan's water management institutions and its evaluation of engineering, economics, ecological, and social impacts throughout Jordan over time provide a state-of-the-art example of how to implement advanced integrated water management to achieve robustness, resilience, and sustainability.

Therefore, the purpose of this action is to update the institutional process for developing projects, empower water sector stakeholders with the necessary conceptual understanding of green growth as it pertains to the water sector to inform better decision making, and support the participative design and implementation of a graphical interface of the Jordan Water Project Model together with the development of a single installation file for the model. This capacity building program will improve clarity on the UPMU's roles and functioning, align its resources with its core work, establish appropriate accountability mechanisms to enhance the credibility of the regulatory framework and enhance the institutional process for project management and development. This proposed activity would include the development of an accessible, graphical interface for the Jordan Water Project Model, which includes the possibility to easily modify key inputs for the model runs, select between various population and GDP growth scenarios and combine political interventions in the water sector to test for their outcomes. In addition, the interface would allow for various visualizations of output data and a simple export of key results for presentations and other uses.

The Joint Work Programme (JWP) model would meet the Jordan's Water Sector urgent need for a strategic planning tool, and has the support of the water sector senior management. This has the potential to complement the water sector's current crisis management practices for water policy decisions with a long-term perspective and to support them in their role as a pilot country for monitoring the United Nations (UN) SDG 6 ("Water and Sanitation"). In addition, capacity building will provide water authorities with the necessary skills, methodologies, and technology to do better water resource planning, further incorporating green growth and sustainability objectives. As a result, the government will have more relevant water planning to give greater weight to projects that address social inclusion and that respond to climate change adaptation and mitigation objectives. This means a shift away from the focus on capital-intensive, large-scale water infrastructure to a portfolio approach that incorporates hard and soft infrastructure options.

Action Objectives	<ul style="list-style-type: none"> ▪ Support capacity of the water sector (MWI, JVA, and water utilities) around the concept of water and green growth by making use of better tools and incorporating criteria to consider environmental impacts as well as social impacts. ▪ Conduct needs assessment for training and provide targeted training in green growth planning for the water sector to MWI and JVA officials. ▪ Develop a long-term green growth roadmap for the water sector, with an accompanying investment and financing plan to optimize and prioritize sector investments. ▪ Develop and implement a Strategic Modeling Tool for Water Management in Jordan (JordanCap)/Develop a Graphical Interface for the Strategic Planning Tool. ▪ Offer training for the Strategic Modeling Tool for Water Management Users and IT professionals to analyze, update, and extend the JWP model autonomously.
Implementation Milestones	<ul style="list-style-type: none"> ▪ Capacity building will be undertaken through workshops and joint studies between experts and government decision makers. The program will support an inclusive update to the methodology for project prioritization as listed in the Capital Investment Plan through introduction of green growth criteria. New criteria could include: <ul style="list-style-type: none"> ▪ Assessment of existing evidence base needed for sustainable water resources management; ▪ Appropriateness of project under anticipated climate change scenarios during the lifetime of the respective solution; ▪ Greater emphasis on efficiency in water supply, sewerage services, and re-use; ▪ Opportunities for scaling up or replicating solutions that have been piloted in Jordan and in the region; ▪ Promotion of green jobs in the water sector and private sector-based solutions; and ▪ Minimizing the trade-offs between ecosystem services and economic growth. ▪ One manual developed for best practices in water planning and management, including a course on social, environmental and economic costs and benefits of different water sector decisions. ▪ PCM guideline developed for use by the UPMU and other relevant water sector authorities. ▪ Development and Implementation of a Strategic Modeling Tool for Water Management in Jordan (JordanCap)/Development of a Graphical Interface for the Strategic Planning Tool, including personnel costs for IT professionals, support by a research assistant, and overhead costs.
Relevant Green Growth Objectives	<ul style="list-style-type: none"> ▪ Sustainable Economic Growth – Strengthening the capacity of the public sector in managing water sustainably and efficiently, adopting a green growth approach. ▪ Climate Change mitigation and adaptation – Strengthen the water sector’s resilience and adaptive capacity to climate-related hazards and natural disasters through capacity building.

Estimated Implementation Period	
<i>Start Year</i> – 2021	<i>End Year</i> – 2023

Location(s)	Nationwide	Other key partners	Ministry of Tourism and Antiquities (MOTA), MOPIC, Ministry of Industry and Trade and Supply (MITS), ASEZA, Utilities
Implementing Stakeholders	Lead MWI, JVA, WAJ Support MoEnv, Ministry of Agriculture (MoAg)	Estimated Budget for this Action	USD 760,000

Financing Secured	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Potential Source of Funding	USAID, GIZ, JICA
Action leads to investment	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No – No specific investment will result from this action, however, improving public authorities' capacity to plan water sector interventions may lead to the identification of new priority investments <input type="checkbox"/> This action is an Investment opportunity	Estimated Investment Size	-

Level of Priority			Readiness for Implementation				
Very High	High	Medium	1	2	3	4	5
<ul style="list-style-type: none"> Jordan Water Project researchers, funded by the scientific agencies of USA, Germany, Canada, and the UK under the Belmont Forum's Freshwater Security call, have built an innovative strategic water planning tool for the entire country of Jordan that is ready to be implemented. 							

Implementation Risk Mitigation Measures	<ul style="list-style-type: none"> A detailed needs assessment is essential to ensure the right level of detail in training is provided, and to ensure that capacity building activities are fully internalized. Efforts should be taken to align the processes of the MWI project management unit's project cycle with the government's intended project cycle management approach.
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WR02 | Establish a rainwater harvesting project financing facility to support projects that augment rural and urban water supply

Description
<p>Water resources in Jordan are at critical levels, with more being pulled from deep groundwater aquifers that will be difficult, if not impossible, to replenish. The severe water shortages likely to be faced by Jordan as a result of climate change require a commitment to use the available water resources in a sustainable way, and to explore all opportunities to supply and use water sustainably. Large-scale reservoirs and seawater desalination have been promoted as long-term solutions, but, thus far, the cost involved does not make this a viable option for supporting rural and sparsely populated areas. At the same time, substantial potential exists to expand national awareness and access to RWH to augment the network’s supply. More than 90% of rainwater in Jordan is lost to evaporation or run-off, and RWH is a lower-cost, sustainable approach to diversify both agricultural and municipal water supply.</p> <p>RWH is one of the greenest water supply augmentation approaches, since there are few costs associated with transportation and energy. Moreover, RWH does not require large-scale infrastructure, has a lower environmental footprint, and can be used to augment supply for supplemental irrigation (under the right conditions), as well as for residential and commercial uses. Urban rooftop water capture is less common, but has substantial potential to take pressure off utilities and struggling flood prevention infrastructure, which is under increasing strain as a result of climate change. Macro-Catchment RWH, referring to RWH at large scale, is suitable for agriculture, allowing farmers and rural communities to store rainwater during winter to utilize during summer. Different structures can be used under macro-catchment methods, including stone bunds, large semi-circular bunds, sand dams, earth ponds, and reservoirs. Among these structures; earth ponds and reservoirs are more common for Jordan especially in the northern, eastern, and southern Badia regions.</p> <p>The main barriers to expanding both urban and rural RWH are scattered governance, awareness, and access to finance. First, responsibility for project identification and development is given to multiple bodies: MWI⁵⁰, MoAg, and municipal governments (either through Local Service Councils or the MOLA). Second, the scale of potential for RWH to augment supply has not been well-mapped and public awareness is relatively low, even though households and businesses are increasingly comfortable with rooftop solar for water heating and management of rooftop water tanks. Studies suggest up to 20% of some municipalities’ potable water consumption could be augmented through RWH.⁵¹ Finally, access to finance for both rooftop and on-farm RWH projects is not up to the level required to achieve a significant impact. This concept is proven by the success of the Agriculture Credit Corporation finance facility, but since the facility is limited to agricultural actors, its impact is limited.</p> <p>The purpose of this action is to work with the Cities and Villages Development Bank to establish and manage a revolving financing facility for RWH in Jordan’s municipalities for domestic, commercial, and small agricultural purposes. The aim is to mirror the success of RE financing approaches (such as the solar water heaters loan subsidization program through the Jordan Renewable Energy and Energy Efficiency Fund, JREEEF), and develop a market mechanism to reduce the pressure on fiscal resources for construction of such projects. The project would leverage a portion of government funds currently allocated to RWH in rural areas as co-financing.</p> <p>For agriculture, municipalities will be expected to play a larger role in the implementation of RWH projects. As part of its mandate to promote water demand management, the Cities and Villages Development Bank (CVDB) and MWI should jointly lead this initiative to promote widespread supply augmentation. The implementation of this action should lead to the development of a number of green job opportunities for water service companies, promoting innovation in water harvesting technologies and techniques. Water utilities may also co-invest in RWH maintenance services, providing an additional revenue stream to improve overall cost recovery.</p>

Action Objectives	<ul style="list-style-type: none"> ▪ Consolidate governance of RWH as a means for improved sustainable water supply. ▪ Increase access to finance for micro, small, and medium size RWH projects for agriculture, residential, and commercial use. ▪ Increase awareness about the benefits of RWH to water users, utilities, and decision makers. ▪ Structuring a financing mechanism for investments in RWH. ▪ Catalyze innovation and green job creation through the development of Ministry of Micro, Small and Medium Enterprises (MSMEs) to provide RWH system maintenance services.
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Implementation Milestones	<ul style="list-style-type: none"> ▪ A pipeline of key small and medium water harvesting projects developed in cooperation with MoAg, MWI, municipalities, funding agencies, and international NGOs. ▪ Funding mechanism/requirements determined and revenue model developed for a sustainable financing facility to be managed by relevant national financing institutions and/or commercial banks. ▪ Structure and mandates of the responsible financing facility for managing RWH funds/projects identified. ▪ Technical capacity of responsible body to manage RWH funds/projects ensured. ▪ Government funds channeled into identified financing facility to support implementation of micro, small, and medium size RWH projects. ▪ Marketing and outreach plan developed and implemented to increase awareness about RWH and the availability of funds to support RWH projects on the farm and in urban settings. This also includes: <ul style="list-style-type: none"> ▪ One assessment study conducted to inform the development of the plan, and one monitoring framework developed, implemented, and maintained by MWI. ▪ One marketing and outreach plan developed in collaboration with key stakeholders. ▪ Network of local NGOs and/or Community based organizations (CBOs) activated and supported to increase awareness about the benefits of RWH and provide technical support for project owners. ▪ Social marketing and outreach tools, including mobile apps and multi-media tools, developed and implemented nationwide. ▪ Periodic results monitoring implemented and used to inform future planning. ▪ RWH mainstreaming and expansion plan developed for the period 2025-2029, with a detailed proposal for project implementation designed and discussed with potential donors. ▪ Funding mechanism tested and piloted before upscaling the activities.
Relevant Green Growth Objectives	<ul style="list-style-type: none"> ▪ Natural capital – Augmenting water supply for priority economic activities through decentralized infrastructure solutions, such as RWH or reclaimed wastewater, and ensuring a reliable supply of water to protect and restore critical water-related ecosystems, including forests, wetlands, rivers, aquifers, and lakes. ▪ Climate change – Improve drought resilience by expanding supplies and introducing demand management measures across sectors. ▪ Social development and poverty reduction – Ensuring equitable, reliable, and affordable access to clean water and sanitation services for all.

Estimated Implementation Period

<i>Start Year</i> – 2021	<i>End Year</i> – 2024
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Location(s)	RWH projects in all municipalities would be eligible for support	Other key partners	UN Habitat, Hashemite Fund for Badia Development, International Center for Agricultural Research in the Dry Areas (ICARDA), Royal Society for the Conservation of Nature (RSCN), USAID-Water Innovations Technologies (WIT) Program
Implementing Stakeholders	<i>Lead</i> CVDB, municipal governments <i>Support</i> MOLA, MoAg, MWI, JVA, MoF	Estimated Budget for this Action	USD 5,000,000 – this will cover technical assistance and financial modelling (market research, technical needs analysis and business model development for the program).

⁵⁰ MWI. "Water Sector Capital Investment Plan 2016-2025," 2016.

⁵¹ Abdulla, Fayez A, and A W Al-Shareef. "Roof Rainwater Harvesting Systems for Household Water Supply in Jordan." Desalination 243, no. 1 (2009): 195–207.

Financing Secured	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Potential Source of Funding	Adaptation Fund
Action leads to investment	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> This action is an Investment opportunity	Estimated Investment Size	USD 10,000,000 – estimated initial fund size

Level of Priority			Readiness for Implementation				
Very High	High	Medium	1	2	3	4	5
<ul style="list-style-type: none"> National experience on RWH is growing and available to support project design and implementation. Several development agencies and government institutions are working on RWH techniques that are ready for scale up. 							

Implementation Risk Mitigation Measures	<ul style="list-style-type: none"> Strong outreach and awareness are necessary to ensure full funds utilization. Implementing institution will need training and support around project development and implementation. A stakeholder coordination committee should be established between water and agriculture authorities and implementing stakeholders to support joint decision making. Piloting RWH at public facilities in urban centers and using the results in awareness raising efforts (demonstration) is likely to trigger wider community engagement in the process, and trigger more local investments and external funds to scale-up and replicate. Developed funding mechanism should be embedded in the CVDB with technical support for various projects following mandates of the responsible governmental body (MWI, MoAg).
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WR03 | Implement Key Wastewater Treatment Projects to improve Water Supply Augmentation

Description
<p>Several initiatives are being considered to provide lasting solutions to the water scarcity situation in Jordan, and one of these includes the construction of WWTPs to recycle wastewater. WWTPs are adaptation measures engineered to reduce water scarcity, expected to worsen over the coming years in Jordan as a result of the hazardous impact of climate change. Several studies have shown the impact of wastewater recycling on water availability as it can reduce the demand-supply gap by as much as 48%, significantly improving water availability. Furthermore, WWT also confers environmental and ecological benefits. It enables the conservation and preservation of existing water sources by rechanneling wastewater that would have been dumped into water bodies to treatment plants. Other benefits also include the maintenance of a healthy and sustainable ecological system.</p> <p>Agriculture is the highest water consuming sector representing 52% of the total water use, from which 26% is sourced by treated water and the remaining 74% is from groundwater and surface water⁵². The amount of treated water used for irrigation represents 98% of treated wastewater produced. The effluent from treatment plants is used primarily in the plant's surrounding region for restricted irrigation of forage crops, while surplus is indirectly discharged to wadis and streams where it can blend with freshwater reservoirs, after which it is directed for reuse in farm irrigation. While the vast majority of reclaimed water is used for restricted irrigation, 2% is currently used for industrial purposes in particular within the Aqaba Special Economic Zone⁵³, while the rest is mainly sourced from groundwater.</p> <p>In 2017, re-used treated wastewater only accounted for 14% of the total water resource available in Jordan⁵⁴ and in light of growing water scarcity, there's adequate room for WWT to play a more central role. While only 63% of Jordan's population has access to a collection and treatment system, the supply of reclaimed water production is expected to increase as a result of increasing connection to sewer systems and population growth. On the other hand, the use of treated water in the agriculture sector is growing relative to other sectors, and the potential of fresh water saving through reclaimed water in agriculture is estimated at 75 MCM per year (2010). Therefore, substituting groundwater and surface water with treated wastewater in the agriculture sector would allow to redirect freshwater to potable, use helping to depress the supply gap. This method can also be applied to the industrial sector, but this sector's current water use remains low compared to the agriculture sector, since the sector only consumes 32 MCM per year (2017). Treated wastewater can provide additional water volume to boost the Kingdom's existing water resources. Currently, sewage services are available to 63% of Jordan's urban population, providing basic resources required for the treatment plant. In Jordan, there are 31 WWTPs operating to international standards treating an estimated 122 billion liters of water and providing more than 115 billion liters for varied uses in industry and agriculture.</p> <p>This program is aimed at developing and expanding the capacities of WWTPs at Aqaba, Madaba and Burkish to improve the volume of reclaimed for agriculture use thus redirecting potable water used in irrigation for domestic uses to alleviate the water supply deficit.</p>

Action Objectives	<ul style="list-style-type: none"> ▪ Increase production and use of treated wastewater to alleviate current water stress and improve ecosystem quality.
Implementation Milestones	<ul style="list-style-type: none"> ▪ Construction of the Burkish WWTP. ▪ Rehabilitation of the Madaba WWTP. ▪ Decentralized expansion of the Aqaba WWTP to the south coast. <p>NOTE: Detailed concept notes for these actions are available.</p>

⁵² GCF project concept note developed in 2020 by GGGI on Wastewater Treatment.

⁵³ GCF project concept note developed in 2020 by GGGI on Wastewater Treatment.

⁵⁴ GCF project concept note developed in 2020 by GGGI on Wastewater Treatment.

Relevant Green Growth Objectives	<ul style="list-style-type: none"> ▪ Climate Change Mitigation and Adaptation - Reducing GHG emissions in the water sector through use of RE and EE in water production and distribution systems. ▪ Natural Capital - Augmenting water supply for priority economic activities through decentralized infrastructure solutions such as RWH or reclaimed wastewater; Increasing the quantity of water and wastewater treated for further recycling and reuse.
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Estimated Implementation Period	
<i>Start Year</i> – 2021	<i>End Year</i> – 2025

Location(s)	Aqaba, Madaba and Burkish	Other key partners	-
Implementing Stakeholders	Lead MoEnv, MWI, WAJ Support ASEZA, Aqaba Development Corporation (ADC), Arabetch Jardaneh	Estimated Budget for this Action	USD 1,500,000 – feasibility studies and analysis

Financing Secured	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Potential Source of Funding	Green Climate Fund (GCF)
Action leads to investment	<input checked="" type="checkbox"/> Yes - this is a preparatory activity currently being proposed to GCF <input type="checkbox"/> No <input type="checkbox"/> This action is an Investment opportunity	Estimated Investment Size	USD 67,900,000 USD 55,600,000 million - Burkish WWTP USD 12,300,00 million - Aqaba WWTP rehabilitation

Level of Priority			Readiness for Implementation				
Very High	High	Medium	1	2	3	4	5
<ul style="list-style-type: none"> ▪ GCF concept notes have been developed and will be submitted in 2020 to receive project preparation facility grants. 							

Implementation Risk Mitigation Measures	<ul style="list-style-type: none"> ▪ Financial Risks: To minimize the cost of energy, wastewater plants will incorporate RE solutions such as PV panels, as a cheaper source of energy to power the plants. Besides reducing the cost of the O&M, the RE options will also significantly reduce the treatment plant's carbon footprint. Markets studies have been commissioned to assess the need for reclaimed water in the regions where treatment plants will be implemented. ▪ Operational Risks: A performance improvement and training needs assessment is ongoing to establish the technical skill gap and how best to improve local capacity. The reclaimed water produced needs to meet effluent quality standards set by the government. All 3 WWTPs have been designed so that effluent standards are met. All three treatment plant projects have incorporated sewer network extensions to ensure that most of the wastewater produced by households, industries, and businesses is channeled to the WWTP. ▪ Ecological and Health Risks: To mitigate contamination of potable water by wastewater, treatment facilities are designed to comply with the Jordanian technical standard n.893/2006 on water reuse management in Agriculture.
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WR04 | Establish incentives for pollution prevention with industry in the Zarqa River Basin

Description				
<p>The Zarqa River's catchment area is one of the most densely populated areas in Jordan, comprising around 65% of the country's population and more than 85% of its industrial and economical activities. The continuous deterioration of the basin's ecosystem components for almost three decades is one of the biggest environmental challenges in Jordan. The conditions have been compounded with unplanned growth and the influx of refugees, and measures are lacking to meet the increasing demand on resources, in addition to the effects on the socio-economic situation. Agriculture, which is the mainstay of some of the people, has also been affected as desertification has swept through the east of this governorate, bringing eastern wind and sand to Zarqa's residents, and the Zarqa River itself has become significantly degraded, with reduced base flow.</p> <p>Approximately 52% of all industries are located in the Zarqa Governorate and 86% of those industries have a WWT unit installed. Only half of those units are operational (42%). Currently, there are no incentives in this area to prevent pollution or to support rehabilitation. Industries dump the produced industrial wastewater at the Al Akaider facility which is located in Jordan's northern border with Syria (100 km away). While there are studies conducted to construct an industrial WWTP in Halabat area, it is important to also develop appropriate incentives for the industries to limit pollution. Neglecting water pollution control also entails high social and environmental costs.</p> <p>Water pollution cannot be addressed by price and market-based schemes alone. It is necessary for a combination of planning (e.g. EQOs), regulation (e.g. monitoring), and economic instruments (e.g. incentives such as charges, tradable permits, etc.) be used. In addition to these, voluntary initiatives can help support and fill gaps not covered by economic instruments. Successful incentives (economic and voluntary) will cost less than building an industrial treatment facility. The goal of these initiatives is to enhance the efficiency and scope of existing regulations. Voluntary initiatives for pollution reduction can be introduced for sectors or pollutants in which the political will to pass formal regulations is still lacking. Voluntary, however, does not mean unregulated. Voluntary incentives would include regulations set by the government that establish specific targets or target-based goals, with the government also possibly specifying a qualitative or process-oriented goal.</p> <p>The purpose of this action is to undertake a process of consultation to bring industrial sources of pollution to identify the appropriate mix of voluntary environmental goals in exchange for support with environmental awareness, technical process changes, and access to necessary technologies to remediate pollutive practices.</p> <p>Regardless of which combination of schemes is used, realistic goals and priorities need to be set in order to reduce and reverse water degradation according to appropriate indicators. Rigorous but phased legislation, with realistic timetables and enforcement of technical standards, can act as key catalysts of change in water pollution abatement. These shall be designed in close consultation with industrial partners.</p>				
<table border="1"> <thead> <tr> <th data-bbox="340 1608 539 1993">Action Objectives</th> <th data-bbox="539 1608 1505 1993"></th> </tr> </thead> <tbody> <tr> <td data-bbox="340 1608 539 1993"></td> <td data-bbox="539 1608 1505 1993"> <ul style="list-style-type: none"> ▪ Identification and development of geo-database of key industries in the region and their current status with regard to volume and nature of produced wastewater, and practices for disposing treated or untreated industrial wastewater in Zarqa river. ▪ Assessment of regulatory and law enforcement frameworks on treatment, storage, and disposal of industrial wastewater. ▪ Development of industrial wastewater management action plan for industrial activities, including the promotion of on-site treatment and re-use of treated industrial wastewater. ▪ Economic evaluation and testing of the options (e.g. tax credits) for the implementation of Voluntary Incentive Program compared to the costs for building an industrial WWT facility. ▪ Raising the level of awareness of target industry about industrial wastewater-based pollution prevention, the developed action plan, and on WWT system operations. </td> </tr> </tbody> </table>	Action Objectives			<ul style="list-style-type: none"> ▪ Identification and development of geo-database of key industries in the region and their current status with regard to volume and nature of produced wastewater, and practices for disposing treated or untreated industrial wastewater in Zarqa river. ▪ Assessment of regulatory and law enforcement frameworks on treatment, storage, and disposal of industrial wastewater. ▪ Development of industrial wastewater management action plan for industrial activities, including the promotion of on-site treatment and re-use of treated industrial wastewater. ▪ Economic evaluation and testing of the options (e.g. tax credits) for the implementation of Voluntary Incentive Program compared to the costs for building an industrial WWT facility. ▪ Raising the level of awareness of target industry about industrial wastewater-based pollution prevention, the developed action plan, and on WWT system operations.
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Implementation Milestones	<ul style="list-style-type: none"> ▪ Geo-database developed to cover key industries along Zarqa river, to better understand the types and sources of pollution, and provide regulators (MoEnv) with the necessary tools to monitor progress against joint objectives. ▪ Economic study conducted to compare the cost of building an industrial WWT facility and the payment incentives needed to reduce or eliminate the pollution from industries. ▪ Assessment of laws and frameworks that govern industrial wastewater management conducted. ▪ Establish one joint public-private dialogue on the challenges and opportunities around reducing such pollution, including which incentives and investments would be required to encourage a long-term shift from pollutive activities. ▪ Industrial wastewater management action plan developed and piloted for key industrial activities within the Zarqa river catchment, following participatory approaches. ▪ Awareness and knowledge sharing materials developed, and four, industry-specific, awareness events held for target industry on pollution prevention, the action plan, and on industrial WWT system options and costs.
Relevant Green Growth Objectives	<ul style="list-style-type: none"> ▪ Natural capital - Augmenting water supply for priority economic activities through decentralized infrastructure solutions, such as RWH or reclaimed wastewater, and ensuring a reliable supply of water to protect and restore critical water-related ecosystems, including forests, wetlands, rivers, aquifers, and lakes. ▪ Sustainable Economic Growth - Generating additional green jobs through private sector engagement and cross-cutting approaches in the water sector.

Estimated Implementation Period	
<i>Start Year</i> – 2021	<i>End Year</i> – 2024

Location(s)	Zarqa region	Other key partners	Private industrial firms, International Union for Conservation of Nature - Regional Office for West Asia (IUCN ROWA)
Implementing Stakeholders	<p><i>Lead</i> MoEnv, MWI, MITS, Jordan Chamber of Industry (JCI), ZCI</p> <p><i>Support</i> MoF, MOLA, MoAG</p>	Estimated Budget for this Action	USD 950,000 (USD 150,000 for the geodatabase, USD 250,000 for studies, assessments and development of the action plan, USD 50,000 for the awareness events; additional USD 500,000 for follow up and/or scale up)

Financing Secured	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Potential Source of Funding	International Union for Conservation of Nature (IUCN), SDC
Action leads to investment	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No - No specific investment is identified through the implementation of this action; however, cooperation with industry may result in investment opportunities that could achieve a triple bottom line. <input type="checkbox"/> This action is an Investment opportunity	Estimated Investment Size	-

Level of Priority			Readiness for Implementation				
Very High	High	Medium	1	2	3	4	5
<ul style="list-style-type: none"> ▪ Upcoming Study - an agreement between IUCN ROWA and IOW was signed to prepare the situation study for Zarqa River Basin in Jordan. 							

Implementation Risk Mitigation Measures	<ul style="list-style-type: none"> ▪ Strong engagement needed with the private sector. ▪ Laws and regulations need to be carefully reviewed to make sure incentives are aligned, and that there are no other “perverse” incentives that inadvertently increase pollution. ▪ Stakeholder coordination committee should be established between MWI, MoEnv, Chambers of Industry, and other private sector entities. ▪ Partnership between the MWI and MoEnv.
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WR05 | Construct dams and implement a parallel community water resource stewardship program for several communities in the Jordan Valley

Description
<p>The governorates of Karak and Tafilah are two of the greatest water hotspots in Jordan, while at the same time a major source of agricultural production for the country. A decreasing flow of water from the upper Jordan River, together with a decreasing rainfall due to climate change, have created a complex water resource management situation in communities across these governorates. While increasing water supply through pumping underground aquifers is not a sustainable solution, dams that can collect and store harvested rainwater can help address some of the economic, environmental, and social strain that has come as a result of water scarcity. Karak and Tafilah are already host to some of Jordan's major dams, yet additional supply is required to meet the environmental and economic demands of the region. Although the majority of olive cultivation in this region of the country continues to be rainfed, irrigated agriculture, tourism, and municipal users are all competing for limited water resources. Water losses in the networks connected to these dams are especially high due to damage to the pipes, as well as illegal drilling and pumping.</p> <p>The purpose of this action is to address both supply and demand for water in these key communities through the construction of infrastructure and implementation of community-based stewardship approaches. JVA and their supporters have already completed feasibility studies for 3 priority dams to be constructed, including the Medien Dam, the Wadat Dam in the Tafileh governorate and the Wadi Essal Dam in the Karak governorate. The estimated cost for constructing these dams is relatively high (at USD 69.0 million), with an estimated storage capacity of 5.84 MCM of water. Therefore, additional efforts are needed to ensure the sustainable economic development of the region, which requires addressing the livelihood development and environmental sustainability concerns at the same time. To achieve this, dam construction will be undertaken in parallel with a strong package of technical assistance programs, educating communities about the infrastructure's development process, including its potential benefits and associated costs. Through this approach, the program will aim to build greater community stewardship of the future water resources. The program will increase awareness about climate change, collect local knowledge and combine it with international best practices and introduce appropriate water efficiency measures. Livelihood opportunities as a result of the expected water resources will be explored and supported in the agriculture (processing and value-add), tourism and municipal water services sectors.</p>

Action Objectives	<ul style="list-style-type: none"> ▪ Building new dams to raise the total storage capacity and improve supply for different uses in potential drought hotspots. ▪ Increase awareness about climate change, combining local knowledge and international best practice to train water farmers on water efficiency techniques. ▪ Identify water-efficiency opportunities for livelihood development in the tourism, agriculture, and water services sectors.
Implementation Milestones	<ul style="list-style-type: none"> ▪ Conduct strategic environmental impact assessments for three proposed dams in the Jordan Valley. These studies will identify the costs and benefits of investment and evaluate the impact of construction on long-term growth potential. Mitigation measures will be identified for further investment, including any potential impact on ecosystem services through community-based approaches. ▪ Design and implement community-level climate change awareness and environmental stewardship programs for each of the 3 communities to benefit from the construction of these dams. Beneficiaries to be engaged with will likely include the major agricultural users as well as community leaders, youth, and women. ▪ Undertake a study to identify livelihood opportunities and innovative approaches to promote profitable, resource-efficient ventures in collaboration with local water users, focusing on tourism, agriculture, and water supply services. Business start-up grants will be provided to promote water-efficient business creation. ▪ Construction of dams to increase water storage capacity for different uses at three sites: <ul style="list-style-type: none"> ▪ Construction of Medien Dam with a storage capacity of 1.5 MCM. ▪ Construction of Wadat Dam with a storage capacity of 0.44 MCM, near Tafileh. ▪ Wadi Essal Dam with a storage capacity of 3.9 MCM, near Karak.

Relevant Green Growth Objectives	<ul style="list-style-type: none"> ▪ Climate Change Mitigation and Adaptation - Improve drought resilience by expanding decentralized supply and introducing demand management measures across sectors. ▪ Resource Efficiency - Improving EE in water operations such as water and WWT and pumping systems. ▪ Social Development - Ensuring equitable, reliable, and affordable access to clean water and sanitation services for all.
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Estimated Implementation Period	
<i>Start Year</i> – 2022	<i>End Year</i> – 2025

Location(s)	Across the Jordan Valley	Other key partners	-
Implementing Stakeholders	<i>Lead</i> JVA <i>Support</i> MWI, Municipalities, Water Users Associations	Estimated Budget for this Action	USD 1,000,000 in technical assistance (studies and engagement) USD 2,000,000 in business startup grants and support

Financing Secured	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Potential Source of Funding	To be determined (TBD) (public, private, donor mix)
Action leads to investment	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> This action is an Investment opportunity	Estimated Investment Size	USD 63,900,000 USD 8.4 million for Medien Dam USD 10.5 million for Wadat Dam USD 45 million for Wadi Essal Dam

Level of Priority			Readiness for Implementation				
Very High	High	Medium	1	2	3	4	5
<ul style="list-style-type: none"> ▪ Feasibility studies for the construction of the dams are available from the JVA. 							

Implementation Risk Mitigation Measures	
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WR06 | Technical Assistance to support water efficiency in businesses, industries and commercial activities (Based on SwitchMed Experience)

Description
<p>The European Union (EU)-funded SwitchMed program aims at scaling-up social and eco-innovations in the Mediterranean to achieve circular and sharing economies. The MED TEST II component, implemented through the RSS in partnership with Amman's chamber of Industry and with technical guidance by the United Nations Industrial Development Organization (UNIDO), aims at reinforcing the local capacities of service providers on resource efficiency tools and to develop local markets for sustainable production services. For example, following their participation in the MED TEST II program and identification of green growth opportunities, the Coca-Cola Bottling Company of Jordan was able to achieve total annual savings of more than 26,000 m³ of water (EUR 50,000) by optimizing the Clean-in-place (CIP) system, treating the cooling towers' blowdown by Reverse osmosis (RO) system for reuse; installing water-efficient devices (i.e. taps, shower heads, toilets, trigger operated hoses, etc.); modifying the existing RO3 to treat all water disposed from RO1 to be reused; using sterilized compressed air at 3 bar instead of water to purge the concentrate residues in the pipes before starting the CIP process; reducing operating hours at the Returnable Glass Bottle line by 77% to produce Non-Returnable Glass Bottle only. Also, there is the potential to recycle around 40,000 m³/year of treated wastewater, which can be used for irrigation.</p> <p>The water saving measures could be achieved through applying Resource Efficient and Cleaner Production (RECP)/ Transfer of Environmentally Sound Technology (TEST) systematic audits, in which the inefficiencies' sources and causes are revealed by applying benchmarking, measurements, and water mass balances. At the same time, corrective saving measures are generated and their technical, environmental, and economic feasibilities are analyzed for planning an action, implementation, evaluation of performance, and continuous improvement. There are currently no plans or resources for the government to hold a permanent role in supporting the industry with water efficiency measures. In the long run, this type of service should be provided by the private sector because there is clear financial incentive for businesses to invest in retrofits. However, in the medium term, industry should work with the government and development partners to design a system that can be implemented effectively. No comprehensive study has been done to assess the potential of water savings from this action. But, through water efficiency, companies will save on their own costs, which can be used to reinvest in better technologies and processes. There is a significant lack of technical capacity in small- and medium-sized enterprises (SMEs), as well as in large industries, regarding resource efficiency tools, and there is also a lack of knowledge regarding the promising opportunities and economic benefits that the shift towards green growth holds. Increased water efficiency by large and small companies in the industrial sub-sector, together with the reuse of treated wastewater for irrigation purposes, would alleviate water stress caused by agriculture's ever-increasing demand. This would also protect key ecosystems from further deterioration, while contributing to more sustainable patterns of water management. Water reuse by the agriculture sector has the additional co-benefit of reducing the sector's reliance on freshwater, thus addressing the sector's overall demand.</p> <p>The purpose of this action is to support the shift towards more sustainable production and consumption patterns to be implemented by SMEs and industries, giving rise to low carbon and climate resilient societies. Based on the SwitchMed experience, MEDTEST II identified 12 food and beverage industry actors that would benefit from investing in water efficiency retrofits in a similar way to Coca-Cola.⁵⁵ As per Jordan's MED TEST II experience, t 63,844 m³ of water could be saved annually in these 12 companies. Other relevant sectors can include the textile industry, or other industries that require water use.</p>

Action Objectives	<ul style="list-style-type: none"> ▪ Scale up RECP in Jordan, building on the capacities and experience gathered thanks to the MED TEST II project which was implemented within the regional SwitchMed program in 2015-2017. ▪ Support industry through the application of a systematic approach on effective innovations, including best available techniques for maximizing water use efficiency. ▪ Train local technical assistance providers in the RECP/TEST methodology to build capacity in the local market. ▪ Develop incentive programs to encourage offering products and services that improve water use efficiency in businesses. Such programs might include low cost loans, tax incentives, grants, and fee waivers. ▪ Financial or tax incentives to encourage businesses to use reclaimed water instead of freshwater. ▪ An annual awards program recognizing the achievements of businesses, institutions, and individuals in the field of water efficiency shall be implemented, to promote and develop a rational use and protection of water resources.
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⁵⁵ SwitchMed. "Switch Med Magazine, Jordan," 2018.

Implementation Milestones	<ul style="list-style-type: none"> ▪ Enhancement of the capacity of key industrial businesses identified as major water consumers, preparing them to achieve water efficiency (this entails the development and efficient implementation of a capacity building program). ▪ Investment support mechanism developed to mainstream water efficiency across the industrial sector. This includes the following sub-milestones: <ul style="list-style-type: none"> ▪ Identification and evaluation of the types and options available for the fiscal incentives required to make water efficiency and conservation investments for business and industry more attractive. ▪ Development and piloting of an incentive program to encourage the offering of products and services that improve water use efficiency in businesses. The program must encompass at least 10 key industrial businesses. ▪ Investment support mechanism developed for water audits and upgrades, using relevant technologies with the engagement of commercial banks and/or national financing institution. ▪ Establishment of an annual awards program recognizing the achievements of businesses, institutions, and individuals in the field of water efficiency, to promote the rational use and protection of water resources.
Relevant Green Growth Objectives	<ul style="list-style-type: none"> ▪ Resource Efficiency - Increasing water-use efficiency across all sectors, including agriculture, industries, and municipal sectors, to address water scarcity. ▪ Sustainable Economic Growth - Introducing demand management measures such as efficiency improvements to save water and enhance capacity. ▪ Climate change adaptation and mitigation - Improve drought resilience by introducing demand management measures across sectors.

Estimated Implementation Period	
<i>Start Year</i> – 2021	<i>End Year</i> – 2024

Location(s)	Nationwide	Other key partners	ASEZA, Chamber of Industry
Implementing Stakeholders	<i>Lead</i> RSS <i>Support</i> Amman Chamber of Industry, ZCI, MWI, MoEnv	Estimated Budget for this Action	USD 1,640,000

Financing Secured	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Potential Source of Funding	EU, with potential co-financing from national fund
Action leads to investment	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> This action is an Investment opportunity	Estimated Investment Size	USD 2,500,000

Level of Priority			Readiness for Implementation				
Very High	High	Medium	1	2	3	4	5
<ul style="list-style-type: none"> ▪ RSS has received multiple rounds of support to undertake studies and capacity building in cooperation with the private sector, to reduce water consumption in several commercial and industrial sectors. 							

Implementation Risk Mitigation Measures	<ul style="list-style-type: none"> ▪ Businesses might be reluctant to participate. Appropriate incentives need to be developed to ensure participation, and to help the businesses continue to make profits. ▪ Commercial banks' awareness should be raised about the value of such incentive programs and the potential benefits they can achieve when engaging in similar programs. This can be established based on the achievements in the RE and EE initiatives.
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WR07 | Implement Water Supply Improvement Project for Balqa Governorate

Description
<p>Non-revenue water (NRW) is water that is pumped into water networks but that is not charged to clients. There are various reasons for NRW, either because it doesn't reach the clients because of leakage in the networks, inefficient water meters, because of water theft, or because bills are either not sent or not paid. NRW is normally divided into two categories: technical losses, which occur in the system due to leakages; and administrative losses, which occur due to faults in the sending of bills, such as not sending bills, sending bills to the wrong clients or because clients are not paying. As a rule of thumb, the technical and administrative losses each represent 50% of the total in the context of Jordan. The NRW rate in the capital is about 37%, a considerably high percentage. It's important to see whether there is room for lowering the NRW, especially for a country like Jordan, which is characterized by water scarcity. MWI has already set a target of reducing NRW to 30% by 2025, bringing technical losses to below 15%.</p> <p>The purpose of this action is to reduce the percentage of NRW loss by improving water networks. By reducing leakage in the Balqa municipal networks, there will be a reduction of physical losses in the system and utilities will be able to recover water distribution costs, improving overall financial performance. As part of these network improvements, improved metering and administration of municipal systems will allow for enforcing action against water theft and illegal wells. The areas were selected based on a specific basis and study on all areas of the capital, which amounted to 45 service areas. Therefore, the areas which most need to reduce losses were selected through number of complaints, number of fractions, population, and network lengths.</p>

Action Objectives	<ul style="list-style-type: none"> Reduction of about 5%-10% of water losses from the municipal water supply system in the targeted areas. Reduction of energy consumption for water pumping through the water supply system. Increasing the efficiency of water supply services as well as the amount of water delivered through the municipal water network. Installation of new water metering units at the administrative level to enhance the water network's control and management. Contribute to improve the quality of supplied water and reduce the incidence of water pollution as a result of improved water supply infrastructure. Building capacity of water utilities in NRW management.
Implementation Milestones	<ul style="list-style-type: none"> Potential locations for municipal water network rehabilitation identified and prioritized. Baseline studies prepared to identify the scope rehabilitation activities necessary for the water network. Feasibility studies and engineering designs prepared, in order to assist the water network's rehabilitation. Updated Geographic Information System (GIS) data for the newly constructed/rehabilitated water networks. Municipal water network rehabilitated in the targeted areas. Improved capacity of water utilities in managing NRW, through the provision of technical trainings and capacity building programs.
Relevant Green Growth Objectives	<ul style="list-style-type: none"> Sustainable Economic Growth - Introducing demand management measures such as efficiency improvements to save/conservate water and improve financial sustainability through reduced leakages/losses and NRW. Resource Efficiency - Increasing water-use efficiency across all sectors, including agriculture, industries, and municipal sectors, to address water scarcity. Climate change adaptation and mitigation - Improve drought resilience by introducing demand management measures across sectors. Social development and poverty reduction - increased access to water services.

Estimated Implementation Period							
<i>Start Year</i> – 2021		<i>End Year</i> – 2025					
Location(s)	Balqaa	Other key partners	-				
Implementing Stakeholders	<i>Lead</i> MWI, WAJ <i>Support</i> Water utilities, Balqa Governorate	Estimated Budget for this Action	USD 300,00 for feasibility studies and engineering designs				
Financing Secured	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Potential Source of Funding	To be determined (TBD)				
Action leads to investment	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> This action is an Investment opportunity	Estimated Investment Size	USD 2,000,000 for network rehabilitation in 4-5 locations				
Level of Priority		Readiness for Implementation					
Very High	High	Medium	1	2	3	4	5
Implementation Risk Mitigation Measures	<ul style="list-style-type: none"> Strong community outreach to spread awareness regarding NRW losses. Stakeholder coordination committee should be established between public and private stakeholders. Technical capacity of water utilities in managing NRW is key aspect to guarantee the proposed objectives can be achieved. 						

WR08 | Improve irrigation efficiency in the Jordan Valley (Mid-Ghors)

Description
<p>Agriculture is extremely important to the Jordan valley's local economy, with farming being a critical contributor to food security, livelihood creation, and overall agriculture sector sustainability. Irrigation demand for the Jordan Valley is 320 MCM/ year, and the share of irrigated agriculture from the available water resources stands at 53% as of 2017, with increasing demand for domestic and industrial use. With the increasing water demands for domestic and industrial uses (due to population and economic growth), the share available for agriculture will further decrease. A significant reason for the lack of resource efficiency in Jordan's agriculture sector is that incentives for efficiency have not been fully developed or implemented. Decision makers struggle to remove or reform the subsidy because profits in agriculture remain low, with approximately JOD 13 million annual losses under the prevailing irrigation tariffs and market prices, forcing many farmers in the Jordan Valley to be largely dependent on loans to survive. Until this situation can be addressed in the medium to long term, measures that improve water efficiency in agriculture will be critical. As such, the purpose of this action is to reduce the loss of water in the irrigation networks of the mid-region of the Jordan Valley. The Middle Ghors region in particular has been characterized in studies as an area with high levels of water insecurity and water quality concerns from farmers. Irrigation water management in an era of water scarcity has to be carried out efficiently, aiming at saving water and at maximizing its productivity. Irrigation management will shift from emphasizing the production per area unit towards maximizing the production per unit of water consumed, i.e., water productivity. Through rehabilitation of the physical network and installation of metering devices, as well as capacity building for local water users, this action aims to raise the efficiency of the irrigation at the network level to 85%.</p>

Action Objectives	<ul style="list-style-type: none"> Introducing demand management measures such as efficiency improvements, loss reduction to save/conservate water. This action aims at improving efficiency of irrigation network in in the mid-section of the Jordan Valley through rehabilitating and upgrading the existing irrigation networks.
Implementation Milestones	<ul style="list-style-type: none"> Irrigation network properly rehabilitated, serving an area of 930,000,000 square meters. Achievement of water savings through the irrigation network's rehabilitation, attained by upgrading current systems, installing Farm Turnout Assembly (FTA) (metering devices, etc.), and installing leakage detection devices. Provision of on-site capacity building for JVA staff and members and Water Users Associations, together with a joint exploration of innovative incentive structures that will increase efficiency in the end-use of water for agricultural purposes.
Relevant Green Growth Objectives	<ul style="list-style-type: none"> Economic Growth and Sustainability - Introducing demand management measures such as efficiency improvements to save/conservate water and improve financial sustainability through reduced leakages/losses. Resource Efficiency – Increasing water-use efficiency across all sectors, including agriculture, industries, and municipal sectors, to address water scarcity. Climate change adaptation and mitigation – Improve drought resilience by expanding supplies and introducing demand management measures across sectors.

Estimated Implementation Period							
<i>Start Year</i> – 2021		<i>End Year</i> – 2025					
Location(s)	Middle Jordan Valley	Other key partners	MoAg, NARC				
Implementing Stakeholders	<i>Lead</i> JVA <i>Support</i> MWI, Water Users Associations	Estimated Budget for this Action	USD 500,000				
Financing Secured	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Potential Source of Funding	To be determined (TBD)				
Action leads to investment	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> This action is an Investment opportunity	Estimated Investment Size	USD 28,000,000				
Level of Priority			Readiness for Implementation				
Very High	High	Medium	1	2	3	4	5
Implementation Risk Mitigation Measures							

WR09 | Increasing willingness of end user stakeholders to accept wastewater reuse in Jordan

Description	
<p>The project will promote circular economy and reuse of reclaimed wastewater among end user stakeholders (farmers, industry, business owners, and others), building on the success of current programming such as ReWater MENA. Fortunately, the use of recycled water within Jordan has been made possible by the development and evolution of a sound legislative and legal foundation. There are several sets of standards that have paved the way. These include the first law regarding the operation of municipal sewer systems, which was first established in 1955, and the original public health standards first enacted in 1971. Today, there are several sets of standards and guidelines for wastewater, sludge, soil, and crops that were derived from the work of WAJ and the MWI. The total number of treatment plants is currently 33, treating about 107 MCM/year, or about 98% of the collected wastewater. Unfortunately, the construction of WWT facilities and policies to promote reuse does not ensure that the public will accept, use or pay for recycled water, despite its important advantages, particularly for the irrigation of agricultural crops and landscapes.</p> <p>Amongst the barriers preventing its exploitation and hindering new investments (e.g., financial constraints, inadequate regulatory frameworks, engineering issues, etc.), several researchers have pointed out the importance of social acceptance and beliefs in influencing the implementation of new water projects or, more generally, the use of innovation. Examples of factors potentially influencing people’s acceptance of recycling water schemes are represented by perceived risks and benefits, perceived control over the quality of water, trust in authorities, knowledge about the schemes, and personal feelings and emotions about these schemes. Indeed, end users’ perception of reclaimed water may be a function of its quality, but consideration should also be given to the end users’ capacity to manage the challenges that are associated with reclaimed water (salinity, irrigation system damage, marketing of produce, etc.) as well as their actual and perceived capacity to control where and when reclaimed water is used, and their capacity to influence the quality of the water delivered to the farm.</p> <p>In terms of policy implications, this confirms the importance of raising end user stakeholders’ awareness and encouraging their involvement in leveraging public acceptance to foster technology diffusion. Participation of end users in developing guidelines, standards, policies, and plans for agricultural/industrial/business reuse is very important for the sustainability of treated wastewater reuse. However, raising the public’s knowledge of water reuse alone could prove to be insufficient to ensure acceptance. Policy measures aimed at informing local actors should look more carefully at local water needs by potential users, build on personal experiences, and address business-specific water-related concerns. This should build on a more thorough assessment of how end users and their businesses can benefit the most from water reuse. Transparency in information will be relevant, in particular in cases in which doubts can be raised with respect to technical aspects of reusing purified wastewater. A mix of approaches, focusing the needs of different potential users, needs to be contextualized in a shared vision of long-term challenges associated with water scarcity.</p> <p>The purpose of this action will be to increase the engagement and influence the behavior of end user stakeholders on wastewater reuse and the development of a circular economy.</p>	
Action Objectives	<ul style="list-style-type: none"> ▪ Promote circular economy and reuse of reclaimed wastewater among end user stakeholders through tailored engagements.
Implementation Milestones	<ul style="list-style-type: none"> ▪ Assessment of various end user stakeholder’s perceptions, beliefs, and knowledge on safety and benefits of wastewater reuse/ recycled water use. ▪ Mass Media Campaign on safety and benefits of recycled water use for non-potable uses in business, industry and farming developed and implemented. ▪ Informational materials developed and distributed addressing business/ industry specific concerns regarding wastewater reuse. ▪ Capacity Building workshops and informational meetings on the process of WWT/quality, benefit of wastewater reuse, and potential application of treated wastewater for targeted end user groups.

Relevant Green Growth Objectives	<ul style="list-style-type: none"> ▪ Sustainable Economic Growth – Improving financial sustainability of the sector through innovative business models etc. and generating additional green jobs through cross-cutting approaches in the water sector. ▪ Social Development and Poverty Reduction – Ensuring equitable, reliable and affordable access to clean water and sanitation services for all; Supporting and strengthening the participation of local communities, women and marginalized groups in improving water management.
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Estimated Implementation Period	
<i>Start Year</i> – 2021	<i>End Year</i> – 2025

Location(s)	To be determined (TBD)	Other key partners	End-users of treated wastewater such as farmers, business owners and industries.
Implementing Stakeholders	<i>Lead</i> MWI <i>Support</i> MoAg, MoEnv, USAID, ReWater MENA	Estimated Budget for this Action	USD 1,000,000

Financing Secured	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Potential Source of Funding	To be determined (TBD)
Action leads to investment	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> This action is an Investment opportunity	Estimated Investment Size	-

Level of Priority			Readiness for Implementation				
Very High	High	Medium	1	2	3	4	5
<ul style="list-style-type: none"> ▪ Some experience has been gained on this topic thanks to large investments in wastewater reuse infrastructure, regulatory reform, and associated feasibility studies suggesting increased community engagement. 							

Implementation Risk Mitigation Measures	<ul style="list-style-type: none"> ▪ Innovative approaches to community engagement, specifically addressing the concerns and conditions for reuse will be important; international and regional best practice can be used to improve the impact.
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WR10 | Construct an industrial Wastewater Treatment Plant in Zarqa

Description	
<p>The MoEnv is responsible for enforcing laws regarding the dumping of industrial waste and also for mitigating its impact on the natural environment. The Zarqa River is one of the most highly polluted surface water bodies in Jordan, with industry dumping large amounts of hazardous material directly into the river without treatment. Not only does this likely have substantial, yet unknown, impacts on human health and safety in the immediate vicinity of the Zarqa River, there are also substantial impacts on the health of the Zarqa River ecosystems, which must now be fully rehabilitated. The first step in this process is the development of an industrial WWTP to ensure the removal of hazardous waste from the Zarqa River.</p> <p>The purpose of this action is to reduce the environmental impact of hazardous waste in Zarqa River, and serves as a first move towards the rehabilitation of the Zarqa River Basin. The project will be implemented with the support of development partners, and a feasibility analysis has already been undertaken by the European Investment Bank in cooperation with the MoEnv.</p>	
Objectives	<ul style="list-style-type: none"> Introducing efficient energy recovery systems at selected WWTPs using onsite waste-based biogas systems, which can contribute to: <ul style="list-style-type: none"> Reduce environmental impacts and GHG emissions from WWTP through proper management of generated biomass (sludge). Reduce energy costs for WWTP operation by producing energy (electricity) from biogas.
Implementation Milestones	<ul style="list-style-type: none"> Assessment study undertaken, focused on existing WWTPs with similar systems, and evaluation of the needs for new bio-gas systems or for upgrading existing ones. List of potential WWTPs to implement bio-gas systems prepared. Feasibility studies and engineering designs prepared for constructing/upgrading bio-gas systems in selected WWTPs. <ul style="list-style-type: none"> Arrange the prioritization of replication investments based on costs and feasibility, discussing it with donors, lenders, and the government. Replicas of As-Samra Biogas Power Plant in other WWTP facilities across Jordan at 4-5 selected WWTP.
Relevant Green Growth Objectives	<ul style="list-style-type: none"> Natural Capital – Increasing the quantity of water and wastewater treated for further recycling and reuse. Sustainable Economic Growth - Improving financial sustainability of the sector through measures including NRW reduction, revised water tariffs, innovative and market based-business models etc. Social Development and Poverty Reduction - Ensuring equitable, reliable, and affordable access to clean water and sanitation services for all. Climate Change Adaptation and Mitigation – Reducing GHG emissions in the water sector through use of RE and EE in water production and distribution systems.

Estimated Implementation Period							
<i>Start Year</i> – 2021				<i>End Year</i> – 2025			
Location	To be determined (TBD)		Other key partners		EIB		
Implementing Stakeholders	<i>Lead</i> MWI <i>Support</i> MoEnv, WAJ		Estimated Budget for this Action		USD 700,000		
Financing Secured	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			Potential Source of Funding	To be determined (TBD)		
Action leads to investment	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> This action is an Investment opportunity			Estimated Investment Size	USD 27,000,000		
Level of Priority			Readiness for Implementation				
Very High	High	Medium	1	2	3	4	5
Implementation Risk Mitigation Measures	<ul style="list-style-type: none"> Financing for the projects must be determined. Technical capacity for bio-gas systems construction and operation must be guaranteed. The As-Samra WWTP can be considered a good case study for this purpose. 						

WR11 | Enhance the Energy Efficiency in the well fields and Pumping Stations

Description
<p>Enhancing EE in the well field and Pumping Stations will reduce the cost of electricity in the water sector. The project will result in reducing costs associated with electricity consumption and, consequently, bringing down the electricity bill. Energy savings are expected to be around 50 GWH per a year, combined with a reduction in carbon dioxide (CO₂) emissions (around 40 wells + 5-10 pumping stations).</p> <p>The project is split into two phases:</p> <ul style="list-style-type: none"> Phase 1 - Consultancy Services for Energy Assessments in the Jordanian Water Supply System. Phase 2 – Consultancy Services for Implementation of Investment Measures for improving the Efficiency of Energetic Components of Jordanian Water Supply Systems, with subsequent implementation of the respective concepts. <p>The program comprises all parts of Jordan: the Northern Governorates (Irbid, Ramtha, Mafraq, Ajloun, and Jerash), the Middle Governorates (Zarqa, Balqa, and Madaba), Amman, the Southern Governorates (Karak, Tafila, and Ma'an), and the city of Aqaba. The project focuses on improving efficiency in wellfield extraction facilities, pumping and booster stations, transmission pipelines, and, to a lesser extent, components of high energetic relevance in water treatment facilities (desalination) as well as wastewater pumping and treatment facilities.</p> <p>The total number of wells in Jordan for domestic use amounts to about 800 units, and the number of pumping stations and booster stations of various sizes is estimated to be in the range of about 150 units.</p>

Action Objectives	<ul style="list-style-type: none"> Improving EE in water supply systems (wellfield extraction facilities, pumping and booster stations, transmission pipelines etc.). Reducing the electricity consumption cost and saving energy. Reducing GHG emissions and its associated environmental impacts.
Implementation Milestones	<ul style="list-style-type: none"> Updated assessment study of EE in the Jordanian Water Supply System. Proposed interventions prepared, with the goal of improving EE in water supply systems through utilizing of solar energy and/or EE measures. Investment Measures for improving the EE of Jordanian Water Supply Systems prepared. Feasibility studies and engineering designs prepared for Solar Power stations, utilizing 30MWp photovoltaic power generation systems, to support 5 pumping stations belonging to three different water companies in the central and northern part of Jordan: Zai Water Station, Zara Ma'en Water Station, Wadi Al Arab Water Station, Al Za'atari Water Station, and Al Azraq Water Station. EE measures implemented, and solar energy power plants constructed and operated in the targeted locations.
Relevant Green Growth Objectives	<ul style="list-style-type: none"> Sustainable Economic Growth – Improving financial sustainability of the sector through reducing the cost of energy required to operate water supply systems. Climate Change Adaptation and Mitigation – Reducing GHG emissions in the water sector through use of RE and EE in water production and distribution systems. Resource Efficiency – Improving EE in water operations such as water and WWT and pumping systems.

⁸¹ ELD Initiative. "Report for policy and decision makers: Reaping economic and environmental benefits from sustainable land management." 2015.

Estimated Implementation Period							
<i>Start Year</i> – 2021		<i>End Year</i> – 2025					
Location(s)	Hashemite Kingdom of Jordan /National	Other key partners	KfW, EBRD, EU				
Implementing Stakeholders	<i>Lead</i> MWI/WAJ <i>Support</i> Water Utilities and Companies, Private sector (Build Operate Transfer (BOT) basis)	Estimated Budget for this Action	USD 500,000				
Financing Secured	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Potential Source of Funding	-				
Action leads to investment	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> This action is an Investment opportunity	Estimated Investment Size	USD 70,500,000				
Level of Priority		Readiness for Implementation					
Very High	High	Medium	1	2	3	4	5
Implementation Risk Mitigation Measures	<ul style="list-style-type: none"> ▪ Project needs strong capacity support to ensure sustainable operation. ▪ Technical capacities of O&M personnel should be guaranteed by providing specialized O&M trainings. 						

WR12 | Increase the resilience of displaced persons and host communities to climate change-related water and climate change challenges

Description
<p>The overall aim of this project is to support the development of a comprehensive response framework to climate change, combined with the Syrian crisis, especially in an urban context. This is done by identifying effective approaches and best practices to build urban resilience, focused on actions that address water challenges that benefit both displaced peoples (DPs) and host communities, and especially women and youth. The framework is not only developed for the project's target areas, but also for areas with similar contexts. The project is proposed by the United Nations Human Settlements Programme for two countries (Lebanon and Jordan), where the Jordan component is executed by MoEnv, MWI, line departments in municipalities; United Nations Children's Fund (UNICEF), and NGO partners.</p> <p>The Jordan Refugee Response Plan identifies the Northern region as highly vulnerable (including Irbid), while the East (Mafraq) is the second highest region in the percentage of DPs rated highly vulnerable or above.⁵⁶ Syrian DPs in Jordan are specifically vulnerable to climate-induced water challenges. The Jordan Refugee Response Plan survey shows that 32% of Syrian DPs are identified as severely vulnerable due to spending over 25% of their expenditure on WASH items⁵⁷. This leaves most of the DPs susceptible to the impacts of climate change and with weak adaptive capacity.</p> <p>The project will focus on supporting a sustainable water management approach, by reducing water use from unsustainable sources (through minimizing water losses and increasing water use efficiency) and by increasing water supply from sustainable sources (by supporting water harvesting and promoting the use of non-conventional sustainable water resources). The approach also includes the promotion of innovative, low cost, and sustainable techniques and the establishment of urban-rural linkages (as water challenges also impact agriculture and livelihood security). The project identifies DPs as the most vulnerable group due to socio-economic challenges that could affect affordability to access water in the target areas. However, the project also recognizes increased tension between DPs and host communities.</p>

<p>Action Objectives</p>	<ul style="list-style-type: none"> ▪ Increase the resilience of municipal governments, by managing urban risks and vulnerabilities in the context of climate change combined with the high influx of DPs. ▪ Improve DPs and host community's engagement and livelihood security support. ▪ Increase community-level resilience to water challenges, by expanding the coverage of resilient water supply systems, and using innovative, low-cost, and replicable techniques that are suitable for a context with a high DPs presence. ▪ Improve policies and plans to increase urban resilience in the region, by developing a regional urban risks and vulnerabilities management model.
<p>Implementation Milestones</p>	<ul style="list-style-type: none"> ▪ Land use strategies and plans prepared, as a tool to assess and efficiently respond to water demand and availability, taking into consideration both climate change (including floods and increasing temperatures) and the movement of DPs (which require studies and assessments). ▪ Capacity building programs of municipal officers conducted, focusing on participatory planning approach and community resilience. ▪ Participatory community-level planning processes developed and implemented to promote social exchange focused on water conservation and adaptation options to climate change. ▪ Community level skill building trainings conducted for women and youth, focused on best practices for water conservation and climate adaptation measures. ▪ Plans for water conservation and climate adaptation developed and implemented for the context of DPs, including options for water conservation at the household and community levels, RWH, treatment and reuse of greywater/wastewater, as well as efficient water use options in agriculture and permaculture. ▪ 'Regional' urban risks and vulnerabilities assessment, planning, and management approach model developed for type 2 cities, taking into account climate change and urban development trends, including DPs movements. The model can be replicated in similar contexts and fed into 3RP programming.

⁵⁶ UNHCR. "Jordan Refugee Response Plan," 2015.

⁵⁷ UNHCR. "Jordan Refugee Response Plan," 2015.

Relevant Green Growth Objectives	<ul style="list-style-type: none"> ▪ Social development and poverty reduction – Building resilience to climate-change related water challenges among vulnerable groups, particularly DPs. ▪ Climate Change Adaptation and Mitigation - Strengthen the water sector’s resilience and adaptive capacity to climate-related hazards and natural disasters. ▪ Sustainable Economic Growth – Strengthening the public sector’s capacity in managing water sustainably and efficiently, by adopting a green growth approach.
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Estimated Implementation Period	
<i>Start Year</i> – 2021	<i>End Year</i> – 2024

Location(s)	Nation-wide, but the project can be piloted in Amman	Other key partners	Municipalities; UNICEF and NGO partners
Implementing Stakeholders	<i>Lead</i> United Nations Environment Programme (UNEP)/UN-Habitat <i>Support</i> Adaptation Fund, MOPIC, MWI	Estimated Budget for this Action	USD 7,000,000

Financing Secured	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Potential Source of Funding	To be determined (TBD)
Action leads to investment	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> This action is an Investment opportunity	Estimated Investment Size	-

Level of Priority			Readiness for Implementation				
Very High	High	Medium	1	2	3	4	5
<ul style="list-style-type: none"> ▪ Project has been submitted for consideration to the Adaptation Fund and has been provisionally approved for implementation by the UN-Habitat. 							

Implementation Risk Mitigation Measures	<ul style="list-style-type: none"> ▪ Outreach and awareness-raising are necessary at the local level to engage DPs. ▪ The implementing institution will need training and support around project development and implementation. ▪ Host communities need to be identified and prioritized before implementing action interventions.
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WR13 | Increase the availability of WASH in Schools and strengthening WinS standards for climate change impacts

Description
<p>Children are one of the largest groups at risk from climate change. Measures that specifically target this group have the potential to reduce the impacts of climate change across a large proportion of the population. WASH in Schools was noted as a strategic intervention in NWS for ensuring that children have adequate water, sanitation, and hand-washing facilities. It further noted that schools are at the center of people's sensibilities and values, thus making them a potentially effective entry point for introducing societal changes in many areas.</p> <p>In Jordan, more than 2.1 million students are enrolled in formal primary or secondary school, with more than 50% of students enrolled in public schools. The number of students in Jordan's schools has risen over the last decade, with an increasing portion of the population being under the age of 18. There is a necessity for Climate Resilient WASH in schools, especially in water scarce Jordan where 40% of schools do not have access to sufficient quantities (10 liters per day per student) of water.</p> <p>According to the Drinking Water, Sanitation, and Hygiene in Schools Baseline Report 2018, Jordan has the second lowest coverage of basic sanitation services in schools in Northern Africa and Western Asia. A 2015 Nationwide assessment of public schools for strategic planning found that 10% of schools were dependent on water tankers as their main source of drinking water or to supplement the public supply, and 57% of the schools surveyed reported that the frequency of the supply and available storage was insufficient to provide the national minimum of 10 liters of water per student per day. 77% of assessed schools received water less than 4 times per month, while 8% received water once or twice per month and 3% never received water. In addition to this, 68% of schools were not connected to wastewater. UNICEF is set to roll out the new 'Three Star Approach' for better WASH standards in Ministry of Education schools in Jordan. The project will rehabilitate WASH facilities in schools, increase water conservation practices, promote positive hygiene behaviors among students, and connect more schools and communities to the public water network. Along with this approach, it's necessary to explore how a green growth lens can be incorporated into the Three Star Approach and National WinS Standards.</p>

Action Objectives	<ul style="list-style-type: none"> To build school's capacity to adapt to and mitigate the effects of climate change and water scarcity.
Implementation Milestones	<ul style="list-style-type: none"> Target schools develop and implement local water conservation plans. Target schools develop and implement wastewater reuse strategies. Target schools can recognize and mitigate water insecurity drivers within their campuses. Increased awareness of the benefits of water conservation and incentives to practice water conservation behaviors. Water conservation and wastewater reuse strategy incorporated into each step of the 3-star approach. Benefits of installing Decentralized Wastewater Treatment Systems (DEWATS) and Rain Harvesting technologies assessed in select target schools. A comprehensive complementary package developed, focusing on the promotion of green growth within WINS projects and activities developed.
Relevant Green Growth Objectives	<ul style="list-style-type: none"> Resource Efficiency – Building resilience to climate change and water challenges among vulnerable groups. Enhanced Natural Capital - augmenting water supply for priority economic activities through decentralized infrastructure solutions, such as RWH or reclaimed water, for priority uses. Social development and poverty reduction – Supporting and strengthening the participation of local communities, women, and marginalized groups in improving water management and conservation.

Estimated Implementation Period							
<i>Start Year</i> – 2022		<i>End Year</i> – 2024					
Location(s)	Nationwide	Other key partners	UNICEF, United Nations Office for Project Services (UNOPS), EBRD, Save the Children\, MADRASTI				
Implementing Stakeholders	<i>Lead</i> MOE <i>Support</i> MWI	Estimated Budget for this Action	USD 1,500,000				
Financing Secured	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Potential Source of Funding To be determined (TBD)				
Action leads to investment	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> This action is an Investment opportunity		Estimated Investment Size -				
Level of Priority			Readiness for Implementation				
Very High	High	Medium	1	2	3	4	5
Implementation Risk Mitigation Measures	<ul style="list-style-type: none"> Considering the huge number of schools all over the Kingdom, a clear and transparent approach to select beneficiary schools needs to be developed, targeting preferentially the schools in most vulnerable areas. 						

WR14 | Improve implementation of decentralized water supply and sanitation solutions in Al-Azraq

Description

The challenge of water scarcity and the increasing demands of a growing population in Jordan, particularly due to the influx of vulnerable refugees from Syria, are well known. Jordan currently has the world's second highest proportion of refugees, with 87 refugees per 1,000 inhabitants. The country's infrastructure is overstretched and can no longer meet the needs of the growing population. Drinking water is in short supply and unemployment is high in many of the communities hosting refugees, as the economic situation in Jordan has deteriorated steadily since the start of the Syrian crisis. The Jordanian population is thus increasingly competing with refugees in the country for scarce resources and this, in turn, is threatening social cohesion.

Additionally, inadequate sanitation systems in Jordan affect both host and refugee communities and can pollute the country's scarce water resources, posing significant environmental and public health threats. Currently, 60% of all Jordanian households in urban and semi-urban areas are connected to WWTPs. The remaining households, many of which are found in rural and peri-urban areas, typically rely on desludging of their cesspits. Not only do these cesspits fail to fulfil safety standards, they also pollute the environment through leakages or overflowing. If pits are actually emptied, the sludge is usually not safely disposed of due to a lack of available and adequate treatment sites, economic incentives, and general awareness. The 'Sanitation Solutions for Underserved Communities in Jordan' project (ISSRAR) seeks to contribute to reducing existing environmental risks related to unsafe sanitation practices, creating better living conditions from an environmental, public health, and economic perspective, thus improving the resilience of local populations. By realizing a showcase sustainable sanitation system, the project aims at establishing replicable examples for other parts of Jordan.

The topic wastewater has found its way into the policies, strategies, and action of MWI, emphasizing its efforts on centralized solutions. Although alternative sanitation and reuse approaches have received increased attention and general support by governmental institutions, feasible and sustainable solutions for remote communities have not yet been successfully implemented on the ground. The project, which is funded by SDC, is implemented by the ISSRAR Consortium, made up of BORDA and Seecon. Within 10 months of the Inception Phase, the ISSRAR team screened possible options for the project implementation and consulted with a broad range of stakeholders to select a community, in this case Al Azraq.

The current lack of proper sanitation services and unsafe disposal of wastewater on a household as well as a communal level in Al Azraq, lead the ISSRAR Consortium to plan a sanitation system comprising of a semi-centralized solution allowing a stepwise completion and expansion in the future. The planned sanitation system in Azraq is designed in a way that wastewater from the nearby refugee camp can also be partly treated. The selected treatment technology for Azraq town is a 2-stage constructed wetland as a biological double stage raw sewage treatment system. The idea of the 2-stage constructed wetland as an integrated sludge and WWT wetland is to use the reed bed technology as a combination of filtration step for the raw sewage (Stage A) as well as of the biological treatment (Stage B) of wastewater. The technology can be considered as a low-tech, close-to-nature technology, which combines wastewater and fecal sludge treatment system and fulfilling fulfills high effluent qualities for of wastewater which will be reused in agriculture.

Action Objectives

- Provide improved sanitation services for refugee populations in Al Azraq using semi-centralized solutions that can be expanded on in the future (16,000 people with access to safe sanitation).
- Provide training and awareness to local citizens and operators on WWT and reuse.
- Demonstrate proof of concept for decentralized or semi-centralized solutions.

Implementation Milestones	<ul style="list-style-type: none"> ▪ Azraq community is aware of the benefits and economic opportunities from using Treated Wastewater and Treated Faecal Sludge (TFS) (bio-solids), and has an increased willingness to pay for WWT and fecal sludge management (FSM). ▪ Decentralized WWTPs constructed and operated to serve local communities without access to adequate sanitary services. ▪ Innovative and sustainable WWT and FSM solutions implemented by actively engaged communities and local public authorities. ▪ Training provided for Azraq Municipality, focusing on developed toolkits including technologies, software, O&M standard operating procedure (SOPs), fleet management, safety and emergency responses. ▪ Training provided for Azraq Municipality, focusing on business models, best management practices, billing procedures, gate fees, procurement, and administrative procedures ▪ Capacity building provided for Azraq Municipality, focusing on the technical and managerial aspects necessary to operate the proposed treatment plant.
Relevant Green Growth Objectives	<ul style="list-style-type: none"> ▪ Natural Capital - Increasing the quantity of water and wastewater treated for further recycling and reuse. ▪ Sustainable Economic Growth - Generating additional green jobs through cross-cutting approaches in the water sector. ▪ Social development and poverty reduction - Supporting and strengthening the participation of local communities, women, and marginalized groups in improving water management.

Estimated Implementation Period	
<i>Start Year</i> – 2021	<i>End Year</i> – 2023

Location(s)	Azraq	Other key partners	-
Implementing Stakeholders	<i>Lead</i> MWI <i>Support</i> Azraq municipality, local community members and CBOs; BORDA, MoEnv, MoAg, international NGOs and funding agencies	Estimated Budget for this Action	USD 5,640,000

Financing Secured	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Potential Source of Funding	SDC
Action leads to investment	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> This action is an Investment opportunity	Estimated Investment Size	-

Level of Priority			Readiness for Implementation				
Very High	High	Medium	1	2	3	4	5
<ul style="list-style-type: none"> ▪ This project is nearly ready for implementation, with project design documents under development by BORDA and funding agreements under discussion. 							

Implementation Risk Mitigation Measures	<ul style="list-style-type: none"> ▪ Social acceptance of using decentralized WWT is important, therefore, a stakeholder coordination committee should be established between stakeholders. ▪ Strong community outreach to spread awareness regarding decentralized WWT and reuse. ▪ Regular maintenance of WWT system must be guaranteed to avoid environmental and health risks.
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WR15 | Implement a program of Performance-based Contracts to Achieve NRW Reduction

Description	
<p>Jordan faces a complex set of challenges in the water sector, including limited water resources accompanied with an unpredictable increase in population due to the region's geopolitical environment. NRW- water is sent into the system but is not billed, which aggravates the situation in the water sector.</p> <p>Basically, there are two main types of NRW: administrative losses due to multifunctioning meters and illegal connection, and physical losses due to leakage in distribution systems. Jordan's NRW rates are extremely high when compared to other countries with low water supply. In part, this may be due to the non-continuous supply, i.e. the starting and stopping of water supply, which damages the system. In places where continuous supply has been achieved, like Aqaba, NRW is significantly reduced. However, even with non-continuous supply, Jordan's performance could be improved.</p> <p>According to Facts and Figures, in 2017 the percentage of NRW was 47.8%. Results show that Amman, Zarqa, Balqa, and al-Yarmouk contribute to 86.2% of total losses while Ma'an, Balqa, and Zarqa show the highest NRW percentage. NRW reduction is one of the core strategies of MWI, besides the work under implementation by the water institution; MWI is willing to outsource specific areas on a performance based contracting strategy. The work usually starts with identifying the NRW baseline levels, the targets are then set with sharing of the gains. Jordan's NRW reduction master plan establishes a unified framework and roadmap for improving the reliability and sustainability of Jordan's supply system through an accountable and holistic approach. The plan will be applied to major system components:</p> <ul style="list-style-type: none"> ▪ Primary systems; ▪ Distribution systems; ▪ Customer metering and billing. 	
Action Objectives	<ul style="list-style-type: none"> ▪ Eliminate the need to pump excessive water from renewable groundwater sources to compensate for NRW losses, which will lead to a reduction in the total energy consumption of water pumping and decrease the abstraction level relative to safe yield abstraction. ▪ Gradually address the financial instability of utilities by increasing cost recovery.

<p>Implementation Milestones</p>	<ul style="list-style-type: none"> ▪ Based on the experience of the PBC issuers, compile one report regarding lessons learned from ongoing NRW performance-based contracts (PBCs). Using this report, design a capacity building program for technical and managerial units at the utility companies. This program will focus on building the understanding, ability and willingness to pay for utilities in specific service areas, the factors affecting their cost recovery, and management techniques that can be used. ▪ Develop an NRW monitoring tool using GIS systems and collect necessary data to populate the system. The goal of the system is to provide better data regarding the amount of NRW due to technical losses (leaking pipes, etc.) and administrative losses (illegal connections, etc.) to enable better targeting of NRW reduction resources (for repairs and replacements or installation of meters). Once an NRW monitoring tool is available and a PBC is in place, utilities should: <ul style="list-style-type: none"> ▪ Create a network partition into District Metered Areas; ▪ Conduct active leakage detection surveys; ▪ Conduct active customer meter replacement policy; ▪ Use various analysis to detect unauthorized uses. ▪ Development of an asset management plan that identifies the condition of assets (meters) and plans for the operation, management, and repairs necessary to maintain the infrastructure, in the annual and long term perspectives. ▪ Prepare terms of references for utilities to outsource the issuance and management of performance-based contracts. Outsourcing in the determined areas will be conducted by qualified water service professionals, taking local challenges under consideration with the close supervision of WAJ and the utility company. The contract managers will work with WAJ to: <ul style="list-style-type: none"> ▪ Account for the full cost of water in billing for water sold in bulk to the water companies and WAJ. Accounting for the full cost of water, rather than just the subsidized price, would provide more incentive to reduce nonrevenue water. It would give further incentive to managers with bonuses tied to profit to address NRW. ▪ Determine the rate of subsidies to water companies per connection, per population or per meter of pipe basis, with an agreement to decrease the subsidy gradually each year. This would provide incentives to water companies to address NRW, while potentially providing gains to its customers in the form of reduced costs and improved service.
<p>Relevant Green Growth Objectives</p>	<ul style="list-style-type: none"> ▪ Sustainable Economic Growth – Introducing demand management measures such as efficiency improvements to save/conservate water and improve financial sustainability through reduced leakages/losses and NRW. ▪ Resource Efficiency - Increasing water-use efficiency across all sectors, including agriculture, industries, and municipal sectors, to address water scarcity. ▪ Climate change adaptation and mitigation – Improve drought resilience by introducing demand management measures across sectors. ▪ Social development and poverty reduction – increased access to water services.

Estimated Implementation Period			
<i>Start Year</i> – 2021		<i>End Year</i> – 2025	
Location(s)	Hashemite Kingdom of Jordan (all areas will be taken into consideration)	Other key partners	Private Sector (BOT Basis)
Implementing Stakeholders	<i>Lead</i> MWI/WAJ <i>Support</i> Water Utilities and Companies	Estimated Budget for this Action	USD 6,000,000 – technical assistance
Financing Secured	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Potential Source of Funding	-
Action leads to investment	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> This action is an Investment opportunity	Estimated Investment Size	USD 60,000,000 (47 M JD, London Conference Estimate) – hardware costs (meters, Information and Communication Technology (ICT), etc.)
Level of Priority		Readiness for Implementation	
Very High	High	Medium	1
			2
			3
			4
			5
Implementation Risk Mitigation Measures	<ul style="list-style-type: none"> Strong community outreach to spread awareness regarding NRW losses. A stakeholder coordination committee should be established between public and private stakeholders. Technical capacity of water utilities in managing NRW is a key aspect to guarantee the defined objectives can be achieved. 		

WR16 | Reduce water losses and increase water savings in King Abdullah Canal

Description
<p>The King Abdullah Canal is Jordan's largest canal system, supplying water from the Yarmouk River to over 40% of Jordan's crops, as well as supplying about 40% of Amman's water after it is treated in the Zai Water Treatment Plan. The canal was constructed as an open waterway, completed in 1966. Since then, it has been expanded to increase its capacity and expansions have taken place which have increased its importance as a source of water for the Greater Amman area. There are several challenges associated with this important dam. First, the infrastructure of the King Abdullah Canal requires repairs, with the associated distribution networks experiencing losses that make the systems more expensive and inefficient. At the same time, with Jordan's high temperatures (and the expected increase in temperatures as a result of climate change), the canal experiences a high level of evaporation, another form of loss that can be addressed through improvements in the infrastructure.</p> <p>The purpose of this action is to undertake construction on the King Abdullah Canal to either rehabilitate the length of the canal to reduce leaking, or to convert a portion of the canal into a closed pipeline. Implementing this action will result in much needed efficiency improvements through loss reductions, contributing to overall costs savings and resource efficiency in the water sector. This will reduce the cost of water supply across the agriculture, industry, and municipal sectors, helping improve Jordan's water security.</p>

Action Objectives	<ul style="list-style-type: none"> ▪ Conduct a comprehensive analysis of potential scenarios to reduce physical and administrative losses in King Abdullah Canal. Two possible scenarios: <ol style="list-style-type: none"> a. Rehabilitation of King Abdullah Canal (110km). b. Converting the Northern part of King Abdullah Canal (65km) into a closed pipeline. ▪ Implementation of either scenario will result in water savings and improved monitoring and control of the available water resources.
Implementation Milestones	<ul style="list-style-type: none"> ▪ Feasibility study conducted to determine which feasible option will be implemented, i.e: rehabilitating or converting. ▪ Implementation milestones will depend on the study's outcomes and on the selected scenario (a or b). <p>NOTE: A full GCF concept note is available, with details about specific implementation milestones.</p>
Relevant Green Growth Objectives	<ul style="list-style-type: none"> ▪ Sustainable Economic Growth – Introducing demand management measures such as efficiency improvements, loss reduction, water reallocation, and incentive structures to save/conservate water. ▪ Climate Change Mitigation and Adaptation - Improve drought resilience by expanding supplies and introducing demand management measures across sectors. ▪ Natural Capital – Enhancing the quality and quantity of water resources. ▪ Resource Efficiency - Increasing water-use efficiency across all sectors, including agriculture, industries, and municipal sectors, to address water scarcity.

Estimated Implementation Period							
<i>Start Year</i> – 2021		<i>End Year</i> – 2025					
Location(s)	Jordan Valley	Other key partners	GCF, CVDB				
Implementing Stakeholders	<i>Lead</i> JVA <i>Support</i> MWI	Estimated Budget for this Action	USD 500,000				
Financing Secured	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Potential Source of Funding	GCF				
Action leads to investment	<input type="checkbox"/> Yes – This is a preparatory action <input checked="" type="checkbox"/> No – This is not linked to any specific investment <input type="checkbox"/> This action is an Investment opportunity	Estimated Investment Size	USD 50 million (Scenario (a) - rehabilitating the canal) USD 65 million (Scenario (b) - converting the northern part of the canal to a closed pipeline)				
Level of Priority			Readiness for Implementation				
Very High	High	Medium	1	2	3	4	5
<ul style="list-style-type: none"> Full concept notes and project design documents are available. However, additional preparatory support might be needed to bring additional investors on board. A concept note has been prepared for submission, allowing GCF to receive project preparation facility grants. 							
Implementation Risk Mitigation Measures			<ul style="list-style-type: none"> For details, reference GCF concept note 				

WR17 | Expand the As Samra Wastewater Treatment Plant (Phase III)

Description	
<p>Jordan is facing combined water and energy scarcity challenges. The annual renewable water resources available per person is less than 100m³, which is manifestly low when compared with the global threshold of absolute water scarcity of 500m³, with a growing gap between demand and availability. National water resources and water balance are facing negative impacts due to higher demand, over abstraction, and the effects of climate change. There is severe competition among socio-economic sectors due to the exponential rise in water demand. The need for water for domestic, irrigation, industrial, and environmental protection pose serious water sustainability challenges. The economic development of the past two decades has further created enormous pressures on groundwater and surface water resources. The main challenge for the future is meeting growing national water demand over the medium to long term. Alternative water resources management and efficiency strategies are therefore needed to optimize the use of this scarce resource.</p> <p>On the other hand, the Jordanian water sector is the most energy-intensive sector, consuming around 14.9% of the total electricity used in water pumping and supply services. Annual energy costs are around 260 million JD and over 1.5 million tons of GHG emissions. With an estimated revenue of 300 million JD for the water sector, the water sector's sustainability is becoming jeopardized. The subsidized electricity tariff has increased significantly between 2010 and 2017, and, consequently, the cost recovery of water utilities has had a substantial negative impact. NWS and the national substitution policy consider treated wastewater effluent as a water resource that has been added to the water budget for reuse, with priority given to agriculture for unrestricted irrigation.</p> <p>The As-Samra WWTP presents a PPP model for financing the construction and operation of public infrastructures based on a BOT. The As-Samra WWTP has been in operation since 2008, and was initially designed to treat municipal wastewater of 2.3 million equivalent inhabitants of the Amman, Zarqa, and Hashimiya areas, with a daily capacity of 267,000 m³. In order to cope with the increase in wastewater volumes, As-Samra was expanded to reach a daily capacity of 360,000 m³ in 2015, to meet WWT needs of 3.5 million inhabitants. However, as a result of additional water resources and supply, there is an urgent need to upgrade the capacity of As-Samra by 35 MCM, in order to handle the anticipated extra influent. The tendency of wastewater influent to As-Samra WWTP has been examined using the DSS-WEAP model. The results imply a significant increase of the influent by 2022 and 2025, as a consequence of improving the water supply and connection rates. The model alerts for the need to upgrade As-Samra WWTP capacity to cope with the increased inflow from the connected areas.</p> <p>Whilst the project aims to provide the public with a suitable service of wastewater collection, conveyance, and treatment service, the plant also provides a reliable and sustainable source of high-quality reclaimed water that allows complete reuse in the Jordan Valley for irrigation, replacing the fresh groundwater resources currently used.</p> <p>Moreover, As-Samra WWTP has a state-of-the-art WWT system that integrates biogas utilization and hydraulic turbines as sustainable techniques for energy recovery, which cover 75% of the plant energy needs, the remaining comes from the national grid. The new expansion is expected to reduce energy consumption and costs, thus contributing to the mitigation of GHG emissions. As-Samra WWTP basically consists of two major lines:</p> <ul style="list-style-type: none"> ▪ Water line: which has 2 hydropower turbines - considered the first hydropower turbines for a wastewater plant in the world - at elevated altitudes to generate energy using hydraulic pressure, which currently provides 40% of generated electricity in the plant. ▪ Sludge line: where anaerobic digestion of sewage sludge generates biogas that provides 60% of generated electricity. 	
Action Objectives	<ul style="list-style-type: none"> ▪ Increased capacity of As-Samra to treat an additional 35 MCM of generated wastewater. ▪ As Samra WWTP will treat 70% of Kingdom wastewater providing 100% of treated wastewater for irrigation purposes.
Implementation Milestones	<ul style="list-style-type: none"> ▪ Undertake the necessary feasibility studies and business model to determine the exact investment parameters for the As-Samra expansion. ▪ Construction firm constructed through the development of a Public-Private Partnership. ▪ Undertake construction of the expansion and operation of the plant.

Relevant Green Growth Objectives	<ul style="list-style-type: none"> ▪ Natural Capital – Increasing the quantity of water and wastewater treated for further recycling and reuse. 						
Estimated Implementation Period							
<i>Start Year</i> – 2021			<i>End Year</i> – 2025				
Location(s)	Zarqa		Other key partners	MoF			
Implementing Stakeholders	<i>Lead</i> WAJ, Private Sector <i>Support</i> PPP Unit		Estimated Budget for this Action	USD 1,000,000			
Financing Secured	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Potential Source of Funding	To be determined (TBD)			
Action leads to investment	<input checked="" type="checkbox"/> Yes – This is a preparatory action <input type="checkbox"/> No – This is not linked to any specific investment <input type="checkbox"/> This action is an Investment opportunity		Estimated Investment Size	USD 324,000,000			
Level of Priority			Readiness for Implementation				
Very High	High	Medium	1	2	3	4	5
<ul style="list-style-type: none"> ▪ Some prefeasibility analysis for this action is available from the MWI. 							
Implementation Risk Mitigation Measures	<ul style="list-style-type: none"> ▪ The business model calls for the generation of biogas to power the operations of the WWTP, and this has been proven effective already, so investment risk is considered low. 						

WR18 | Undertake feasibility studies to explore storm water systems and groundwater filtration

Description
<p>In Jordan, more than 90% of rainwater lost to evaporation or run-off, representing an important water resource that could be tapped into in order to contribute to the recharge of aquifers. Proper management of storm water can also contribute to the reduction of flash flooding events that devastate human life and cause costly infrastructure damage. Poor drainage systems result in the loss of large volumes of storm water runoff via evaporation during intense storm events, therefore increasing water losses in an already water-scarce country like Jordan. Climatic conditions generating flash floods are common in arid Jordan, and they are initiated due to heavy rainstorms accompanied by high amounts of precipitation in a short period of time. Flashfloods in arid Jordan are extremely dangerous and of a disruptive nature. They frequently cause extensive property damage, loss of life, and slope instability due to severe gully erosion and slumping. A 2012 study in Amman found that more than 60% of the roadways in the selected sites within Amman city face problems during intense rainfall events due to the poor conditions of the exiting drainage systems.</p> <p>The barriers preventing climate-resilient flood management include: i) limited technical and institutional capacity in the government; ii) lack of integrated, climate-resilient approaches to flood management; and iii) limited knowledge about Ecobased (EbA)/Low Impact Development (LID) approaches to stormwater management. LID/EbA is “an approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible. LID/EbA employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treats stormwater as a resource rather than a waste product.” While urban EbA/LID interventions reduce the impacts of pluvial flooding by improving infiltration and detention. Infiltration is promoted through increasing green spaces and permeable surfaces within a city, which results in less runoff being generated at the source and runoff being attenuated during rainfall events.</p>

Action Objectives	<ul style="list-style-type: none"> ▪ Decrease the amount of stormwater lost to evaporation and flooding through the use of low impact development/ecosystem-based approaches to infrastructure.
Implementation Milestones	<ul style="list-style-type: none"> ▪ Hydrological assessments and climate risk assessments conducted to inform climate change adaptation solutions for flood management in target cities. ▪ A diagnostic will be led and recommendations will be issued as to structural and non-structural measures that can be implemented locally by residents, businesses, or public institutions to reduce flood vulnerability. These would include both measures for the existing urban fabric, as well as for future urban developments (for instance, regulations for new building materials and techniques). It shall also include a regulatory and economic analysis to identify any existing barriers to the implementation of the determined recommendations and the steps required for their effective implementation. ▪ Develop a comprehensive GIS on flood risk to gather information for adequate policy-making, land planning, and infrastructure design. ▪ Develop a storm water drainage master plan for target cities – legal requirements including the ambiguity around ownership structure of wadi beds, and regulations for development long term planning, the existing facilities and capacities, specification and maintenance. ▪ Design and install LID/EbA solutions in target cities to capture and slow storm water contributing to aquifer recharge. <ul style="list-style-type: none"> ▪ For each target city, the appropriate tools will be developed for large scale risk-mitigation infrastructure design. Studies under this component will determine adapted design storm patterns, rainfall-flow, and rainfall-runoff models.

Relevant Green Growth Objectives	<ul style="list-style-type: none"> ▪ Climate Change Mitigation and Adaptation – Improve flood resilience through flood risk management measures, through appropriate flood mitigation infrastructure and measures to respond effectively to floods. ▪ Natural Capital - Augmenting water supply for priority economic activities through decentralized infrastructure solutions, such as RWH or reclaimed wastewater; Ensuring a reliable supply of water to protect and restore critical water-related ecosystems, including forests, wetlands, rivers, aquifers, and lakes.
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Estimated Implementation Period	
<i>Start Year</i> – 2021	<i>End Year</i> – 2023

Location(s)	-	Other key partners	-
Implementing Stakeholders	<i>Lead</i> MWI, WAJ <i>Support</i> Municipal governments, including GAM	Estimated Budget for this Action	USD 15,000,000

Financing Secured	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Potential Source of Funding	GCF
Action leads to investment	<input type="checkbox"/> Yes – This is a preparatory action <input checked="" type="checkbox"/> No – This is not linked to any specific investment, but it may catalyze investment in critical stormwater management infrastructure <input type="checkbox"/> This action is an Investment opportunity	Estimated Investment Size	To be determined (TBD)

Level of Priority			Readiness for Implementation				
Very High	High	Medium	1	2	3	4	5

Implementation Risk Mitigation Measures	
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WR19 | Undertake Desalination of Seawater at the Gulf of Aqaba through Renewable Energy Sources

Description
<p>The increasing water demand combined with the increased scarcity of freshwater sources has created a water crisis that requires innovative solutions. One of such solutions is the desalination of seawater at the Red Sea to augment the increasing demand for fresh water supplies. The desalination plant will be based at the Gulf of Aqaba to abstract 190-220MCM/year of water for conveyance to Amman. The challenge, however, is the energy-intensive nature of the desalination process, particularly since Jordan's energy is sourced from fossil fuels. The Jordanian government is keen on reducing the country's vulnerability to climate change and also continuing on its pathway to greening energy-intensive industries, such as power and transport. Furthermore, as renewables become more mainstream with declining technology prices, powering the desalination and water conveyance process using RE is a viable option.</p> <p>The desalination process uses reverse osmosis (RO) or membrane desalination, which uses high pressure from electrically powered pumps to separate freshwater from seawater through a membrane. Electricity from solar photovoltaic is a key solution in arid regions, such as Jordan, where sunlight is an abundant resource, and therefore RE powered desalination would be a key enabler to increase water supply for potable water use and productive uses in industry.</p> <p>To contextualize the need for RE, an estimated 85% of GHG emissions in Jordan come from fossil fuel combustion, and more than half of these are generated from electricity production. The fact that Jordan is, to a large extent, dependent on expensive fossil fuels to generate electricity is a primary contributory factor. The consequent effect of this is rising CO2 emission levels with Jordan producing as much as 27 Million metric tons of CO2e emissions (MtCO2e) as at 2012 (0.05% of world total) compared to 1.5MtCO2e in 1971. Therefore, any added capacity coming from a clean source of energy will result in a reduction of GHG emissions, when compared to the current situation.</p>

Action Objectives	<ul style="list-style-type: none"> ▪ Reduction in Jordan's carbon footprint, as power is generated from RE sources rather than from traditional sources. ▪ Improvement in water security and resilience to climate change effects through the provision of an additional supply of water to Amman. ▪ Improvement in health and living standards as a result of improved sanitation brought on by access to an additional supply of water. ▪ Increase in economic activity through the use of water for productive uses.
Implementation Milestones	<ul style="list-style-type: none"> ▪ Renewable desalination plant for seawater project implemented, with the installation of a solar PV plant at the envisioned desalination plant, to be located in the gulf to Aqaba to produce freshwater from seawater. This includes: <ul style="list-style-type: none"> ▪ Installation of solar PV plant for water pumping and desalination to reduce cost and project carbon footprint; ▪ Abstraction and desalination of 190-220 MCM/year seawater to increase water supply; ▪ Possible installation of hydropower plants at the return intake pipe to lower overall energy requirement. <p>NOTE: Full GCF concept notes are available, with detailed description of implementation milestones and project design.</p>
Relevant Green Growth Objectives	<ul style="list-style-type: none"> ▪ Climate Change Mitigation and Adaptation – Improve drought resilience by expanding supplies and introducing demand management measures across sectors; Reducing GHG emissions in the water sector through use of RE and EE in water production and distribution systems. ▪ Resource Efficiency - Improving EE in water operations such as water and WWT and pumping systems. ▪ Social Development – Ensuring equitable, reliable, and affordable access to clean water and sanitation services for all.

Estimated Implementation Period							
<i>Start Year</i> – 2023		<i>End Year</i> – 2025+					
Location(s)	Gulf of Aqaba	Other key partners	-				
Implementing Stakeholders	Lead MoEnv, CVDB Support MWI, Ministry of Public Works and Housing (MPWH), MOPIC, MoF, ASEZA, ADC, Ministry of Energy and Mineral Resources (MEMR)	Estimated Budget for this Action	USD 1,000,000 for feasibility studies and preparatory activities				
Financing Secured	<input type="checkbox"/> Yes <input type="checkbox"/> No	Potential Source of Funding	GCF/ MWI/The World Bank/EBRD/ International Finance Corporation (IFC)/ Contractors				
Action leads to investment	<input checked="" type="checkbox"/> Yes – This is a preparatory action <input type="checkbox"/> No – This is not linked to any specific investment <input type="checkbox"/> This action is an Investment opportunity	Estimated Investment Size	USD 254,000,000				
Level of Priority		Readiness for Implementation					
Very High	High	Medium	1	2	3	4	5
<ul style="list-style-type: none"> A full concept note is available for review and will be submitted to the GCF for project preparation facility funding through the CVDB in 2020. 							
Implementation Risk Mitigation Measures	<ul style="list-style-type: none"> NRW: water sent to distribution systems but not billed due to leaks, unauthorized connections, and inadequate management is one of the significant issues affecting domestic water supply, and is likely to impact overall project viability. Although RE use is beginning to feature in Jordan's energy landscape, it's still new and solar PV plants - such as those envisaged for the desalination plant - are of higher capacity than most RE projects in Jordan; therefore, a strong technical expertise and potentially new technologies will be required for a higher chance of success, which may add to the already high technical risk. Additional investment in risk reduction measures and substantial technical assistance will be required. 						

ANNEX 1: Water Sector Green Growth Results Framework

The Green Growth Results Framework below was constructed with the support of the MWI, DOS, and other national actors in accordance with international best practices in the field of green growth. This collection of indicators can be used to better understand the availability of green growth-

related data in Jordan. The Government of Jordan is continuously striving to improve the quantity and quality of data for decision making in the area of sustainable development, and this framework will be continuously revisited and improved throughout the implementation phase.

Indicator	Definition	Baseline	Target	Responsible	Reporting and SDG	Timeline
Enhanced Natural Capital						
Total available water resources (total water budget) AND Annual increase (or decrease) in total available water resources	Available water resources in MCM per year, including surface water, groundwater and treated wastewater) And year-over-year comparison	1008.8 MCM (2015)	1341 MCM by 2025 2030 target to be set after sector actions are established	MWI	SDG	Every 2 years Latest is 2017
Data Source Jordan Water Sector Facts & Figures 2015 http://www.mwi.gov.jo/sites/en-us/Hot%20Issues/Jordan%20Water%20Sector%20Facts%20and%20%20Figures%202015.pdf						
Proportion of potable water safely treated (water quality)	% conforming water samples in public resources, public networks, private resources and private tanks	99.3% (2015)	100% (All wastewater to be treated and used as a replacement of fresh water and utilized by the agricultural sector)	DOS	Jordan's water strategy SDG 6.3.1 Proportion of wastewater safely treated (C060301)	Annual Latest is 2015
Data Source DOS Jordan Statistical Yearbook 2016, issue 67, table 1.3.2.11						
% protected water resources	% surface and groundwater resources protected	35% (2014)	60% by 2025	MWI	National Water Strategy	Annual
Data Source Not published. Available upon request						
% of water over-abstraction	Abstraction level, relative to safe yield abstraction quantity from renewable groundwater (which is 275 MCM annually)	160% (2014)	140% (2025)	MWI	National Water Strategy	Every 2 years Latest is 2017
Data Source Jordan Water Sector Facts & Figures 2015						

Indicator	Definition	Baseline	Target	Responsible	Reporting and SDG	Timeline
Sustainable Economic Growth						
# and % workers in the water sector	# workers in "Water Supply, Sewerage, Waste Management and Remediation Activities" AND # workers in "Water Supply, Sewerage, Waste Management and Remediation Activities" sector, relative to total national employment	8,546 (2016) 0.74% Total employment 1,161,639 (2016)	2030 target to be set after sector actions are established	DOS	-	Annual Latest is 2016
Data Source http://www.dos.gov.jo/owa-user/owa/employment.emp_show_t1						
Sector's contribution to GDP	%GDP contribution of "Electricity and Water" sector relative to national GDP (at constant 1994 market prices)	2.3%	2030 target to be set after sector actions are established	DOS	-	Annual Latest is 2015
Data Source DOS Jordan Statistical Yearbook 2016, issue 67, table 23.11						
Social Development & Poverty Reduction						
% population connected to sewage networks	Total number of households connected to sewage networks, relative to total households	66% (2017)	80% by 2025 2030 target to be set after sector actions are established	DOS	Jordan Vision 2025 National Water Strategy	Annual Latest is 2017
Data Source DOS Environment Statistics 2015-2014 table 5.1.2.2						
% female workers in the sector	# female workers in the "Water Supply, Sewerage, Waste Management and Remediation Activities" sector, relative to total employment in the sector	9.5% (2016)	2030 target to be set after sector actions are established	DOS	-	Annual Latest is 2016
Data Source DOS Employees by Economic Activity, Nationality and Sex For Year 2016 For Both Public and Private Sectors http://www.dos.gov.jo/owa-user/owa/employment.emp_show_t3						
% youth workers in the sector	Total # youth workers (aged 15-29) employed in the "Water Supply, Sewerage, Waste Management and Remediation Activities" sector, relative to total employment in the sector	TBD	2030 target to be set after sector actions are established	DOS	-	Available annually, through special data request Latest is 2017
Data Source DOS Employees by Economic Activity will require special data request						

Indicator	Definition	Baseline	Target	Responsible	Reporting and SDG	Timeline
Resource Efficiency						
Change in water-use intensity over time	Per capita water supply in liters/day (i.e., national water supply in MCM, divided by population) AND % change in per capita water supply in liters/day year-over-year	125 L/day/person (2017)	2030 target to be set after sector actions are established	DOS MWI	SDG 6.4.1 Change in water-use efficiency over time (CO60401) Water Facts and Figures	Annual Latest is 2017
Data Source DOS Environment Statistics 2015-2014 table 2.6.1.5 Jordan Water Sector Facts and Figures						
Energy used per billed cubic meter	Billed kW/m ³	5.8 kW/m ³ (2017)	4.6 kW/m ³ by 2025 2030 target to be set after sector actions are established	MWI	Jordan Vision 2025 NDC National Water Strategy	Every 2 years Latest is 2017
Data Source May be available via Ministry of Energy, or the regulatory commission Waster Facts and Figures 2017						
Change in NRW over time	Annual NRW in MCM, compared to previous year	51.3% in 2015 Vs 52% in 2014	2030 target to be set after sector actions are established	MWI	National Water Strategy	Annual Latest is 2017
Data Source Jordan Water Sector Facts and Figures						
Amount treated wastewater	Municipal wastewater safely reused, compared to total municipal wastewater	163.7	2030 target to be set after sector actions are established	MWI	National Water Strategy	n/a
Data Source Jordan Water Sector Facts and Figures						
Energy consumption of water pumping	Energy consumption of water pumping in GWh relative to baseline (5-year average)	1668GWh (5-yr average) DOS data shows 2426 GWh in 2015	23% by 2020 (reduction of 384 GWh) 2030 target to be set after sector actions are established	DOS	Jordan Energy Efficiency Action Plan (NEEAP)	Annual Latest is 2015
Data Source DOS Environment Statistics 2015-2014 table 2.2.2.9						
Climate Change Adaptation and Mitigation						
Total national greenhouse GHGs from water pumping	Metric tons of CO ₂ e emissions (tCO ₂ e) from water pumping	3530 tCO ₂ e in 2015 (based on 1.45524 tCO ₂ e per MWh)	2030 target to be set after sector actions are established	DOS		Annual Latest is 2015
Data Source DOS Environment Statistics 2015-2014 table 2.2.2.9 And emission factor from DOS Environment Statistics 2015-2014 table 2.2.1.4						

