SDG 6 Country Acceleration Case Study Jordan

2024



SDG 6 Country Acceleration Case Studies

UN-Water coordinates the work of the United Nations (UN) on water and sanitation. At the end of 2023, UN-Water was comprised of 35 UN entities (Members) and 48 other international organizations (Partners) working on water and sanitation issues. UN-Water's role is to ensure that Members and Partners 'deliver as one' in response to water-related challenges.

The latest progress report shows that we are not on track to achieve SDG 6. At the current rate of progress, the world will not reach the SDG 6 targets by 2030. In 2021, UN-Water reported that the world – on average – must quadruple current rates of progress to have a chance of achieving SDG 6 by 2030.¹

It is not enough to look at what is not working. There is so much we can learn from the many countries that have made significant progress. Since 2022, UN-Water has therefore commissioned case studies to understand how some countries are advancing towards SDG 6. The case studies highlight achievements and describe processes, enabling conditions and key lessons learned in countries selected for their progress on SDG 6. As such, each case study is a recognition of the progress made at the country level on one or several SDG 6 targets.

The case studies are meant to enable the replication of what has worked and encourage continued action to achieve SDG 6 in the selected countries. The 2030 Agenda for Sustainable Development forms an overarching lens for the case study to capture interlinkages and opportunities that are relevant across sectors and SDGs.

Starting in 2022, UN-Water has published case studies on three countries each year. The selection of the case studies is made by the UN-Water Expert Group on the 2030 Agenda for Sustainable Development, based on country progress reporting on the SDG 6 global indicators, compiled by the UN custodian agencies. In 2024, the Expert Group selected Jordan, Cambodia and Czechia for the case studies.

The contents of the case studies are prepared by UN-Water, based on material shared by UN-Water Members and Partners and representatives from relevant ministries and institutions in the selected countries, including the country monitoring focal points for the SDG 6 global indicators. This case study also includes inputs from two participatory workshops, organized in collaboration with the UN Children's Fund (UNICEF), the Food and Agriculture Organization of the UN (FAO) and the Ministry of Water and Irrigation of Jordan, as well as background interviews with a variety of stakeholders, conducted online and in-person. The case studies are reviewed and validated by UN-Water Members and Partners before publication.

To enable cross-country comparison and learning, the case studies examine key underlying factors and enabling conditions that brought about the changes. Often, these are political, institutional or behavioral, and they span over the five global accelerators identified in the SDG 6 Global Acceleration Framework: financing, data and information, capacity development, innovation and governance.

So far, the following countries have been selected for country acceleration case studies:

2022: Costa Rica, Pakistan, Senegal2023: Brazil, Ghana, Singapore2024: Cambodia, Czechia, Jordan

More information: www.unwater.org/publications/country-acceleration-case-studies

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Executive summary

Despite a context of water scarcity and an influx of refugees, Jordan has seen the fastest improvement in coverage of safely managed drinking water services in Western Asia and is on track to achieve the correspondin **SDG 6 target.** At the same time, Jordan has also made significant progress in sanitation, water quality and integrated water resources management. Few countries have shown such commitment to increase the water use efficiency of irrigation and the reuse of treated wastewate The key factors and drivers identified so far include:

- There are high levels of government commitment. Supported by the highest level of government, regular updated national strategies provide overall guidance to the sector.
- Water-efficient agriculture is widespread. Solutions such as the use of less water-intensive crops, drip irrigation, and precision fertigation, together with water, as well as drainage water reuse, have been successfully piloted and deployed.
- There has been heavy investment in the reuse of treated wastewater. Over 30 plants produce treated wastewater which is mixed with freshwater and reuse mostly for irrigation purposes.
- Technical cooperation has been mobilized at all level Jordan received support and technology transfer from development partners at all levels, from national authorities to local communities.

The experience of Jordan is highly relevant for other medium to small water stressed countries. Jordan is actively engaged with neighbouring countries, namely over the management of the Yarmouk River with Syria and the Disi-Saq transboundary aquifer with Saudi Arabia. The peace treaty signed in 1994 with Israel stipulates that Jordan has the right to a certain share of water per year from the Jordan Basin. At the regional level, Jordan actively participates in water-related initiatives of the United Nations Economic and Social Commission for Western Asia (UNESCWA) and hosts the Arab Countries Water Utilities Association (ACWUA) in Amman, where several other regional organizations and programmes are also based. Since 2012, it holds the joint presidency of the Union for the Mediterranean, together with the European Union (EU). At the global level, Jordan is a party to and participates in global water and environment conventions and processes, such as the Watercourses Convention and the Ramsar Convention on Wetlands.



ng	•	There has been massive investment in water infrastructure. Jordan's Water Strategy 2009-2022 planned investments of more than 8 billion USD with donor support.
er.	•	The government provides high levels of targeted subsidies. Overall, government subsidies represent more than half of the cost of water provision for both irrigation and domestic uses.
ly	•	There are coping mechanisms for limited and intermittent water supply. Households, farmers and businesses have installed water storage tanks and are investing in water treatment, reuse and rainwater harvesting.
	•	Non-piped solutions are regulated . A well-regulated system of tankers is helping households and farmers cope with water scarcity in efficient ways.
	•	The institutional framework has been reformed. A decentralization process was implemented, with the establishment of three water utilities.
ed, I s .	•	Transboundary cooperation is institutionalized. Jordan has reached agreements on water sharing rights with Israel, Syria and a Memorandum of Understanding with Saudi Arabia.
I	•	Investment in water-related education and research is high. There are several research centres. Students can pursue degrees in water engineering, hydrology and environmental science.

1. Country context

Jordan is a medium-sized country located in Western Asia. Most of its population lives in urban areas, including a significant number of refugees from neighbouring countries (Table 1). With a Gross Domestic Product per capita of 4,311 United States dollars (USD) per year, Jordan is classified as a lower-middle-income country. Its political system is a parliamentary constitutional monarchy, where the King appoints the government, which is accountable to the bicameral parliament. The Chamber of Deputies is elected for four-year terms, while the members of Senate are appointed by the King. Most elected officials are not affiliated with a political party. The country is divided into 12 governorates.

Water management is a top priority in Jordan. The King is personally involved in water matters. The government has been investing heavily in the water sector, overseen by the Ministry of Water and Irrigation, alongside other ministries. The Water Authority of Jordan is responsible for water and sanitation, it operates either directly or, in most cases, through three publicly owned water utilities, namely

Miyahuna, the Agaba Water Company and the Yarmouk Water Company. These utilities were established between 2004 and 2013 as part of a decentralization process. Additionally, the Jordan Valley Authority is tasked with overseeing development in the Jordan Valley, particularly through irrigation projects like the King Abdullah Canal, and the distribution of the blended water from King Talal Dam.

Table 1: Overview of water-related key data

Population	11,516,000 (90% urban) Source: Department of Statistics, 2023)
Gross domestic product	4,311 USD per capita/year (lower-middle income) Source: World Bank (2022, current USD)
Renewable freshwater resources	61 m ³ /habitant/year (27% external) Source: Ministry of Water and Irrigation (2021) and FAO Aquastat (2020)
Main rivers and aquifers	Yarmouk, Disi, Jordan Source: Government of Jordan (2023)
Renewable groundwater	0.54 billion m³/year Source: FAO Aquastat (2020)
Water-related ecosystems	0.5% of land area Source: Calculated from the Freshwater Ecosystem Explorer (2022) data
Degraded land	25.6% of land area Source: UNCCD (2023)
Water withdrawal	52% agriculture, 45% domestic, 3% industry Source: FAO Aquastat (2020)
Irrigated land	8.8% of agricultural land Source: FAO Aquastat (2021)
Hydropower	0.2% of electricity generation Source: IEA (2021)
Drought risk	High (medium-high in Eastern Jordan) Source: WRI Aqueduct 4.0
Riverine flood risk	Low (high along the Zarqa River) Source: WRI Aqueduct 4.0

Jordan is among the most water scarce countries in the

world. In 2007, per capita water availability was 145 m³ wastewater inflow in Samra. per year. However, due to population growth, particularly In 2000, only 53 per cent of the population was using due to the large influx of refugees from neighbouring safely managed drinking water services. The country countries, and the impact of climate change, this figure has surpassed the regional average of Northern Africa and rapidly declined. Jordan now has only 61 m³ of renewable Western Asia in 2015 (Figure 1). The situation has since freshwater available per person annually. If these trends improved, thanks to the expansion of non-piped supply, continue, this figure will drop to 35 m³ annually by 2040, including tankers, bottled water and treatment solutions at according to the Ministry of Water and Irrigation. the household level. Moreover, around 82 per cent of the A significant amount of Jordan's renewable freshwater population have access to safely managed sanitation in 2022. This is also higher than the regional average. Access is better in urban areas, while most of the population in rural areas have access to at least basic services of both drinking water and sanitation.

resources flow from neighbouring countries.

Transboundary cooperation is therefore essential for Jordan. Agreements were signed with neighbouring countries, including for the use and management of transboundary rivers and aquifers, as well as water sharing rights. Furthermore, Jordan was among the first countries to accede to the 1997 Convention on the Law of the Non-navigational Uses of International Watercourses (Watercourses Convention) in 1999.

Jordan is fighting against drought and desertification.

Most parts of the country are at high risk of drought. Water supply interruptions are common, and water withdrawals exceed the total renewable freshwater resources of the country, impacting environmental flow requirements and contributing to land degradation. Jordan therefore relies on non-renewable groundwater, with pressure to use it before the water becomes brackish and unsuitable for use, because water scarcity is raising the saline concentration of aquifers. Forest loss has contributed to land degradation. According to the United Nations Convention to Combat Desertification, more than one-quarter of Jordan's land area is currently degraded.

Irrigated agriculture represents more than half of water withdrawals. Most agriculture is rainfed. Less than one-tenth of agricultural land is irrigated. However, according to the National Water Strategy, in 2021, irrigated agriculture consumed 49 per cent of water and about 48 per cent of water is withdrawn for domestic uses. Industry withdraws the remaining 3 per cent. Environmental flows are estimated at 3 per cent of renewable water resources. Hydropower generation is limited. There is one small hydropower plant on the King Talal Dam on the Zarga River, which also contributes to flood protection. There are also some unconventional hydropower solutions, such as a facility which exploits the cooling water taken from the sea for a thermal

power station in Agaba and another one exploiting the

The proportion of safely treated domestic wastewater flow is high for a lower-middle-income country. This is the consequence of water scarcity, which is a strong incentive for water reuse, and is possible because of the expansion of sewerage and wastewater collection from septic tanks. According to the World Health Organization (WHO), the proportion of domestic wastewater from sewers that is safely treated reached 93 per cent in 2022, while it is 48 per cent for septic tanks.



Figure 1: Household WASH trends (2000-2022)

Source: UN-Water SDG 6 Data Portal

Progress despite a significant influx of refugees

Over the decades, Jordan has hosted large numbers of Palestinian, Lebanese, Iraqi and Syrian refugees. 730,000 refugees are currently registered with the United Nations High Commissioner for Refugees (UNHCR). Out of those, 19 per cent live in refugee camps. However, the number of refugees present in the country is certainly higher. The Government of Jordan estimates the number of Syrian refugees alone at 1.3 million. This situation has a cost, which receives support from donors, but also an impact on per capita water resources.

It is remarkable that in recent years Jordan has managed to make progress on water and sanitation, despite significant pressure from population growth because the influx of refugees, which put a strain on water and sanitation infrastructure, management, as well as financial and human resources. UNHCR data on access to drinking water and sanitation in refugee camps and for refugees in host communities is comparable to the level of access of the rest of the population.

For example, 85 per cent of households in the Zaatari camp and 91 per cent of households in the Azraq camp report full accessibility to latrines and 78 per cent of households in which at least one member has a disability reported physical accessibility for all members of the household. Moreover, most wastewater in both camps is disposed of through the sewage system. This means that the progress made was not hampered by refugees and was not to the detriment of the refugee population.





Covers of the 2022 Vulnerability Assessment Framework for refugees living in camps and host communities in Jordan. UNHCR

2. What was achieved

In recent years, Jordan has seen the fastest improvement in coverage of safely managed drinking water services (SDG 6.1.1) in Western Asia. In 2022, 86 per cent of the population had access to such services, compared to 53 per cent in 2000 (Figure 2). A significant acceleration of progress can be observed in the mid-2000s. With an average improvement of 1.5 percentage points per year, the country is therefore almost on track to achieve SDG target 6.1.1 by 2030. However, it will be difficult to reach some rural and remote areas, particularly nomadic populations, which require targeted action. Jordan has also made significant progress on access to safely managed sanitation (SDG 6.2.1a). Some acceleration can also be observed in the mid-2000s. However, the country needs to further accelerate progress on sanitation to achieve universal coverage by 2030.

SDG indicator 6.1.1 "Proportion of population using safely managed drinking water services" monitors the proportion of population using safely managed drinking water services. A safely managed service is defined as an improved drinking water source that is accessible on the premises, available when needed, and free of fecal and priority chemical contamination. Improved water sources include piped water, boreholes or tubewells, protected dug wells, protected springs and packaged or delivered water.

SDG indicator 6.2.1a "Proportion of population using safely managed sanitation services" tracks the proportion of population that is using an improved sanitation facility, which is not shared with other households, and where the excreta produced is either treated and disposed in situ, stored temporarily and then emptied and transported to treatment off-site or transported through a sewer with wastewater and then treated off-site. Improved sanitation facilities include flush/pour flush to piped sewer system, septic tanks or pit latrines, ventilated improved pit latrines, composting toilets or pit latrines with slabs.

Jordan has also shown progress on several other
SDG 6 targets, in addition to the progress on drinking
water and sanitation services. According to data by the
UN Environment Programme (UNEP), the proportion
of bodies of water with good ambient water quality
(SDG 6.3.1) went from 92 per cent in 2017 to 100 per
cent in 2020. This does not take into consideration the
Jordan River, which is transboundary. Overall, the degree
of integrated water resources management has also
improved slightly since 2017 (SDG 6.5.1). The small
improvement in the proportion of transboundary area
with an operational arrangement for water cooperation
(SDG 6.5.2) is related to an adjustment in the estimated
size of the Disi-Saq transboundary aquifer.

Figure 2: Progress on SDG 6 indicators in Jordan.



Source: UN-Water SDG 6 Data Portal

3. Understanding the achievement

This section describes how and why progress took place.

It examines the direct and indirect factors that enabled the achievement, paying attention to which factors could be replicated in other countries. Six main drivers have been identified in the case of Jordan: innovation, capacity development, financing, governance, data and information, as well as people and businesses. The first five correspond to the five global accelerators of the SDG 6 Global Acceleration Framework, with the addition of 'people and businesses'. They are presented in order of relevance.

Innovation: water efficiency and non-conventional solutions

irregular supply.

Huge efforts were made to increase efficiency of irrigation. With the support of development partners, solutions such as the use of less water-intensive crops, drip irrigation, precision fertigation, i.e. using drip irrigation to distribute the right amounts of fertilizers and pesticides, together with water, as well as drainage water reuse, were successfully piloted and deployed, first along the King Abdullah canal in the Jordan Valley. These solutions were then scaled up across the country, following demand from farmers, who suffer from water scarcity and

Jordan has invested heavily in the reuse of treated wastewater. As the available water is not sufficient for irrigation, domestic and other purposes, solutions were developed to reuse water, always seeking new technologies and tools to improve treatment facilities. The country can now count on the Samra wastewater treatment plant, as well as more than 30 smaller wastewater treatment plants, including in mining sites and refugee camps. The treated wastewater is mixed with freshwater and reused, mostly for irrigation purposes. Other such plants are planned across the country. Currently, Jordan seeks further technological innovation in several areas, including treatment of toxic organic and inorganic chemicals, recycling wastewater treatment sludge and improvement of energy efficiency at treatment facilities.

The SDG 6 Global Acceleration Framework

is a unifying initiative that aims to deliver fast results, at an increased scale, towards the goal of ensuring the availability and sustainable management of water and sanitation for all by 2030. The Framework contributes to the new Water Action Agenda, an outcome of the UN 2023 Water Conference, held in March 2023.

More information: www.unwater.org/our-work/ sdq-6-qlobal-acceleration-framework

The country is now investing in other non-conventional **solutions.** As the promotion of water saving and efforts to increase efficiency are not sufficient in a context of water scarcity, Jordan is investing in exploration and exploitation of groundwater resources, including non-renewable ones, as well as in desalination of water from the Red Sea in the south near Agaba and conveyance to Amman in the northern part of the country. The country is supported by

development partners in these efforts.

Water innovation is contributing to Jordan's economic modernization vision. Further innovations, such as the installation of solar panels on reservoirs to reduce evaporation and produce renewable energy, decentralized wastewater treatment, hydroponic farming and fertilizing fishponds, but also smart solutions, such as telemetry and irrigation apps, are being piloted across the country. These solutions are often supported by donors. Partners such as the National Agriculture Research Center (NARC) play a key role in the localization of solutions and for the incubation of enterprises. This is important to scale up from pilot projects to actual solutions. Such water innovations are inscribed in the National Water Strategy 2023-2040, which is in turn a crucial component of Jordan's Economic Modernization Vision 2022-2033.

Samra Wastewater Treatment Plant

Started in 2008, the Samra Wastewater Treatment Plant collects wastewater from the capital city of Amman and produces more than half of the treated wastewater in the country. This represents around 10 per cent of Jordan's water supply. Samra is also renewable energy self- sufficient, generating enough hydropower and biogas to cover its operational needs. It is the first build, Operate and Transfer (BOT) investment in Jordan's water sector. The project was supported by the United States Agency for International Development (USAID) and the Millennium Challenge Corporation (MCC).



Samra Wastewater Treatment Plant. Photo: Jon Marco Church

Capacity development: decades of partnership building

For decades, Jordan has benefited from technical cooperation at all levels. It has received support and technology transfer from development partners, such as the USAID, the German International Cooperation (GIZ), UNICEF and FAO. Support was provided at all levels, from national authorities to local communities, including water user associations (WUAs) and refugee camps. This has resulted in good levels of capacity to improve water management.

There is investment in water-related university education and research. In Jordan, students can pursue degrees in various water-related fields, including water engineering, hydrology and environmental science at the University of Jordan and German Jordanian University (GJU), where a graduate programme in water and sanitation was started in 2021. Moreover, there are several research centres, such as the Water, Energy and Environment Center (WEEC) at the University of Jordan and the Royal Scientific Society (RSS), and the Water Diplomacy Center (WDC), which was established in 2020 at Jordan University of Science and Technology (JUST), with support from the Swiss Agency for Development and Cooperation (SDC), as a hub for water diplomacy and cross-border water cooperation.

Finance: public spending, donor support and international finance

Jordan's Water Strategy 2009-2022 planned investments of more than 8 billion USD. This investment focused on mega-projects such as the Samra wastewater treatment plant, as well as the exploitation of the Disi-Saq aquifer and the Aqaba-Amman water desalination and conveyance project, which are both still underway. These investments were generously supported by the donor community and international financial institutions, which provided grants and soft loans. There are many donors present in the country. So far, their coordination has been important to effectively support the ambitious investment programme of the government.

There are high levels of government subsidies. Subsidies support not only capital investment and repair, but also regular operation and maintenance. Overall, they represent more than half of the cost of water provision for both irrigation and domestic uses. Consequently, tariffs are relatively low, which ensures affordability but also contributes to a high level of debt, which doubled between 2015 and 2021. To limit indebtedness, the water sector is now seeking to attract private investment. However, issues such as tariffs that do not ensure cost recovery, the absence of a structured subsidy system, as well as high levels of non-revenue water, which includes leakage and illegal use, need to be addressed for the sector to become more attractive for private investment, in a context where donor support is slowing down, even for refugees. The

new National Water Strategy adopted in 2023 reaffirms the objective of halving non-revenue water.

Governance: ambitious strategies and effective reforms were adopted

The government of Jordan is extremely committed.

The recently updated National Water Strategy 2023-2040 provides overall guidance about future direction, like the previous strategies did for the periods 2009-2022 and 2016-2025, and aligns with King Abdullah's vision to establish a long-term plan to effectively address challenges such as water scarcity, population growth, climate change and the need for optimal water resource management.

There have been effective reforms of the institutional

framework. A Ministry of Water and Irrigation is in place and works hand in hand with other relevant ministries, like the ministries of agriculture, health, environment, finance, planning and international cooperation. Their work is supported by the National Water Advisory Council and the Royal Water Commission. The Water Authority of Jordan is responsible for drinking water and sanitation. The Jordan Valley Authority and WUAs operate irrigation and drainage systems. Reforms, such as the decentralization process that started in the mid-2000s with the establishment of three publicly-owned water utilities - Miyahuna, Yarmouk Water Company and Agaba Water Company – which conclude management contracts with each governorate and the recent establishment of a Utility Performance Management Unit under the Ministry of Water and Irrigation, have proved to be effective in improving service provision and oversight. Currently, water governance is being further developed under the USAID Water Governance Activity (WGA).

Jordan adopted specific policies for the water sector.

Many policies and plans are in place for green growth, drought management, capital investment, decentralized wastewater, climate change, surface water, demand management, water reallocation, water substitution and reuse, groundwater sustainability, as well as gender. Most of these policies were developed with the support of development partners.

Transboundary cooperation agreements are in place.

They include the agreement concerning the utilization of the Yarmouk waters, signed in 1987 with Syria, and the Disi-Saq transboundary aquifer agreement with Saudi Arabia, signed in 2014. Moreover, the peace treaty signed in 1994 with Israel includes extensive water provisions, such as allocation of rights to water resources in the Jordan Basin, as well as joint projects to develop further water resources and prevent pollution. Jordan is a strong supporter of dialogue between and with its neighbours.

Data and information: planning documents and smart technologies

Data is gathered and analyzed for policymaking, planning and reporting purposes. In the framework of Jordan's Economic Modernization Vision, an elaborate system of indicators is in place. The Ministry of Planning and International Cooperation monitors the implementation of the vision. It produces a dashboard and regular reports. A lot of data is gathered and analyzed to produce documents such as the three National Water Master Plans, prepared with the support of GIZ, and the three Groundwater Resource Assessments, prepared with the support of the Federal Institute for Geosciences and Natural Resources (BGR) of Germany. On this basis, a Water Documentation and Awareness Centre was established at the Ministry of Water and Irrigation. A National Water Information System has been under development at the Ministry of Water and Irrigation since the 2010s, bringing together all water-related datasets. Decentralized data management is also being strengthened.

There is deployment of telemetry and smart technologies.

Fighting against leaks, the illegal use of water and the illegal dumping of wastewater are priorities for a country where water scarcity is so acute. For this reason, telemetry, remote sensing and other networked and smart technologies, such as smart metering, monitoring and controlling systems were developed and are being deployed, including by water utilities.

People and businesses: increased awareness and behavioral change

Coping with limited and intermittent water supply. The population has been dealing with water scarcity for many years and is increasingly concerned about water quality. Many households and businesses have installed water storage tanks and are investing in water treatment

Disi and Aqaba Control Centers

A Supervisory Control and Data Acquisition (SCADA) system is in place for the water, wastewater and treated sewage effluent facilities at Agaba. It connects all the remote water facilities to the Central SCADA Computers. The two centres monitor and control the wells, the collection reservoir, as well as all water and wastewater facilities.



The Control Centre at Aqaba Water Company. Photo: Aqaba Water

A well-regulated water tanker business

Much of the observed progress on access to water and sanitation comes from non-piped solutions such as water tankers. A colour-coded tanker system was developed for drinking water, non-potable water, industrial water and wastewater. A double licensing system is in place for both trucks and wells. The quality of water is regularly tested, trucks are monitored with GPS and hefty fines are levied for violations. Trucks buy water from utilities, which also run trucks themselves.

systems such as reverse osmosis water filters for drinking water. Farmers have also adapted practices, installing water saving technologies, as well as water storage and reuse systems, for irrigation. However, there are many illegal wells contributing to overextraction.

Development of non-piped solutions. A system of tankers by water utilities and private trucks are bringing water to households and farmers in efficient ways. The Ministry of Water and Irrigation maintains a register with the contact details of all truck drivers to be able to mobilize them in case of emergency. Efforts are in place to improve the quality of the water delivered by trucks, while tariffs need further regulation. Bottled water is widely used for drinking purposes.

4. Recommendations for accelerated action in Jordan

Some recommendations emerged from the analysis of the drivers of progress towards SDG 6, particularly from interviews and published material. Moreover, the SDG 6 Global Accelerator Framework also provides some indications of where action may be required to make further accelerated progress.

Jordan invested in all five global accelerators. For the country, it would have not been possible to achieve progress on SDG 6 in a context of water scarcity if it had not employed all five accelerators identified in the SDG 6 Global Accelerator Framework, namely governance, financing, data and information, capacity development, and innovation. The available evidence shows that progress across four SDG 6 indicators is the result of investment in water efficiency and non-conventional water resources, related capacity development mainly from development partners, massive financial resources mobilized by government, donors and financial institutions, strong commitment from the government, ambitious policies, effective reforms, as well as the availability of a lot of data and information for decision-making and management.

To achieve SDG 6 in Jordan, the financial crisis of the water sector needs to be addressed. The mega projects have left the sector with high levels of debt. Water remains highly subsidized by the government and donors. This enables rapid improvement when financial resources are available and sufficient to cover capital investment and repair, as well as operation and management costs. If resources are not sufficient to cover operation and management, the result is the rapid deterioration of infrastructure and the need for further capital investment and repair. With tariffs that are below cost recovery and with donor support that is not constant, the sector relies greatly on the capacity of the government to compensate with high levels of subsidies. It is recommended to improve the financing of the water sector, starting from

better regulating subsidies, as they may have unintended consequences, such as disincentivizing water saving and favouring capital investment instead of regular operation and maintenance, while ensuring that tariff structures cushion the poorest customers.

Other recommendations that emerged from the case study include the need to further increase water and energy efficiency, further promote wastewater treatment, and reuse and further develop demand-side management. Moreover, it is important to keep fighting against leaks and illegal use, particularly the many illegal wells, to reduce non-revenue water and meet irrigation water needs without overuse of groundwater that causes lasting harm and destroys aquifers for future generations. The country could also consider increasing tariffs to improve cost recovery and thus strengthen operation and management, while bearing in mind the need to maintain affordability.

As energy accounts for around half the operational budget of the Water Authority of Jordan and energy consumption is expected to grow, it is also imperative to maximize energy efficiency. Moreover, it is essential that projects that increase the available resources, such as the Agaba-Amman water desalination and conveyance project are completed, and that local authorities and organizations are further empowered in the framework of the decentralization process and ongoing reform of public administration.

Finally, it is recommended to keep promoting water conservation, including the so-called 'green water' stored in vegetation and soil, and consider nature-based solutions such as the restoration of forests, wetlands and other water-related ecosystems. A concrete plan addressing these issues to further accelerate towards the 2030 Agenda for Sustainable Development could help achieve SDG 6.

5. Replicability in other countries

The experience of Jordan is highly relevant for other medium-small water stressed countries, with urgency to take action and high levels of ambition. Key factors and drivers that may be replicated in other countries include:

- There are high levels of government commitment. Supported by the highest level of government, regularly updated national strategies provide overall guidance to the sector.
- Water-efficient agriculture is widespread. Solutions such as the use of less water-intensive crops, drip irrigation, precision fertigation as well as drainage water reuse have been successfully piloted and deployed.
- There has been heavy investment in the reuse of treated wastewater. Over 30 plants produce treated wastewater, which is mixed with freshwater and reused, mostly for irrigation purposes.
- Technical cooperation has been mobilized at all levels. Jordan received support and technology transfer from development partners at all levels, from national authorities to local communities.
- There has been massive investment in water infrastructure. Jordan's Water Strategy 2009-2022 planned investments of more than 8 billion USD with donor support.

- The government provides high levels of targeted subsidies. Overall, government subsidies represent more than half of the cost of water provision for both irrigation and domestic uses.
- There are coping mechanisms for limited and intermittent water supply. Households, farmers and businesses have installed water storage tanks and are investing in water treatment, reuse and rainwater harvesting.
- Non-piped solutions are regulated. A well-regulated system of tankers is helping households and farmers cope with water scarcity in efficient ways.
- The institutional framework has been reformed. A decentralization process was implemented, with the establishment of three water utilities.
- **Transboundary cooperation is institutionalized.** Jordan has reached agreements on water sharing rights with Israel, Syria and a Memorandum of Understanding with Saudi Arabia.
- Investment in water-related education and research is high. There are several research centres. Students can pursue degrees in water engineering, hydrology and environmental science.

Opportunities for experience sharing

Jordan is engaged at the bilateral, regional and global levels. It has entered into agreements with neighbouring countries over the management of the Yarmouk River with Syria and the Disi-Saq transboundary aquifer with Saudi Arabia. The peace treaty signed in 1994 with Israel stipulates that Jordan has the right to a certain amount of water per year from the Jordan Basin. At the regional level, Jordan hosts the ACWUA in Amman, where several other regional organizations and programmes are also based. It currently holds the joint presidency of the Union for the Mediterranean, together with the EU. At the global level, Jordan is a party to and participates in global water and environment conventions and processes, the Watercourses Convention and the Ramsar Convention on Wetlands.

Water Diplomacy Center. Its recent establishment at the Jordan University of Science and Technology (JUST) is an important platform for experience sharing. This centre receives support from Blue Peace Middle East. The Blue Peace Initiative contributes to the Water Action Agenda, launched at the UN 2023 Water Conference, held in New York in March 2023. Blue Peace is a long-term diplomatic initiative based on the idea that fair and efficient management of freshwater resources across borders, sectors and generations contributes to sustainable peace and development. The initiative is funded by Switzerland.

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Notes

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