



Ministry of Water & Irrigation
وزارة المياه والري

Water Demand Management Policy

2016

This document is an integral part of the National Water Strategy, related policies and action plans.

1. National Water Strategy 2016-2025.
2. Water Sector Capital Investment Program (2016-2025).
- 3. Water Demand Management Policy.**
4. Energy Efficiency and Renewable Energy in the water sector Policy.
5. Water Substitution and Re-Use Policy.
6. Water Reallocation Policy.
7. Surface Water Utilization Policy.
8. Groundwater Sustainability Policy.
9. Climate Change Policy for a Resilient Water Sector.
10. Decentralized Wastewater Management Policy.
11. Action Plan to Reduce Water Sector Losses (Structural Benchmark).

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Foreword

Jordan is a nation burdened with extreme water scarcity that has always been one of the biggest barriers to our economic growth and development. This crisis situation has been aggravated by a population increase that has doubled in the last two decades alone because of refugees fleeing to Jordan from neighboring countries. We must then add to this the transboundary and climate change issues affecting Jordan's water supplies.

In the face of these challenges, and to achieve our goal of successful integration of Jordan's water resources management, the Ministry of Water and Irrigation has been active in putting forward four new policies that set clearly defined rules to manage the scarce water resources efficiently and sustainably. These new policies lay out the measures and actions required to achieve our national goals for long-term water security. These result-oriented policies are built upon and updated from previously adopted strategies, policies, and plans. Together, they are an integral and ongoing part of the overall management efforts that have already been achieved.

This policy is the result of the efforts of working group to whom I am thankful. My team has been putting great efforts to enhance water governance that support these policies at all levels, which include enforcement of a suitable legal framework and regulatory tools, enhancing efficient institutional capacities, and supporting dynamic management plans that adapt the concepts of participation and decentralizations all under the umbrella of Integrated Water Resource Management which I am sure will show results in the near future.

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Introduction

Jordan faces significant challenges in water sources where it became one of the poorest countries in the world in water, and the most prominent of these challenges is the inability of the available water resources to meet the growing water demand. Jordan's per capita share of water is one of the lowest ratios in the world; it decreased over the last several years to reach less than 100 m³.

Jordan is classified as being a semi-arid to arid region, and depends mainly on rain fall which varies from one year to another. , reports indicates a decrease in rainfall by up to 20% during the past several decades which is attributed mostly to the effects of climate change that faces our planet.

The unstable political situation in the region including; conflicts and wars in neighboring countries over the past decades, led to worsening water crisis and result of a large influx of refugees to Jordan. Whereas, the latest of which was the Syrian crisis that caused the flow of approximately (1.26) million Syrian refugees across the Jordanian borders, resulting in tremendous pressure on our water reserve.

Population growth and economic development will lead to a growing demand on scarce available water sources, where the new 2015 census indicates that the number of Jordan's population has reached more than (9.5) million inhabitants.

In addition, the over abstraction of groundwater and the water losses as a result of illegal uses of water resources and water carrier lines and deterioration of water networks, s are considered among the challenges facing the water sector.

However, Jordan is a considered a leader in water management compared to other countries in the region, where the drinking water services cover approximately 94% of the population of the Jordan with a quality conforming to the standards of microbiological rate at (99.3%), which is a result of the great efforts and excellent performance of the Ministry and its affiliated institutions.

The Objective of Water Demand Management Policy

The main objective of water demand management policy which -approved by the Cabinet in 2008- is maximize the utilization of the available water and minimize water losses and conserve water resources, promote effective water use efficiency, to adapt with the challenge we face of water scarcity in order to reduce the gap between supply and demand .

Water is a vital resource for social and economic development, the Ministry of Water and Irrigation aims to promote the water sector to maximize the benefit from available water resources through; proper management, sustainability, and the development of legislations, laws and policies governing the water sector, and develop action plans and follow up their implementation.

The water demand management policy is an integral part of the national water strategy and their related policies which have been prepared and updated by the ministry; it is an important tool in changing the ways, methods and behavior for using water, for better sustainability, efficiency and equity.

The exponential rise in water demands as result of the high population growth and economic development needs, the impact of climate change on the annual rainfall and food production, created enormous pressures on water supply to meet the competing economic sectors on water. Therefore, implementing water demand management policy, water resources managements and protection, expanding use of treated waste water and exploitation new water resources will have positive influence in the water sector.

This policy addresses the management of water demands in all sectors, including municipal, industry, tourism, agriculture and other activities of national importance. And according to the priorities stated in the National Water Strategy, water for municipal purposes is a top priority among all sectors, followed by industry, tourism and agriculture.

In light of the new challenges we are facing in the water sector in Jordan, there was need to update the water demand management policy. Thus, it is essential to evaluate and monitor the implementation of this policy and revise it every three years as necessary.

Due to the special condition of the Municipal, Tourism and Industrial Sectors (served by the network) including the Energy and Mining sector and Irrigated Agriculture sectors in water consumption, the Water Demand Management Policy is presented hereinafter, in two parts:

- **Municipal, Tourism and Industrial Sectors**
- **Irrigated Agriculture Sector**

First: Municipal, Tourism and Industrial Sectors

This part of the Water Demand Management Policy consists of a set of procedures and measures which provide guidance for the development and implementation of demand management programs which aims to increase the efficiency of water use to meet water needs of this sector in all regions of the country. Where the water used for industrial purposes gives a higher economic return from other uses, therefore it is necessary to give the industrial sector the attention it deserves in order to maximize the economic return of used water, as well as enhance the efficiency of water use in the industry.

Due to the water need of new strategic projects, like oil shale mining and energy projects, this sector will be presented hereinafter in two parts:

A – Municipal, Tourism and Industrial Sectors (served by the network)

1. Construction, Standards and Specifications

- All establishments shall comply with the technical specifications for all plumbing products such as pipes, fixtures, and other materials. As this will save large quantities of water by ensuring only high quality products are used, thereby minimizing water leakage in household.
- Jordan shall update codes and technical regulations periodically to ensure:
 - Specify the maximum water use in liters / minute or liters / flush for all plumbing fixtures that are installed in newly constructed buildings.
 - Rainwater harvesting systems should be installed for new construction (residential, commercial, industrial, tourism, etc.) where the size of the storage tank that depends on average rainfall and the surface area of the building is considered within the construction code. Harvested rain can provide a nonpotable water source that can augment existing water supplies.
- Continue implementation the replacement of all inefficient plumbing fixtures, appliances and equipment with the latest most efficient models. Assist low income consumers to obtain water saving devices for free or stimulatory prices.
- Jordan should actively promote the transition of local manufacturing to the production of water efficient products.

- Jordan should ensure that other important national initiatives, such as membership in the World Trade Organization, bilateral trade agreements does not constrain the ability of Jordan to prohibit importation of inefficient or poor quality water using products to the Jordanian market.
- Adoption of technology that uses less water in the industrial and tourism product.

2. On Reduction of Non-Revenue Water

The violation and old network system leads to higher water losses from the network. The following actions are to reduce the non- revenue water include

- Ensure the enforcement of existing laws and regulations to clearly prohibit illegal use of water resources and other appropriate penalties against violators as set forth in the amended Water Authority law no. (22/2014)
- Monitor and document the used amounts of water in each sector, issue bills based on actual consumption and value for all subscribers.
- Meters shall be periodically tested or replaced, and adequate records maintained, to ensure their accuracy.
- In order to encourage consumers to use water more efficiently, utilities shall set an example by demonstrating to consumers that they are effectively managing the water supply through the development and implementation of effective maintenance management system and standard operating procedures.
- Rehabilitation of infrastructure, water systems including the main pipelines and distribution lines to achieve the highest possible efficiency in transmission and distribution and to minimize and reduce losses as well as the protection of networks of water pollution.

3. Reducing Water Losses

- Regulations and instructions shall be developed to reduce water losses such as; washing cars, sidewalk, driveways and streets with water hoses. In addition limiting the creation of ornamental ponds and water features without re-circulating pumps or timers and follow-up periodic maintenance of the household water connections to reduce the dripping in faucets and other plumbing leaks and storage tanks that leak or overflow due to poor maintenance.

- Water auditing process for commercial and high rise building is essential for identifying and monitoring the amount of used water, and identifies baseline and benchmark water use. And to continue the check if the actual consumption is above the recommended amount set by the specification of maximum water flow. Implementing the water audit process will therefore lead to applying the concept of optimal efficiency use of water and reduce losses and maintain it, where high rise buildings and shopping malls are among the largest water consumers.

4. Non –Conventional Water Resources

- Graywater use could be a supplemental source of water. Regulations need to be adopted to address any health or environmental issues that may be associated with graywater use. Rural residences not connected to a central sewer system shall consider use of graywater for home gardens. On-site, graywater use shall be required for certain new commercial and residential developments. There are significant opportunities for commercial and residential developments re-using graywater on-site for high-rise and high-density buildings taking into account the impact on centralized sewer systems.
- Technology for using industrial water treatment shall be adopted and reuse in the same sector whenever possible without impacting the quality and quantity of the products.
- Implementing water harvesting system should be obligatory on Municipal, Tourism and Industrial Sector

5. On Water Conserving Landscaping

- Continue implementing water conserving landscapes and reap the positive output from it and update landscape principles for efficient landscape water use in public parks and spaces as well as by all retail water consumers (residential, commercial, hotels and resorts, etc.).

6. Studies and Research

- Cooperation with research and studies centers to support the implementation of best practices in water demand management for Municipal, Tourism and Industrial Sectors.

B- Energy, Mining and Oil Shale Industries Sectors

1. Water Resources

- Water resources for the sector shall be from outside the network.
- Part of the treated wastewater is allocated for the use in this sector.
- Refrain from using the exploited aquifers when other resources are available. Reliance on non-conventional water resources including water harvesting and utilize it for this sector.

2. Legislation

- Abide by approved projects agreements under the promotion of investments, Where the ministry and out of its policy promote investments by provision of water for these investments in terms of quantity and quality.
- Legislation governing this sector shall be reviewed and activated.

3. Tariffs

- Introduce the concept of water value within these investments, which ensure highest return per cubic meter taking into consideration cost recovery when setting the price for the sector.

4. Scientific research

- Cooperation with scientific research institutions and centers to apply modern water efficient technology and methods

5. Best practices

- Contribute to improve water resources and quantities through parallel activities such as groundwater recharge, water balance and water harvesting.
- Introduce effective technology for water recycling
- Water demand of this sector shall not impact the water share for agriculture and food production
- Protect water resources and wadies from pollution
- Water auditing for this sector shall be given the needed attention.

Second: Irrigated Agriculture Sector

Irrigated agriculture sector is considered the largest water user in Jordan, MWI and the related authorities will take all the legal, institutional, technical and economic measures for the management of the demand of irrigation water and raise the efficiency of use to achieve the saving significantly. This will be reflected on the sustainability of water resources and in parallel the agricultural development, thus providing an additional water resource for various sectors while maintaining or increasing agricultural production.

This part of the policy includes the following measures, which constitutes a guide for action and measures within the Demand Management for agriculture water in all regions in the kingdom, as follows:

1. Substitution and Re-Use:

- Enforcement of Substitution and Re-use policy, with the aim of managing scarce water resources efficiently and maximize the benefits and returns, as well as the maximum benefit from the use of treated wastewater for non-drinking purposes, and in investment that provide a high economic return. Provide ways and means suitable for storage of treated wastewater until time of use, and thus providing a new water resource which could substitute fresh water and reuse safely in irrigation.
- Expand the use of reclaimed water for industry and agriculture, to the maximum extent possible, taking into account that the treated wastewater blended and treated wastewater must be in terms of quality and quality matching the standards of the World Health Organization and Food and Agriculture Organization and the specification of Jordan at a minimum, so that it can also be used without mixing in specific areas and achieve full benefit for the various sectors. Treated wastewater quantity is projected to increase to 240 MCM by the year 2025.
- Expansion of introduction of modern technological methods and rehabilitation of the old wastewater plants and the use of modern techniques for treatment to produce reclaimed water of quality that meets international standards and can be used without restrictions. Such water can be considered as an additional source of water and revenue, and adding additional water quantities dedicated to irrigation and allowing the expansion of irrigated agriculture then directing fresh water for drinking purposes, taking into account the economic, cultural, social, political and environmental factors.

2. Efficient Use of Water in Irrigation:

The limited water resources make it necessary to undertake all necessary measures for efficient irrigation systems, taking into account the increase in production and water consumption savings, and also allow the cultivation of larger areas, even in years of water shortage, and this requires the following:

- The introduction of best technologies and modern and advanced irrigation systems in terms of the efficient water use in agriculture.
- Adopt preventive maintenance programs for irrigation systems, which lead to sustain efficient water use and reduce losses. Irrigation water use and efficiency (on-farm, conveyance, and distribution) shall be regularly monitored for demand forecasting and planning purposes.
- Appropriate programs and procedures shall be adopted, to ensure uniform flow discharge and stable pressure all through the irrigation networks.

3. Water Harvesting:

Expansion in establishing water harvesting systems “dams, ponds, excavations” in all regions of the Kingdom especially in the highlands and desert areas that are suited for it, this water can be used in different purposes and agriculture in particular.

4. Research and Development:

- Support and promote applied research in the field of efficient use of irrigation water, which focuses on the water demand management within the farm and achieve the highest return per cubic meter of water.

Utilize the expertise of certified institutions locally and externally in the field of treated wastewater and brackish water reuse for irrigation purposes.

- Encourage joint research in the field of crops tolerant to saline water and drought conditions, and in the field of crop substitution between high water consumption crops and low-consumption and which have high economic value.
- Development of methods and techniques of irrigation in areas that suffer from water shortages and low rainfall.

5. Drought Management:

- Drought is a natural phenomenon that may occur from time to time, and have a negative impact on all sectors, especially irrigated agriculture sector, and therefore it is necessary to develop a strategy and action plans to manage the drought crisis, including early warning systems for drought preparedness in the event of occurrence.

Third: Cross Cutting Themes

1. Legislation and Institutional Frameworks:

- Enforcement of laws and regulations currently in use, and continue to update and develop laws and legislations to implement the best practices in water use, in line with developments in the water situation in Jordan, to ensure raising of water efficiency, conservation of water resources and the reduction of illegal uses.
- Amend groundwater monitoring bylaw to cap water for agriculture and set the allocation shares. Thus reducing the depletion groundwater resources and reduce abstraction to safe yield, as well as implement monitoring measures to ensure commitment with abstraction licenses.
- Institutionalization of the Highland Water Forum and Groundwater Basin committees, and institutionalize the forum fund unit, in order to encourage participatory approach, and ensure that local communities cooperate with decision makers to control the illegal use of water and reduce losses and promote efficient management of all water resources, especially groundwater.
- Legislation shall be reviewed and updated regularly to support advanced practices and technologies at the distribution and on-farm level.
- Review legislations for establishing water users associations and other associations and their legitimate role concerning irrigation water in Jordan, including a clear definition of the role of these associations in the irrigation water supply chain, and determine the relationship between water users associations and authorities, decision makers and define the tasks and duties and institutionalization framework.
- Continuation of the ministry campaign "Tighten Control on Water Resources" and to take deterrent measures against the aggressors on the water resources and as stipulated by the Water Authority Law no. (22/2014).

- Continue to use non-conventional water resources in irrigated agriculture and substituting fresh water anywhere possible.

2. Tariffs and Pricing of Water:

The price of water is a key element and an essential tool of water demand management, to control and raise the efficiency of water use in all sectors regardless the water source, hence the Ministry of Water and Irrigation has recently adopted the “energy efficiency and renewable energy policy”, which aim to reduce traditional energy consumption and adopt alternative energy in water supply systems, and so to reduce operating and maintenance costs, cost recovery and reduce of the water sector losses. The reduction of electric power consumption bill would reduce the water cost, taking into account the following:

- The price shall guarantee the interest of all parties (provider and consumer).
- The price of water shall be commensurate with yield and revenue per sector.
- Water tariffs shall be structured to encourage and motivate efficient water use, taking into account the social and economic aspects as well as low-income consumers.
- Apply differential prices depending on the water amount consumed and quality.
- Water meters shall be read in a timely and frequent manner and water bills should include consumption data and be issued periodically and immediately after meter readings in order to give consumers current knowledge of their water usage and send a clear pricing signal to the consumers.
- It is important to identify a rational price to guarantee costs recovery, taking into account applying of cost-saving innovations, as prescribed in substitution and re-use policy for Treated wastewater or blended water.

3. Awareness, Training and Capacity Building

Awareness

- Continue public awareness campaigns and water education through several means of communication and media focusing on water scarcity and spreading the culture of awareness and responsibility to protect the water sources and its efficient use.
- Public awareness programs shall be implemented for staff and employee in all sectors (tourism, industrial, commercial, agricultural, etc.), to increase public awareness of importance of water and its efficient use.

- The amount of water used for irrigation constitute a large proportion of the annual water budget, therefore programs shall be implemented to increase farmers' awareness and knowledge in the field of water demand management.
- Implement best practices complying with National Water Strategy, and establishing an integrated irrigation advisory service to advice farmers on efficient irrigation water use in an integrated manner.
- Farmers and owners of groundwater wells are educated on the value of ground water source and the importance of water efficient use to achieve strategic goals, economic and social development as well as to sustain of our water resources.
- Enhance private sector participation in public awareness campaigns to implement the policy of water substitution and re-use of treated wastewater in irrigated areas of the Jordan Valley.

Training and Capacity Building

Developing the capacities of water sector institutions and capacity-building of human resources must be placed in a high rank within priorities, through:

- Organizing training and continuous education programs (whether internal or external training), in particular for those concerned in the implementation of water demand management policy, and provide them with the needed experience and communication through close interaction with relevant parties with experience and knowledge in the field.
- Training operating and maintenance technicians in all water and water facilities, to raise their skills and enable them to perform various tasks with professionalism and in accordance with best practices for operations, maintenance, planning and management, and provide them accreditation and competence certificates, depending on the specific sector in training was taken.
- Capacity building of water basin committee (forum members) to enable them to participate in planning and management of water sector.

4. Financial Mechanisms for Improving Water Efficiency

- Financial programs shall be developed and implemented to encourage offering products and services that improve water use efficiency. Such programs might include low cost loans, tax incentives, grants and fee waivers.

- Financial programs shall be implemented to adopt new technology relevant to irrigation system. Such programs might include long-term loans, tax incentives, grants and fee waivers on high efficient-irrigation system.
- Incentives shall be developed and implemented to encourage low water consuming and high-value crops cultivation.
- Financial or tax incentives to encourage rainwater harvesting, graywater and treated wastewater use and desalination projects.
- An annual awards program recognizing achievements of business, institutions and individuals in the field of water efficiency shall be implemented, to promote and develop a rational use and protection of water resources.

5. Best Management Practices

- Water Demand Management and water use efficiency Best Management Practices (BMPs) shall be developed and implemented. BMPs are policies, programs, practices, rules, and regulations that guide stakeholders to more efficient water use. Monitoring key performance indicators of water demand management to ensure compliance with Jordan Vision goals 2025.
- Review guideline releases of best management practices related to water use efficiency in irrigation and other sectors and to be updated and re-printed once required, according to the development of the water situation in the Kingdom.
- Applying best management practices of irrigation water use, including water pumping, conveyance, distribution, and storage and management on-farm level.
- Replace high-water consuming crops with crops of low water consuming, high-value return and tolerant to drought conditions.
- Reduction of over-abstractions of groundwater in irrigation to safe yield.
- Maximize economic return per cubic meter of water used in all sectors, giving priority and preference to water supply to the sectors of highest economic feasibility.

6. Information Program

- A centralized national water demand management information program shall be developed to optimize water allocation and protect resources. Realistic estimates of water use for different consumer classes are essential for understanding the effects of spatial

and temporal patterns of water use on the quality, availability and sustainable use of existing water resources.

7. Water Exchange

- A Water exchange option shall be evaluated, studied and established to institute a transparent socially and economically viable mechanism for trading between water users, subject to MWI water substitution policy considerations. This mechanism would encourage reallocation of water to users, and seek a balance between water uses that create higher value products per unit of water, and maintain food security.