Ministry of Water & Irrigation
وزارة المياه والري

Water Reallocation Policy

2016

This document is an integral part of the National Water Strategy and 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).

Ministry of Water and Irrigation

Contents

List of Tables

List of Figures

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.

Dr. Hazim El- Naser
Minister of Water and Irrigation

Introduction

General

Efforts of (MWI) to improve water and sanitation services are faced by managerial, technical and financial determinants, and the limited amount of renewable fresh water resources. The high rate of population growth including hosting fluxes of refugees from neighboring countries due to political unrest resulted in stressing the water and wastewater infrastructure, and depleting the groundwater resources to the limits that exceeded safe yields in the most of renewable groundwater basins.

To address these challenges, the Ministry is striving, through the adoption of a long-term plan, to improve services provided to citizens through restructuring and rehabilitation of networks, reducing the non-revenue water rates, providing new sources and maximizing the efficient use of available sources. At the same time, the Ministry continues its efforts to regulate the water usage.

This reallocation policy is intended to serve as a vehicle to set action plans for redistributing the water flexibly between sectors and governorates. It intends to employ a conveyance system for water connecting the southern and northern regions and another conveyance system for treated wastewater in the Jordan Valley to maximize the use of treated wastewater for irrigation and free the expensive used fresh water to be used for domestic purposes.

History and current Status

It was not until the year 1985, that all municipal water supplies in Jordan came solely from ground water resources. This practice extended for a long period of time until most of the ground water aquifers became over drafted beyond their safe yield. It was not until then and due to increased requirements, that WAJ started using surface water mainly for municipal and industrial purposes by treating around 50 million cubic meters per year of surface water from King Abdalla Canal. Later the capacity was increased to 90 MCM but this figure was never reached because of the reduced flow in the canal. The second step towards increasing the supply and preserving ground reservoirs was in 2006 where saline springs were desalinated to augment the existing supplies. 35 MCM of brackish water was desalinated and pumped from 400 m below sea level to an elevation of 1000m above sea level some 40 kilometers in length.

The over abstraction of ground water beyond the safe yield caused damages to many aquifers. Additionally, the use of surface water reduced the supplied water to agriculture in the Valley.

The excessive use of ground water and the reliance on the brittle flowing surface waters, forced MWI to extract 100 MCM per year of fossil water from Disi Aquifer and convey it more than 400 km to Amman area by constructing Disi water conveyance and put in operation in 2013.

The planned additional water resources that MWI relies on for closing the gap between needs and supply include the Disi with associated treated wastewater estimated to be about 50-60 MCM utilizing existing and planned wastewater treatment plants (WWTP) like Samra, southern Amman and the northern governorates WWTP's, desalination of brackish water like Hisban, surface water from Kufranjeh Dam, Wehdeh Dam and the capacity increase of both Wala and Mujib Dams in addition to the panned ones, a new Jordan Valley and Wadi Al-Arab conveyance to Irbid, exploration of deep aquifers and the desalination of 85 MCM per year of sea water through the first phase of the Red Sea- Dead Sea Project.

When Disi project became fully operational at the beginning of 2014, the quantities made available to Greater Amman exceeded the needs in Miyahuna Service Area. Moreover, the Disi water made the needs-supply equation in the municipal side positive which allowed several measures to be taken such as reducing the pumping from the overexploited aquifers, especially Azraq and Amman Zarqa Basins, diverting existing supplies to other areas, and redirection of extra supplies to other water deficient areas.

The variation and differences in water resources cost also triggered the reallocation of water between the governorates trying to equalize the cost burden all over the utilities and insure equitable distribution in different locations.

Current Water Uses

According to data collected for the year 2014, the total amount of water made available from all resources was 1197 MCM of which 729 MCM was allocated for agriculture, 429 MCM for municipal and around 39 MCM for industrial activities not covered by the water network.

Despite this limited availability, Jordan utilizes more than 100% of its renewable water resources. Its exploitation of the groundwater resources exceeds the recharge annual rates.

Domestic water consumption is a combination of the indoor consumption including water used for drinking, personal hygiene (i.e. washing face, hands, and bathing), kitchen activitiesand laundry; and the outdoor consumption includes water used for garden vegetation, , house and yard cleaning and livestock needs in villages and remote areas.

Non-domestic water consumption from municipal water network includes commercial, industrial, tourist, public and governmental uses.

Table 1 shows the *Municipal water* per capita share in different governorates, NRW ratio, calculated share and the number of water and wastewater subscribers.

According to table 1, the amount of water for municipal purposes reported in 2014 indicates an average share per capita of 126 liters where the population reached about 9.3 million inhabitants. Considering the NRW, and assuming that the total NRW is totally lost, the average consumed/billed water becomes 61 liters per person per day.

In 2014, the percentage of Jordanians served through water networks reached about 94%. MWI is aiming at maintaining this ratio. On the sewage services side the ministry is aiming at increasing the service coverage from 63% to 80% by the year 2025. The average *municipal* per capita share of supplied water (pumped) in the Kingdom is 126 liters per capita per day (ranging between 65 in Ajloun to 329 in Aqaba, however considering the water losses in different areas, the water share (as billed) ranges between 35 and 236 liters per capita per day in Mafraq and Aqaba respectively.

Table 1: Municipal per capita share, non-revenue water and number of subscribers (2014)

Governorate	Water					Wastewater	
	Per capita of supplied water (l/day)	NRW* (%)	UFW* (%)	Per capita of billed water (l/day)	# of subscribes	# of subscribers	% of sewage coverage
Amman	134.9	38.5	48.4	69.6	573588	458870	80
Zarqa	129.8	64.4	65.2	45.2	153830	110874	72
Balqa	168.8	68.2	68.3	53.6	76941	40959	53
Madaba	109.7	35.0	36.2	70.0	27710	12998	47
Irbid	68.6	36.1	38.6	42.1	Yarmouk Company		
Mafraq	113.7	53	69.5	34.7			
Ajloun	65.0	42.2	42.2	37.5	288706	106761	37
Jarash	69.8	45.1	45.1	38.4			
Karak	179.4	69.2	69.2	55.2	44920	7706	17
Tafeeleh	128.0	57.2	57.2	54.9	15851	3134	20
Ma'an	236.2	73.2	73.2	63.4	22161	7208	33
Aqaba	329.0	28.2	28.2	236.2	36653	32151	88
Kingdom	125.5	52	52	58.5	1240360	780661	63

Note: The population of 2015 census is used to estimate the figures above.

* *NRW* is the ratio between water loss and total water supply, exported water is included in the total supply as a portion of local production and in the billed supplies.

UFW is the ratio between water loss and net water supply, exported water is excluded from the total supply and billed supply.

Non-revenue Water

The Kingdom's NRW reported in 2014 was 52% varying between 28% to 73% in different governorates, this variation is attributed to reasons such as the age of the pipes and their condition, pressure, water quantity, supply duration, metering errors, illegal connection and theft. All factors except the last three are called physical losses while other factors are administrative losses were water is neither consumed nor registered, while the administrative loses are mostly consumed. The consumed part of the administrative losses is estimated at 50% of the NRW.

Water Uses

The total amount of water made available for all uses is demonstrated in table 2. This includes water from ground water, surface water, non-renewable ground water, desalinated brackish water and treated municipal wastewater. These resources are indicated in Table 3.

Table 2: Water Uses in 2014 in different Governorates

Governorate	Water Uses								
	Municipal	Non domestic *	Domestic	Refugees	Agriculture (High Land)	Agriculture (Jordan Valley)	All Agriculture	Industry	All Uses
Ajlun	4.9	0.5	4.4	0.35	4.6	0	4.6	0	9.5
Amman	180	22	158	21.5	43.8	0	43.8	1.72	225.52
Aqaba	16	11	5	0.7	87.4	0	87.4	4.31	107.7
Balqa	35.7	5.7	30	1.7	10.6	100	110.6	0.97	147.3
Irbed	45.2	3.1	42.1	8.6	7.3	57	64.3	0.11	109.6
Jerash	6.7	0.5	6.2	0.3	11.3	0	11.3	0	18.0
Karak	20.5	2.6	17.9	1	17.7	43	60.7	12	93.2
Maan	14.2	3.7	10.5	0.7	110.1	0	110.1	9.59	133.9
Madaba	8.9	0.7	8.2	0.6	6.6	0	6.6	0.97	16.47
Mafraq	24.7	3.4	21.3	8.6	140.2	0	140.2	2.48	167.38
Tafila	5.5	0.6	4.9	0.1	7.1	0	7.1	1.4	14.0
Zarqa	66.6	5.2	61.4	8.3	82.3	0	82.3	5.49	154.4
Jordan	428.9	59	369.9	52.4	529	200	729	39	1197
Percentage	36%						61%	3%	

* Non domestic includes commercial, small industries and tourisms

Water Resources Utilization

The renewable water resources available in Jordan are around 780 MCM depending on the rain fall in different years. The long term average for the rainfall is 8.2 billion cubic meter. Because of the increased needs as a result of growth rates, continuous influx of refugees, competition between all economic sectors, the ministry started utilizing nonrenewable resources, desalinating brackish water, collecting and treating domestic wastewater mainly for agricultural purposes.

Table 3 below illustrates the water quantities from all sources including the non-renewable sources utilized in the year 2014 and by taking into account the recent studies results that were carried out by the Ministry of Water and Irrigation using remote sensing techniques which revealed that there are additional 225 million cubic meters of groundwater used annually for agricultural purposes in the highland areas.

Table 3: Water Resources Utilization in Jordan in MCM- 2014

Source	Municipal	Industrial	Irrigation	Livestock	Total
Surface Water	**103.8**	**4.8**	**143**	**7**	**258.6**
Jordan Rift Valley	91.4	4.8	83	0	179.4
Springs	12.5	0	20	0	32.5
Base and flood	0	0	40	7	47
Groundwater	**325**	**32.2**	**231.2**	**0.1**	**588.5**
Renewable	207.2	19.3	189.4	0.1	419.2
Non renewable	107.2	12.9	41.8	0	162.1
Abo Zeighan	10.2	0	0	0	10.2
Treated waste water	**0**	**2**	**123.3**	**0**	**125**
Total	**429**	**39**	**497.5**	**7.1**	**972**
Total including additional 225 MCM used for irrigation which were estimated using remote sensing techniques					**1197**

Because of the population growth and other reasons, neither the renewable nor the currently utilized nonrenewable resources can together meet the needs for municipal purposes while maintaining the current agricultural activities at the same level. Even with an acceptable level of physical losses, the needs exceed the currently available water quantities. This fact necessitates the imposition of strict policies including the water re-allocation policy.

Future Water Needs Assumptions

This policy document and the calculated future quantities of water are focused on "Needs" rather than "Demand". As need represent a lack of vital commodity that people can't live without while demand cannot be diagnosed nor quantified. Policy and water needs are also based on "Adaptive Capacity" representing the conditions and resiliency that people can tolerate modest water quantities when they are faced with. This requires behavioral change and People won't change their behavior very

much unless they come down to it which is the case in Jordan over many years imposed by lack of water and the current mode of supply.

In this policy the term "Demand" is cautiously and rarely used and mainly for irrigated agriculture especially in the Jordan Valley. This is much elaborated in other policy related to agriculture under the substitution and water reuse policy.

The future water requirements are calculated based on certain assumptions some of which are in coherence with the Water Strategy such as priorities and irrigation water quantities. Additionally, water supply of the year 2014 is used as base year. Other assumptions are as follows:

1- Domestic water share per capita is assumed to be 120 l/c/d for Amman city, 100 l/c/d for other cities, and 80 l/c/d for sub urban areas and villages;
2- Annual population growth rate is assumed to remain constant at 1.94%;
3- Refugees and other foreigners are considered permanent residents;
4- The water consumption of Refugee's and Non Jordanian residents is assumed to be the same as Jordanians according to their place of residency except at camps;
5- All non-Jordanians residents are assumed to grow at the same rate as Jordanians.
6- Syrian refugees' annual growth rate is assumed to be 3%.
7- The NRW is reduced according to the proposed reduction plan.
8- Non-domestic municipal water requirement is assumed to be as per the additional factors presented in table 4 of the total domestic water requirement of each governorate;
9- A 17% of a peak factor demand is added which demonstrates the additional water needs during summer months over the average water requirement. This additional quantity can also be used as buffer capacity during winter;
10- A 2% contingency volume of water is added where such an increase in water needs shall be used as pool that can be shifted from one area to another.
11- Irrigation water use in high lands is constant with reduction possibility in future. Irrigation water in the Jordan Valley shall be increased when new resources are made available such as the increased qualities of treated wastewater.
12- The first phase of the Red Dead – Sea water desalination project is assumed to be completed by the year 2021 thereby increasing the available resources by 30 MCM for the northern governorates through the swap deal signed in 2015 and by 35 MCM to Aqaba. The second phase of the project is assumed to provide the country with additional 150 MCM per year by the year 2025.

Table 4: Additional factor for non-domestic water requirement of domestic water requirement

Governorate	Amman	Zarqa	Balqa	Madaba	Irbid	Mafraq	Ajloun	Jarash	Karak	Tafilah	Maan	Aqaba
Additional factor (%)	13.8	8.5	19.1	8.4	7.4	16.1	10.4	7.6	14.2	12.7	34.9	222

Rational Behind the Water Share Differences

In order to maintain proper health conditions and meet basic needs for people, international organizations including the World Health Organization (WHO) set a minimum share of 50 liters per person per day. This is strictly for domestic and precisely for maintaining hygienic conditions and avoiding water borne, water related and water based diseases.

In civilized communities, the needs go beyond this quantity depending on many factors starting from water availability, cost, tariff, etc. Looking at the domestic water consumption in major cities and countries, the variation is too wide ranging between 35 liters per person per day in small villages in India and Africa to around 400 liters in the US. On the other hand, comparing the water share based on water quantities supplies in Jordan with some European countries, the share for every person in Jordan is almost similar to those in Europe where water availability does not raise any concern because of its abundance in these countries

Figure (1) below compares the domestic water share per person per day in some countries and Jordan. From the illustration, it is evident that the per capita daily share in Jordan does not fall far from this in some European countries and elsewhere. But because of the high NRW percentage, the share is reduced to around 70 liters. This emphasizes the need for reducing the NRW to acceptable levels as priority action. This also gives buffer capacity if the shares assumed above are reduced considering lower shares. Even though, the shares will be still above the WHO minimum quantity.

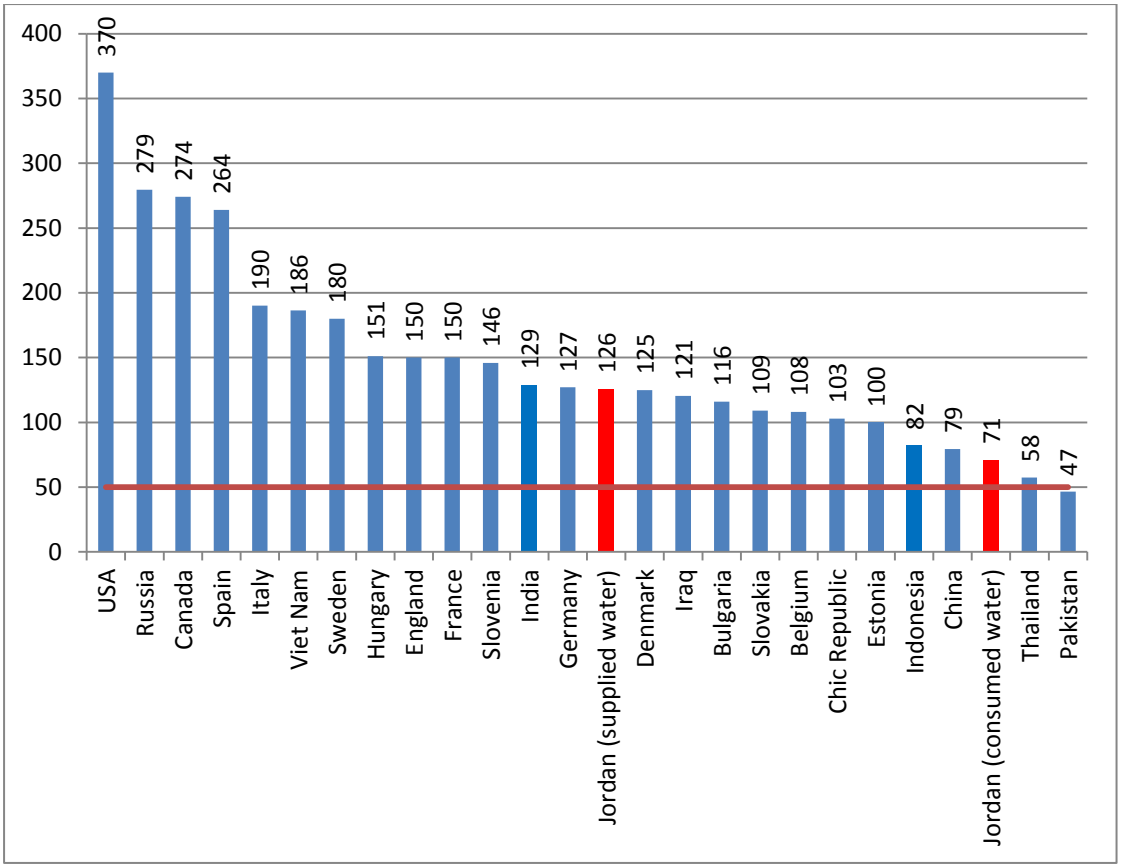

Figure 1: Domestic Water Share in Liters per Person per Day in Selected Countries

The difference in the assumptions for the daily water share between Amman, other cities and suburban areas is because of the family size differences, life style and water appliances used in different areas.

Many studies reported that for an increase of one person per family, the water consumption per capita is reduced at least by (4-5) %. Other studies showed that the consumption is reduced by 12-14% when the family size is increased from 4 to 6. The average number of people per family in Amman is 4.4 while it exceeds 6 in the suburban areas, other towns and villages. And applying the same ratios as reported and taking other factors such as the use of dish washers, laundry requirements, life style and the presence of house maids, it is fair to adopt the shares as assumed. Additionally, the water billed in villages and cities in Jordan shows that around 76 % of customers consume less than 80 liters per person per day and 85% of them consume less than 100 liters per person per day.

Non-Revenue Water Reduction

The average Non-Revenue Water reported in 2014 is 52%. It is believed that no more than 50% of which is attributed to physical reasons, such as old pipes, bursts, leakages etc. while the rest is due to illegal connections and metering errors.

To address the NRW, the following table 5 suggests certain yearly reduction percentages of losses in different areas depending on the NRW percentages reported in 2014. The percentages suggested is a percentage related to the previous year and not to the base year. This will facilitate proper planning, future investment targets and scheduling, and the associated financial and social gains.

Table 5: Annual Targeted Reductions of NRW

Current Level of NRW	Annual NRW reduction as % from previous year
>40	6%
40-30	5%
30-20	4%
<20	3%

To achieve the targeted NRW percentage, some measures are needed to accommodate the annual NRW percentage above; a 30% can be realized within 10 years on average which is acceptable from a financial and investment point of view. Table 6 shows the number of years required for achieving NRW targets.

Table 6: Years Required for Achieving NRW Reduction

%of losses	Years to reduce to 30%	Years to reduce to 20%	Years to reduce to 15%
60%	13	23	33
50%	9	20	30
45%	8	19	29
40%	6	17	27
35%	3	14	24
30%	NA	10	20
25%	NA	5	15
20%	NA	NA	10

Water for Peak Demand

The calculated future water needs assume a 17% increase. This is based on an increase in water demand in summer months compared to other times of the year, where additional water supply requirement is needed to cover the demand from tourism, returned Jordanians, firefighting, and others.

Water for Contingencies

There is a need to create a pool of water resources that can be shifted from one area to another during contingency situation. This is assumed at an additional 2% over water supply requirement.

Future Water needs and use

Jordan's Water Strategy commits the water sector to securing water and wastewater services at affordable prices and acceptable standards and extending services to remote and less developed areas. For Jordan, the term 'Acceptable' can easily be attributed to the minimum consumption needs to secure excellent health and hygiene. However, the most important parameters for municipal service level include:

- Maintaining acceptable water quantities for different areas
- Maintaining an excellent water quality
- Frequency of water supply during summer and winter
- Collecting and treating wastewater for safe agricultural use.

The water use priorities have been set in the Water Strategy where municipal water use is the top priority among all sectors. Other sectors can be put in the order of priority as follows: energy sector, tourism, industrial and the agricultural sector. The irrigation water according to the Strategy will be kept constant and subjected to reduction in highlands and increase in the Jordan Valley where water supply will increase once treated wastewater is made available

Thus, the water re-allocation policy and plans will concentrate on the municipal sector, and will follow the same order of priority with due consideration to the assumptions. A dynamic model is developed that can be calibrated based on any changes in the assumptions. The model shows when the water is deficient or in excess in different years and the transfer of water from one area to another according to the needs and availability.

Considering the current total residents in Jordan according to the 2015 census carried out by the General Department of Statistics, the assumptions made for the shares per capita, NRW reduction and other assumptions, the following Figure No. 2 and table No. 7 show the future resources and needs for all sectors.

Table 7: Development of Resources and Projected Demand in MCM/a

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Groundwater Safe yield	275	275	275	275	275	275	275	275	275	275	275
Non-renewable groundwater	144	145	146	147	178	189	174	240	241	242	243
Groundwater Over Abstraction	160	156	152	148	144	140	136	131	127	122	118
Surface water (Local + Tiberius Lake)	263	265	267	269	271	276	284	293	306	311	329
Treated wastewater	140	140	175	.6176	.6176	.6181	191	191	195	195	235
Additional Resources (Desalination + SWAP)	10	11	12	18	19	20	106	107	108	109	260
Total Resources	992	992	1027	1034	1064	1082	1165	1237	1251	1253	1459
Sustainable Resources	832	836	875	886	920	942	1030	1106	1125	1131	1341
Municipal, Industrial, Tourist demands	701	703	712	717	723	730	737	746	755	766	778
Irrigation demand	700	700	700	700	700	700	700	700	700	700	700
Oil shale and Nuclear power demand	-	-	-	25	25	25	48	48	48	70	70
Total demand without irrigations	701	703	712	742	748	755	785	793	803	836	848
Total Demand	**,4011**	**,4031**	**,4121**	**,4421**	**,4481**	**,4551**	**,4851**	**,4931**	**,5031**	**,5361**	**,5481**
Deficit in MCM/a (with over abstraction)	**(409)**	**(411)**	**(385)**	**(408)**	**(384)**	**(373)**	**(320)**	**(256)**	**(252)**	**(283)**	**(88)**

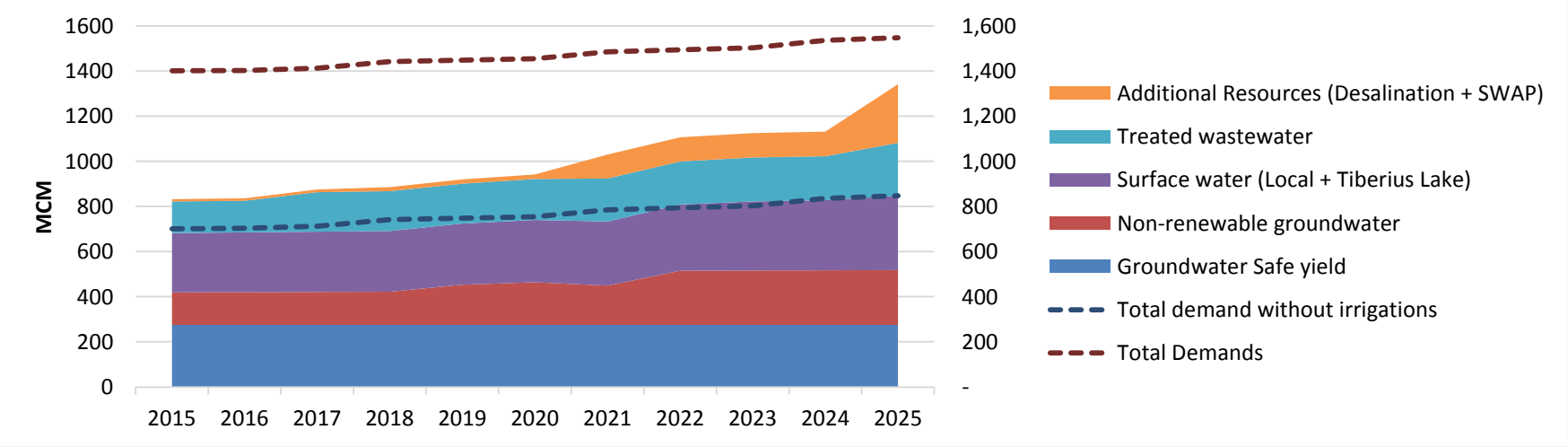

Figure 2: Development of Resources and Projected Demand in MCM/a

The Ministry of Water and Irrigation began the implementation of major projects and put an ambitious plan with precise time frame to increase the amount of water supply for municipal uses and increasing water for irrigation in the Jordan valley and thus, it will result in bridging the gap between water demand and available water resources. Table 7 shows that if the current resources remain unchanged and the irrigation water is kept constant, a quantity of about 300 MCM would satisfy the needs until the end of the planning period except for irrigated agriculture which is subject to reduction in highlands and increase in the Jordan Valley where water supply will increase once treated wastewater is made available; considering the new projects, the deficit will be lowered significantly by the year 2025 which will allow the closure of many ground water resources allowing for recovery and reinstatement ready for future needs.

Water Reallocation Policy Bases

The main pillars for water reallocation are the sustainability, health, efficiency, equity, economy, environment and nature. Priority is given to the domestic uses followed by the other economic sectors according to their importance.

The main criterion on which the policy is built is the "Adaptive Capacity". This means that the consumption shall be restricted to certain quantities of water. Priority is given to the domestic uses that meet the minimum amount needed to maintain safe and hygienic conditions. Then priorities are set for every economic sector according to its importance and contribution to the GDP.

The structure of the subscribers served from the network varies depending on the economic activities. Hotels and restaurants are big customers that exist mainly in Amman and other big cities including Aqaba and the East coast of the Dead Sea that contains big consumers (hotels and resorts). Other industrial and commercial consumers served from the network are spread mainly inside the cities, with the intensity of those big consumers being in Amman and Aqaba. Other cities contain smaller consumers while the other towns and villages host the smallest.

Objectives

The objectives of this policy document are:

- to create rules and present statements considered fundamental in managing the scarce water resources efficiently, protecting them, and proposes actions required for implementation;
- to establish sustainability, protect health, and ensure equity endurance;
- to protect environment and nature; and
- to maintain an internationally acceptable level of economic performance.

Water Reallocation Policy Themes

On Use Priorities

1. Domestic needs have the priority

2. Other priorities shall be given to other economic sectors tied to its economic returns and contribution to the GDP

On Resource Utilization

3. Surface water should be utilized first, followed by the utilization of ground water aquifers according to their safe capacity with strict consideration to environmental, social and economic impacts.

4. Desalination of brackish ground water shall have priority when and where feasible and where safe yields of fresh water is fully achieved

5. Desalination of sea water shall be considered as soon as possible. Desalinated quantities shall replace water from other resources in order to re-establish safe yields of depleted aquifers

6. Wastewater shall be treated and purified for full utilization for industrial, agricultural, cooling and other uses except for drinking purposes.

7. Deep Aquifer water shall be extracted and utilized with due consideration to their potential yield.

8. Priority utilization and use shall apply to impounded waters in reservoirs; such waters shall be treated for its intended use.

9. Reclaimed water shall be used for industry and agriculture as much as possible in order to save the fresh water for domestic uses.

10. A sustainable integrated development and conservation program and management plan shall be established to increase surface water development and usage in the Jordan Valley.

11. A dynamic and sustainable economic development plan coupled with investment program shall be formulated and implemented for the use of surface waters efficiently.

On Distribution and Reallocation Priorities

12. Each governorate shall retain its available water for its sole needs, unless is otherwise necessary, then it will be transferred to the geographically nearest governorate and to the governorate of highest need, with due consideration to sustainability, long term feasibility, availability of infrastructure and cost.

13. Shared water resources shall be allocated to the governorate of the highest need and geographically closest, and which can technically receive the water.

14. Supplied water shall be increased to achieve the target shares by the reduction ratios in NRW.

15. Availability of water infrastructure shall be insured during the reallocation process. Plans shall be made for infrastructures to meet the long term needs and/or the structure life time.

On Planning and Management

16. Planning guidance on sustainable design and construction shall be introduced to the Building Code to ensure that all new homes and apartments shall meet the 120, 100, and 80 l/c/d standard

17. Peak factor shall be broken down by changing the mode of supply from intermittent to gravity supply using command reservoirs and areas

18. Water appliances and water saving devices shall be adopted in all housing designs

19. Storage of rain water from roofs shall be enforced. Storage volumes shall be set in building codes depending on roof area and average precipitation

20. Measures shall be adopted aiming at protecting surface water supplies from pollution and minimizing losses by surface evaporation and seepage.

21. Water harvesting schemes in highlands shall be enhanced especially the design and construction of desert dams.

22. Infrastructure including mains and laterals shall be rehabilitated to achieve improved services, reduce losses and protect water from pollution.

23. In extreme events, during drought periods and when climate changes result in reduced water quantities, scenarios allowing reducing the impact shall be pursued and implemented with care.

On Treated Wastewater

24. The quality of treated wastewater from all municipal and industrial wastewater treatment plants shall meet national standards, monitored regularly, and reviewed periodically.

On Treated Wastewater Standards

25. Wastewater Standards shall be revised and amended to meet direct and indirect water reuse for the production of high value crops. All concerned governmental ministries, agencies and bodies dealing with environment and irrigation issues shall be consulted and be part of the decisions related to effluent quality.

On Irrigation

26. Fresh water allocated to irrigated agriculture in the high lands shall be capped and eventually reduced according to medium and long term plans to be prepared and implemented after which the reallocation plan can be updated accordingly.

27. Irrigation water in the Jordan valley shall be increased when new or treated wastewater is increased

28. Fresh water shall be replaced by treated wastewater. Thus, the irrigated agriculture can be expanded only where treated wastewater is available.

On Local Cooperation

29. Close cooperation via a joint committee between Ministries of Water and Irrigation, Environment, Agriculture and other organizations whose activities directly or indirectly involve the performance in the water sector to develop short-, medium- and long-term plans to monitor and control the water quality, use and impacts.

30. Close cooperation shall be maintained with the. Planning for project implementation and thereafter for water allocation shall be based on these considerations.

31. Exchange of information and experiences between Jordan and other countries shall be established. This can be achieved by twinning procedures, and other activities. The Water Strategy for Arab Countries can serve as a base for initiating regional cooperation.

32. Jordan’s rights in shared surface and ground water resources shall be pursued and guaranteed through international agreements.

On the Role of Society

33. Jordanians are aware of the water scarcity and all associated problems. They will also have to be made aware that water is shared by all those living in Jordan. Hence, awareness campaigns shall be launched addressing the importance of issues such as water harvesting, conserving and protecting resources from contamination.

34. Stakeholder's participation in planning, implementation and monitoring of major projects, plans, and climate change effects shall be encouraged and effected.

35. The public through all communication means shall be enlightened and educated on the value of water, their role on its sustainability and its relevance to their future.

On the Role of Private Sector

36. The role of private sector shall be enhanced and expanded with regard to the treated wastewater reuse, irrigated agriculture in the Jordan Valley with the aim of reducing the water usage and/or increasing the production per cubic meter used.

On Monitoring

37. A monitoring system for the reallocation plan shall be established based on collected, formatted and retrievable data.

38. Modern technologies for data collection, validation, analysis, modeling, sharing, and dissemination shall be employed and expanded.

39. The National Water Master Plan shall include updated information on water use for all sectors and areas, ground water levels, abstraction, rainfall, evaporation, spring discharge, etc. which shall be used for reallocation update every five years.

On Legislation

40. Laws and regulations in effect shall be enforced and updated periodically when needed

On Institutional Considerations

41. Different training and education programs shall be implemented in order to achieve high level and efficient planning, operation and management.

On Policy Follow-up

42. The Policy shall be monitored and evaluated after the completion of every water resource project and updated every 3 years and whenever there is a change in inputs, especially during drought and wet seasons, change demographics and in economic developments in other sectors.