Ministry of Water & Irrigation

# Jordan Water Sector Facts and Figures

## 2023

**Ministry of Water & Irrigation**

Opening Statement

**H.E. Eng. Raed Abu Soud**

**Minister of Water and Irrigation**

Jordan suffers from water scarcity, which poses a threat that would affect all sectors that depend on the availability of water for the sustainability of activities for their development and prosperity.

Water is an essential element for the uses of households, industry and agriculture, the growing water deficit from one year to another and increasing challenges in light of the increasing population and climate change, pose serious threat which leaves its impact on all sectors.

The availability of information is one of the most important determinants of dealing with the situation and the development of strategies, policies and plans. The information availability contributes to making the right decisions and helps all concerned sectors to understand and accept the decisions that will have an impact on the sectors development and growth. Consequently, the Ministry of Water and Irrigation is issuing this bulletin to provide information to stakeholders in the water sector including individuals, public and private sectors in addition to the funding and donors agencies of the water sector. We hope that the published information will be of value to all stakeholders and other parties that may have an interest in the water sector. MWI will continue to provide such information in the future and on periodic basis.

**Ministry of Water & Irrigation**

Opening Statement

**Dr. Jihad Saleh AlMahamid**

**Secretary General - Ministry of Water and Irrigation**

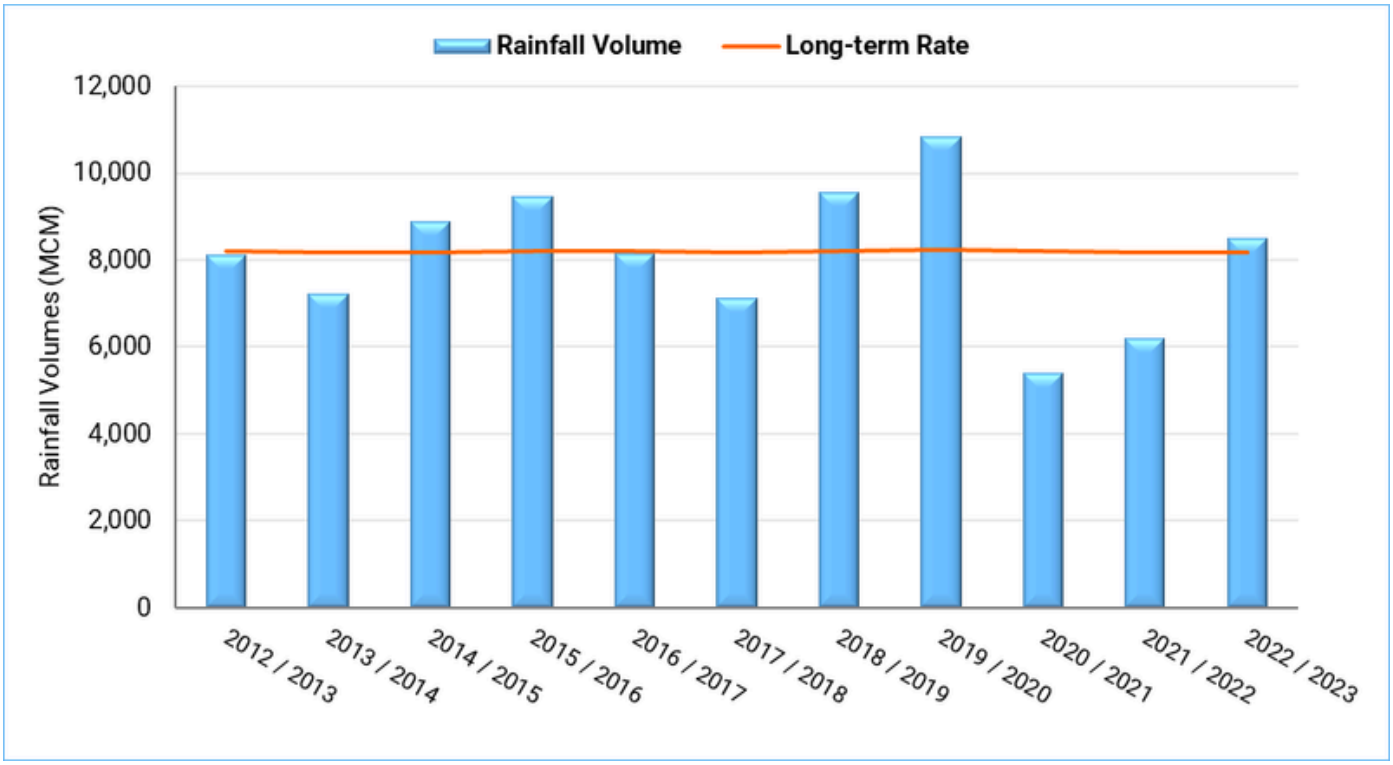
The Ministry of Water and Irrigation has the mandate to develop studies, strategies, policies and plans necessary for the water sector, in collaboration with the Water Authority of Jordan, the Jordan Valley Authority and the water companies operating throughout Jordan.

These studies and strategies are made available to the decision makers to be used in the most optimal manner for water resources management, directing them to demand areas, according to the priorities to ensure provision of water continuously to various users; domestic, industrial and agricultural.
Within the interest of the water sector to implement the principle of transparency in providing the water sector facts and figures to the stakeholders and those interested in the water situation of Jordan, the ministry is publishing this information bulletin that aggregates and describes the water sector.

The information herewith is the result and outcome of the efforts of Ministry of Water and Irrigation staff who work to serve Jordan and its citizens. The ministry intends to publish this information and update it periodically. This publication is intended to facilitate access to information related to the water sector from its source periodically. Hence, we welcome any positive feedback to improve this bulletin in the future.

## Rainfall Volumes (2013–2023) and the Long-Term Rate

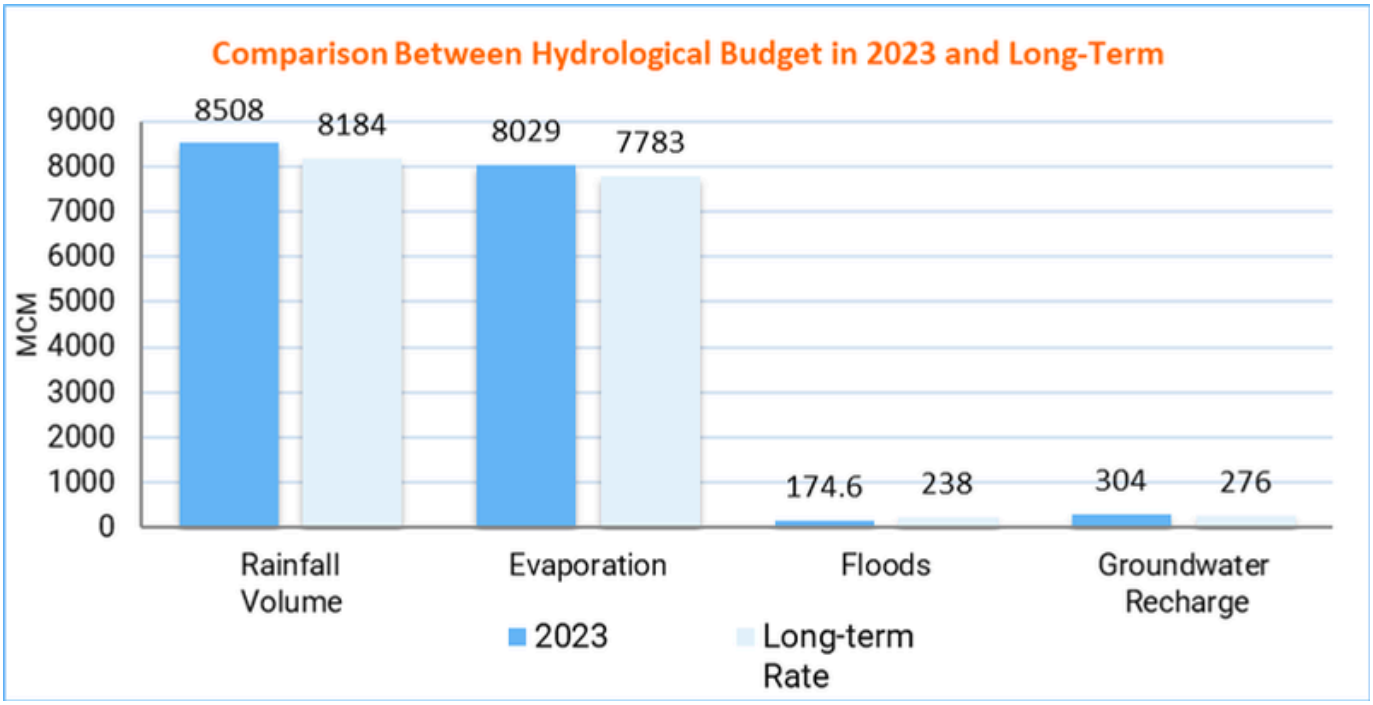
| Year | Rainfall Volume (MCM) | Long-term Rate (MCM) | Deviation from Long term Rate (MCM) |
|---|---|---|---|
| 2012 / 2013 | 8120 | 8194 | -74 |
| 2013 / 2014 | 7,228 | 8,181 | -953 |
| 2014 / 2015 | 8,884 | 8,191 | 693 |
| 2015 / 2016 | 9,483 | 8,207 | 1,276 |
| 2016 / 2017 | 8,165 | 8,206 | -41 |
| 2017 / 2018 | 7,146 | 8,165 | -1,019 |
| 2018 / 2019 | 9,568 | 8,210 | 1,358 |
| 2019 / 2020 | 10,836 | 8,241 | 2,595 |
| 2020 / 2021 | 5,414 | 8,208 | -2,794 |
| 2021 / 2022 | 6,192 | 8,184 | -1,992 |
| 2022 / 2023 | 8,508 | 8,184 | 324 |



## Surface Water Budget (2023)

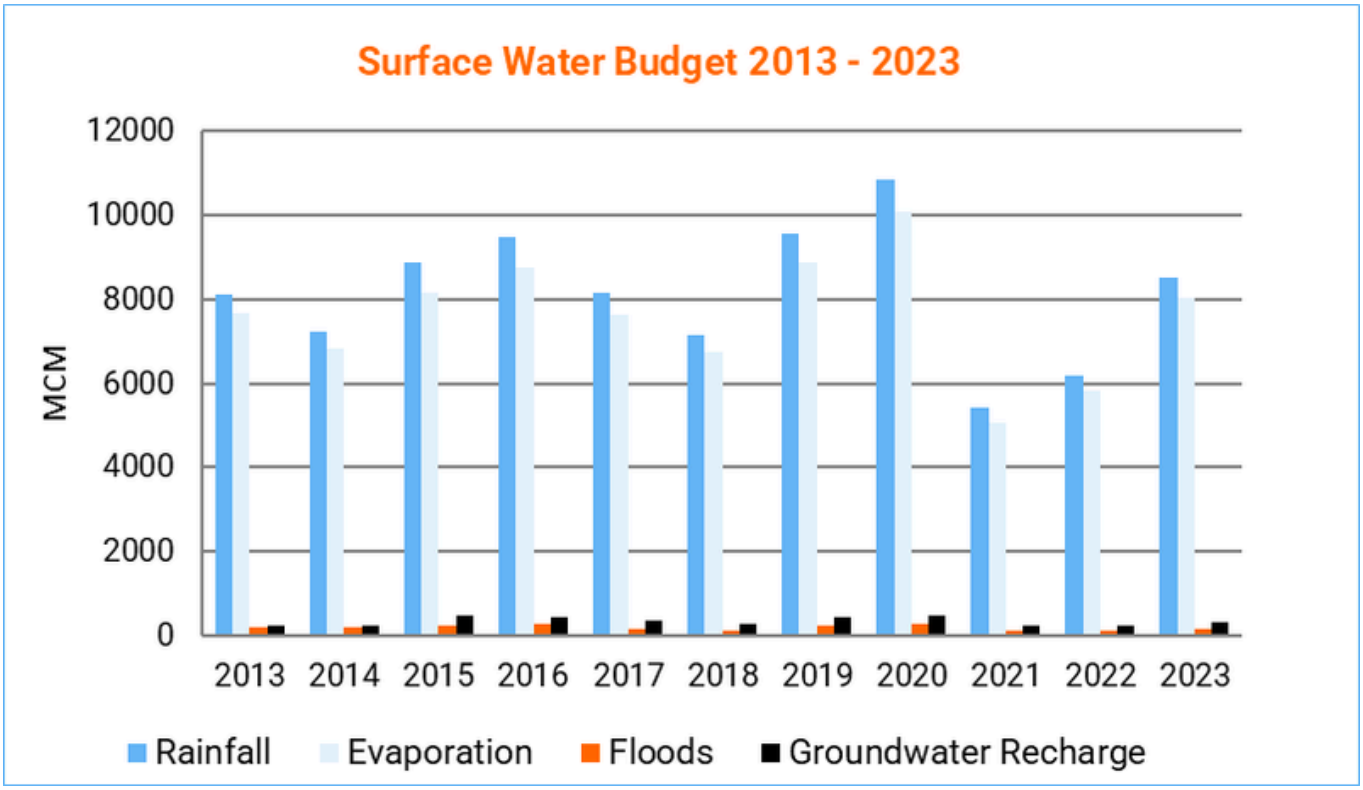
| Hydrological elements | Volumes (MCM) | Percentage to Rainfall | Long-term Rate (MCM) | Percentage to Long term Rate |
|---|---|---|---|---|
| Rainfall Volume | 8508 | | 8184 | 104% |
| Evaporation | 8029 | 94% | 7783 | 103% |
| Floods | 174.6 | 2% | 238 | 73% |
| Groundwater Recharge | 304 | 4% | 276 | 110% |

## Hydrological Budget elements in 2023 vs. Long-Term Rate



# Surface Water Budget (2013- 2023)

| Year | Rainfall (MCM) | Rainfall distributed on | | |
|---|---|---|---|---|
| | | Evaporation (MCM) | Floods (MCM) | Groundwater Recharge (MCM) |
| 2013 | 8,120 | 7,689 | 187 | 244 |
| 2014 | 7,228 | 6,817 | 180 | 231 |
| 2015 | 8,884 | 8,154 | 245 | 485 |
| 2016 | 9,483 | 8,772 | 266 | 445 |
| 2017 | 8,165 | 7,636 | 167 | 362 |
| 2018 | 7,146 | 6,748 | 128 | 269 |
| 2019 | 9,568 | 8,871 | 257 | 440 |
| 2020 | 10,836 | 10,098 | 273 | 465 |
| 2021 | 5,414 | 5,059 | 117 | 238 |
| 2022 | 6,192 | 5,814 | 133 | 245 |
| 2023 | 8,508 | 8,029 | 175 | 304 |

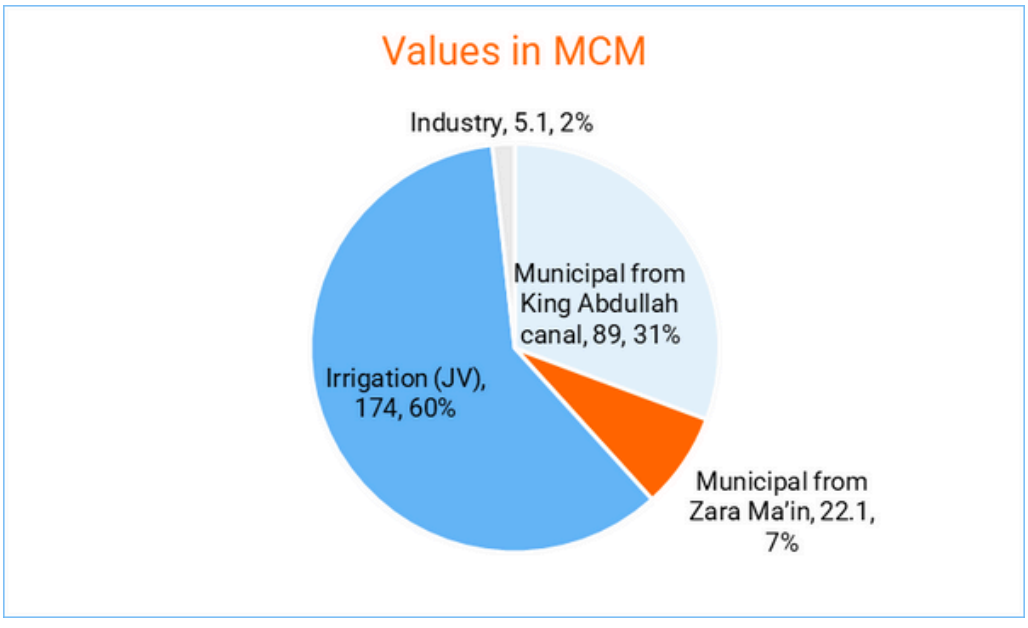


## Dams Design Capacity, Storage, Inflows, and Outflows in 2023

| Dam | Design Capacity (MCM) | Total Inflows (MCM) | Total Outflows (MCM) | Storage End of Year (MCM) |
|---|---|---|---|---|
| Wehdeh | 110 | 23.7 | 25.4 | 9.4 |
| Wadi Arab | 16.8 | 5.1 | 7.8 | 6.4 |
| Zeqlab | 4 | 1.3 | 1.6 | 1.1 |
| Kufranjeh | 7.8 | 3.7 | 3.3 | 2.2 |
| King Talal | 75 | 148.5 | 133.7 | 37.3 |
| Karameh | 55 | 2 | 1.6 | 23.5 |
| wadi Shueib | 1.7 | 9.1 | 9.4 | 0.7 |
| Kafrain | 8.5 | 10.7 | 10.3 | 4.6 |
| Zarqaa Maeen | 2 | 0.9 | 0.9 | 0.3 |
| Allajon | 1 | 0.2 | 0.3 | 0.2 |
| Tanour | 14.7 | 7.2 | 2.2 | 6.8 |
| Wala | 28.6 | 35.2 | 29.6 | 7.2 |
| Mujeb | 29.8 | 48.6 | 30 | 21.5 |
| Karak | 2 | 0.9 | 0.6 | 0.4 |
| **Total** | **356.8** | **297.1** | **256.6** | **121.4** |

**Percentage of storage from design capacity 33.92%**

## Water Uses for Different Purposes from Jordan Valley Resources 2023



## Water Users Associations in Jordan Valley Irrigated Areas

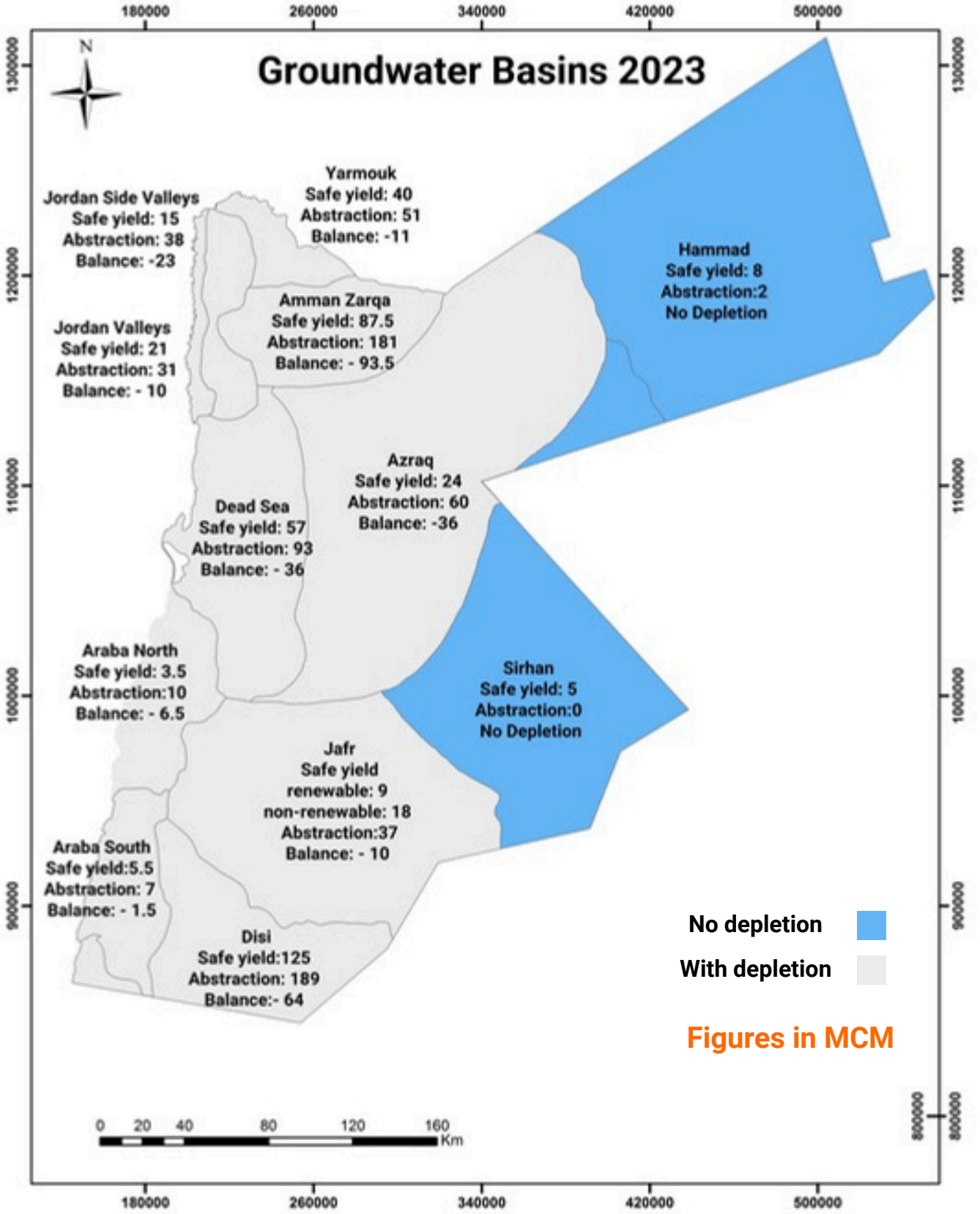
| Location | No. of WUA's | Coverage % from The Directorate | Coverage % from The Jordan Valley |
|---|---|---|---|
| Northern Ghours | 6 | 84% | 16% |
| Middle Ghours | 3 | 29% | 7% |
| South Shuna | 6 | 100% | 20% |
| Southern Ghours | 4 | 55% | 8% |
| **Average** | **19** | **67%** | **52%** |

## Water Harvesting Projects (Desert Dams, Earth Ponds, and Concrete Ponds)

| Water Harvesting type | Number of dams/ponds | Design Capacity (MCM) |
|---|---|---|
| Desert Dams | 76 | 0.3 |
| Concrete Ponds | 73 | 97 |
| Eearth Ponds | 372 | 30.9 |
| **Total** | **521** | **128** |

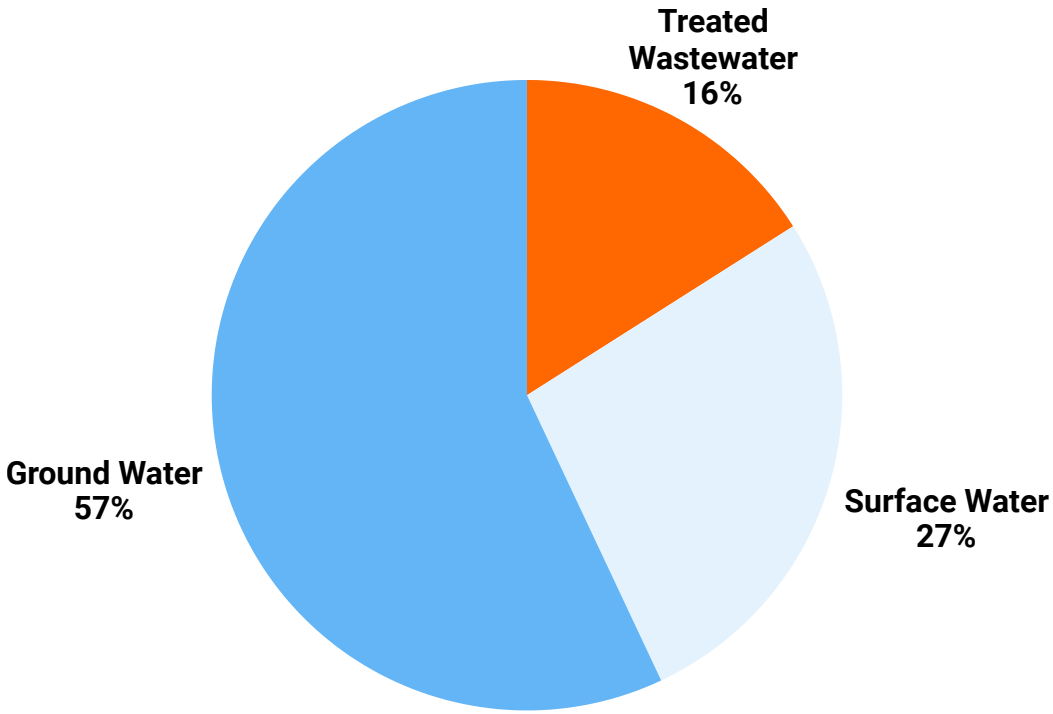
## Groundwater Basins, Safe Yield, Abstraction Volumes in 2023, and Deficits

| Groundwater Basin | Safe Yield (MCM) | Abstraction for 2023 (MCM) | Deficit (MCM) |
|---|---|---|---|
| Wadi Arab North | 3.5 | 10 | -6.5 |
| W. Sirhan | 5 | 0 | 5 |
| Wadi Araba South | 5.5 | 7 | -1.5 |
| W. Hammad | 8 | 2 | 6 |
| Reft Side_W | 15 | 38 | -23 |
| Jordan Valley | 21 | 31 | -10 |
| Azraq | 24 | 60 | -36 |
| Jafer | 27 | 37 | -10 |
| Yarmouk | 40 | 51 | -11 |
| Dead Sea Basin | 57 | 93 | -36 |
| Amman Zarqa | 87.5 | 181 | -93.5 |
| Southern Desert | 125 | 189 | -64 |
| **Total** | **419** | **699** | **-281** |

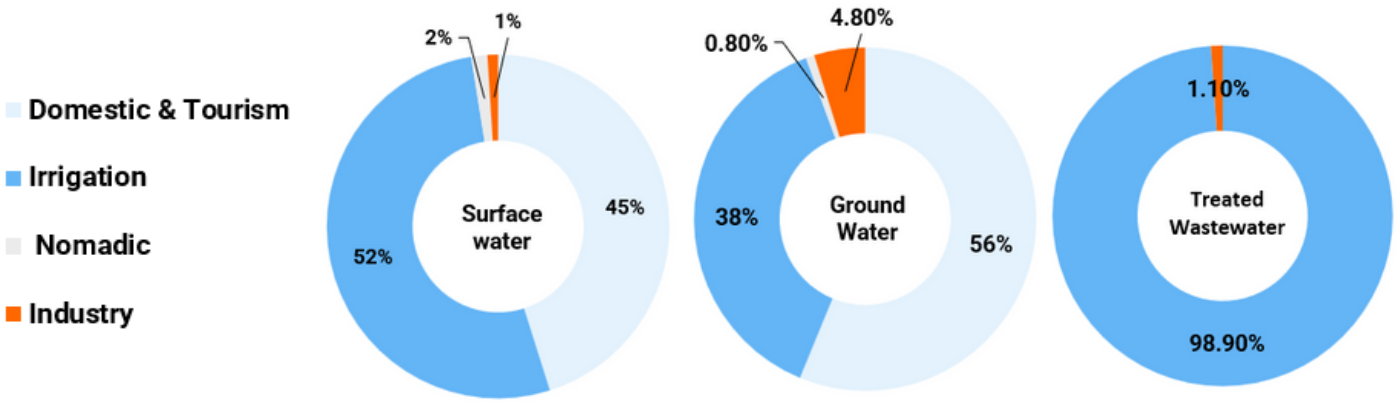

Groundwater Basins 2023
N
180000
260000
340000
420000
500000
1300000
1200000
1100000
1000000
900000
800000
Yarmouk
Safe yield: 40
Abstraction: 51
Balance: -11
Jordan Side Valleys
Safe yield: 15
Abstraction: 38
Balance: -23
Hammad
Safe yield: 8
Abstraction:2
No Depletion
Amman Zarqa
Safe yield: 87.5
Abstraction: 181
Balance: - 93.5
Jordan Valleys
Safe yield: 21
Abstraction: 31
Balance: - 10
Azraq
Safe yield: 24
Abstraction: 60
Balance: -36
Dead Sea
Safe yield: 57
Abstraction: 93
Balance: - 36
Araba North
Safe yield: 3.5
Abstraction:10
Balance: - 6.5
Sirhan
Safe yield: 5
Abstraction:0
No Depletion
Jafr
Safe yield
renewable: 9
non-renewable: 18
Abstraction:37
Balance: - 10
Araba South
Safe yield:5.5
Abstraction: 7
Balance: - 1.5
Disi
Safe yield:125
Abstraction: 189
Balance:- 64
No depletion
With depletion
Figures in MCM
0 20 40 80 120 160
Km

## Water Uses and Resources in 2023 (MCM)

| Uses/Resources (MCM) | Surface Water (MCM) | Groundwater (MCM) | Treated Wastewater (MCM) | Total (MCM) |
|---|---|---|---|---|
| Domestic & Tourism | 146 | 381 | 0 | 527 |
| Irrigation | 168 | 263 | 192 | 623 |
| Nomadic | 6.3 | 5.7 | 0 | 12 |
| Industry | 5.1 | 33 | 2.2 | 40.3 |
| **Total** | **325** | **683** | **194** | **1,202** |
| **Percentage** | **27%** | **57%** | **16%** | **100%** |

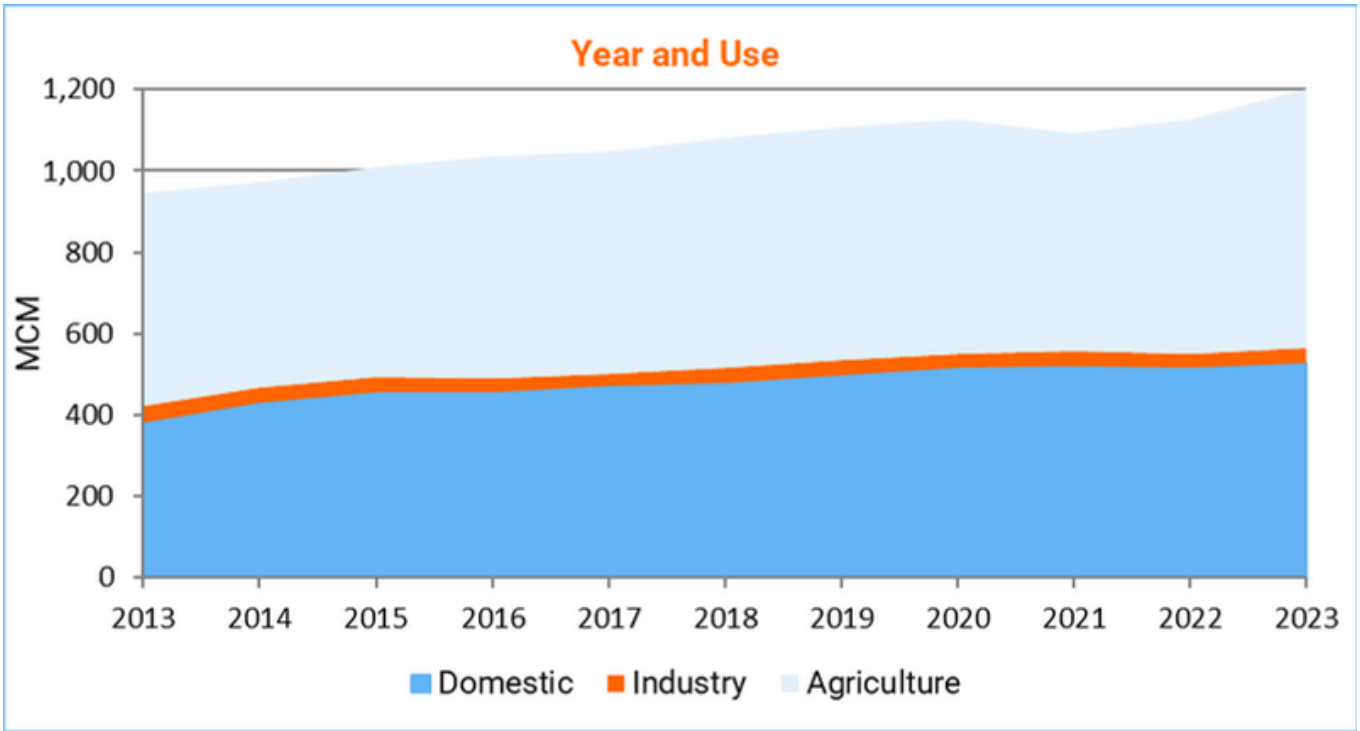



## Water Resources and the Percentage of Their Uses in 2023



## Water Uses (MCM) for Different Purposes 2013–2023

| Total (MCM) | Agriculture (MCM) | Industry (MCM) | Domestic (MCM) | Year and Use (MCM) |
|---|---|---|---|---|
| 945 | 525 | 39 | 381 | 2013 |
| 972 | 504 | 39 | 429 | 2014 |
| 1,009 | 514 | 38 | 457 | 2015 |
| 1,036 | 547 | 32 | 457 | 2016 |
| 1,047 | 545 | 32 | 470 | 2017 |
| 1,080 | 562 | 38 | 480 | 2018 |
| 1,109 | 574 | 37 | 497 | 2019 |
| 1,128 | 577 | 35 | 516 | 2020 |
| 1,093 | 537 | 36 | 520 | 2021 |
| 1,127 | 576 | 34 | 518 | 2022 |
| 1,202 | 635 | 40 | 526 | 2023 |



## Number of Monitoring Stations

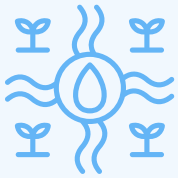
### Rainfall Stations
**Telemetric: 99**
**Normal: 174**
**Total: 273**

### Climate Stations
**Telemetric: 50**
**Normal: 21**
**Total: 71**

### Groundwater Level
**Telemetric: 92**
**Normal: 129**
**Total: 221**

### Runoff Stations
**Telemetric: 6**
**Normal: 23**
**Total: 29**

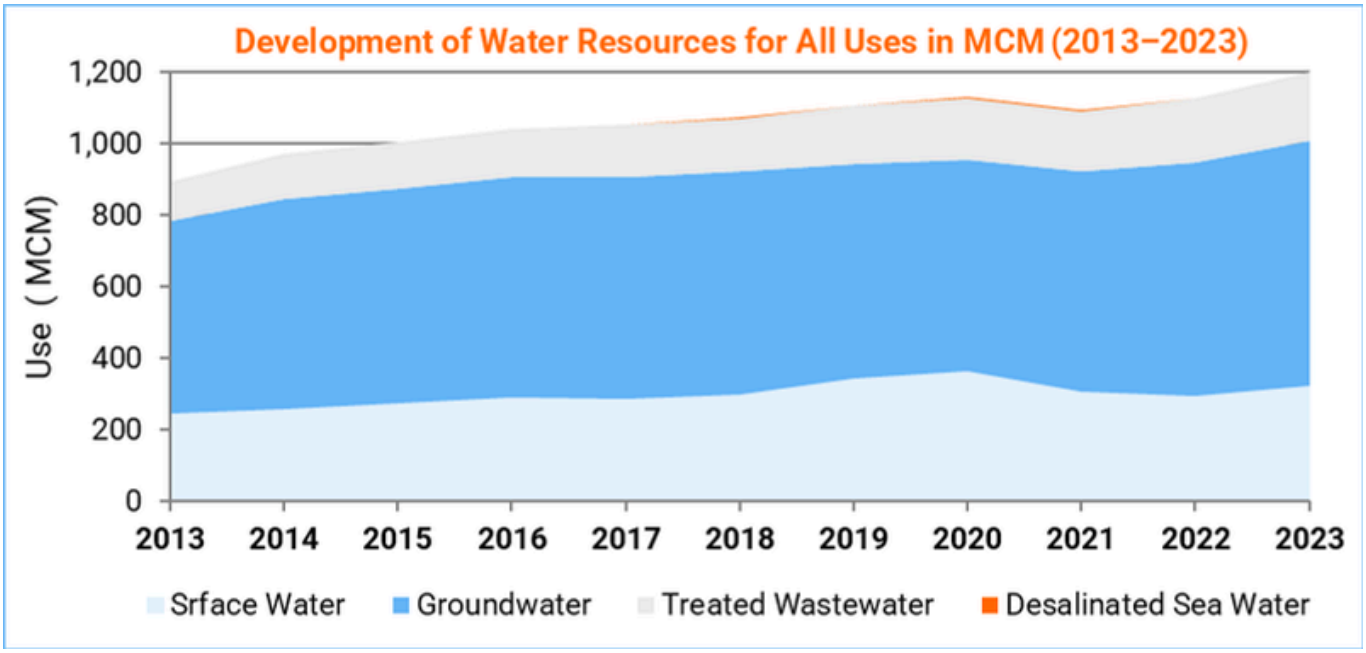
### Spring Discharge
**Telemetric: 0**
**Normal: 425**
**Total: 425**



### Dams
**Telemetric: 8**
**Normal: 0**
**Total: 8**

## Development of Water Resources for All Uses in MCM (2013–2023)

| Year Sources (MCM) | Surface Water (MCM) | Groundwater (MCM) | Treated Wastewater (MCM) | Desalinated Sea Water (MCM) | Total (MCM) |
|---|---|---|---|---|---|
| 2013 | 245 | 540 | 109 | 0 | 894 |
| 2014 | 259 | 588 | 125 | 0 | 972 |
| 2015 | 274 | 600 | 133 | 0 | 1,007 |
| 2016 | 289 | 619 | 136 | 0 | 1,044 |
| 2017 | 288 | 619 | 147 | 0 | 1,054 |
| 2018 | 298 | 625 | 149 | 4 | 1,076 |
| 2019 | 344 | 601 | 160 | 3 | 1,109 |
| 2020 | 364 | 594 | 170 | 2 | 1,130 |
| 2021 | 307 | 619 | 167 | 1 | 1,093 |
| 2022 | 294 | 656 | 177 | 0 | 1,127 |
| 2023 | 325 | 683 | 195 | 0 | 1,202 |

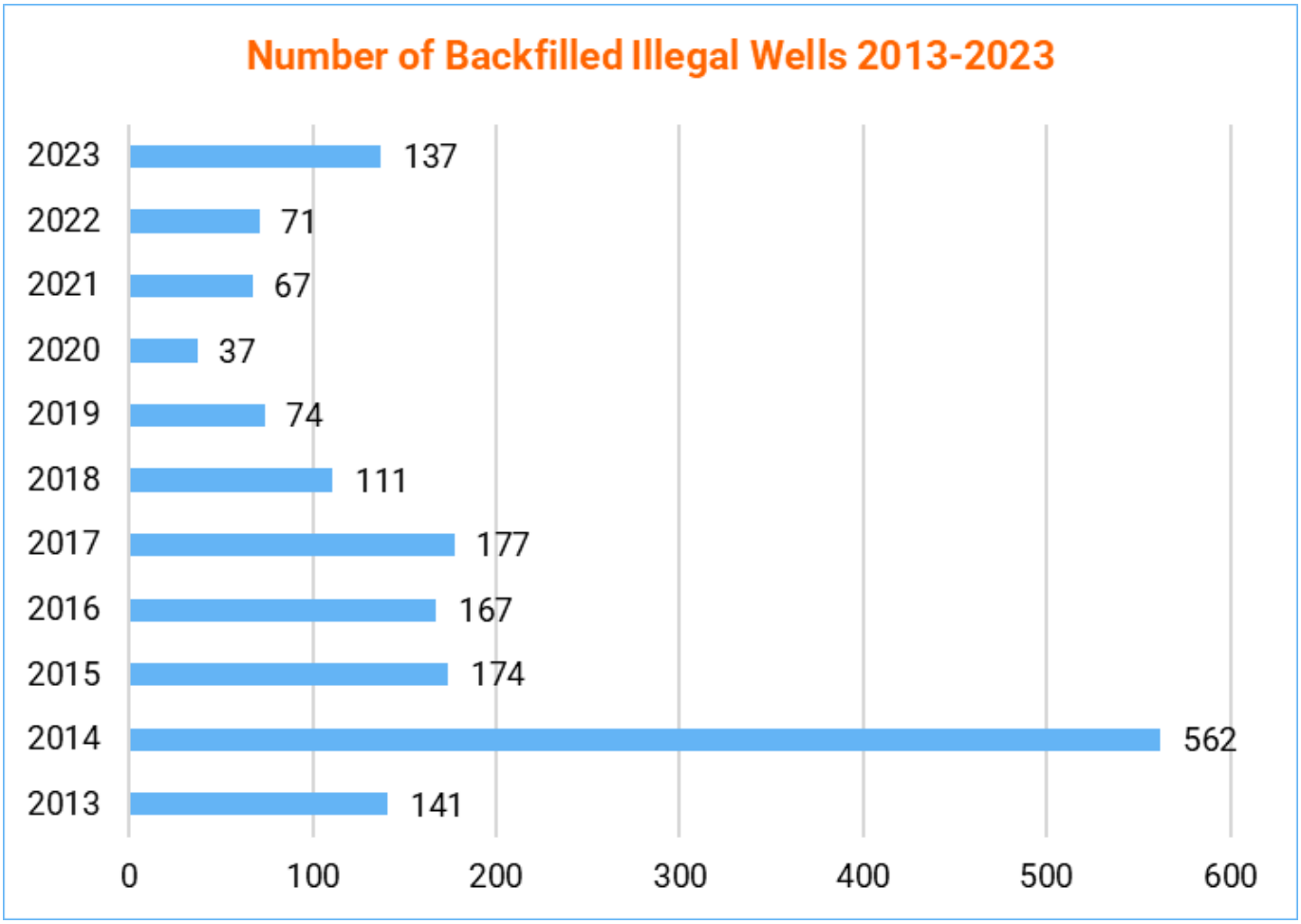



## Number of Operational Wells According to Water Uses (2013–2023)

| Total | Livestock | Drinking | Agriculture | Industrial | Year Well uses |
|---|---|---|---|---|---|
| 3034 | 16 | 602 | 2210 | 206 | 2013 |
| 3031 | 50 | 781 | 2000 | 200 | 2014 |
| 3138 | 18 | 756 | 2163 | 201 | 2015 |
| 3145 | 26 | 761 | 2170 | 188 | 2016 |
| 3272 | 54 | 805 | 2210 | 203 | 2017 |
| 3321 | 47 | 824 | 2262 | 188 | 2018 |
| 3183 | 42 | 797 | 2164 | 180 | 2019 |
| 3208 | 42 | 796 | 2189 | 181 | 2020 |
| 3250 | 38 | 766 | 2268 | 178 | 2021 |
| 3385 | 58 | 813 | 2332 | 182 | 2022 |
| 3438 | 81 | 825 | 2335 | 197 | 2023 |

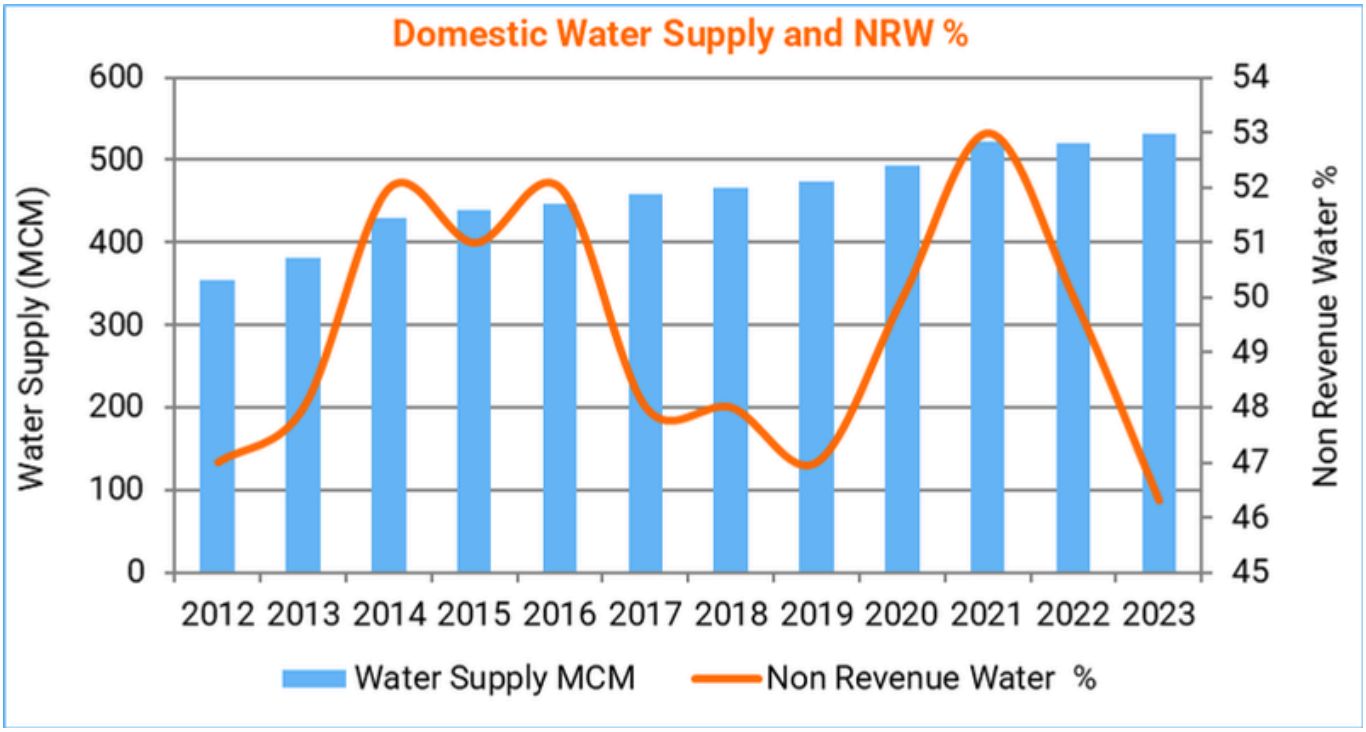
## Number of Backfilled Illegal Wells 2013-2023

| Year | Number of Wells |
|---|---|
| 2013 | 141 |
| 2014 | 562 |
| 2015 | 174 |
| 2016 | 167 |
| 2017 | 177 |
| 2018 | 111 |
| 2019 | 74 |
| 2020 | 37 |
| 2021 | 67 |
| 2022 | 71 |
| 2023 | 137 |



## Drinking Water Supply and Non-Revenue Water 2012-2023

| Year | Water Supply (MCM) | Non Revenue Water (%) |
|---|---|---|
| 2012 | 354 | 47 |
| 2013 | 381 | 48 |
| 2014 | 429 | 52 |
| 2015 | 440 | 51 |
| 2016 | 447 | 52 |
| 2017 | 458 | 48 |
| 2018 | 466 | 48 |
| 2019 | 474 | 47 |
| 2020 | 493 | 50 |
| 2021 | 521 | 53 |
| 2022 | 520 | 50 |
| 2023 | 532 | 46.3 |



## Compliance of Drinking Water Quality Tests with Jordanian Standards

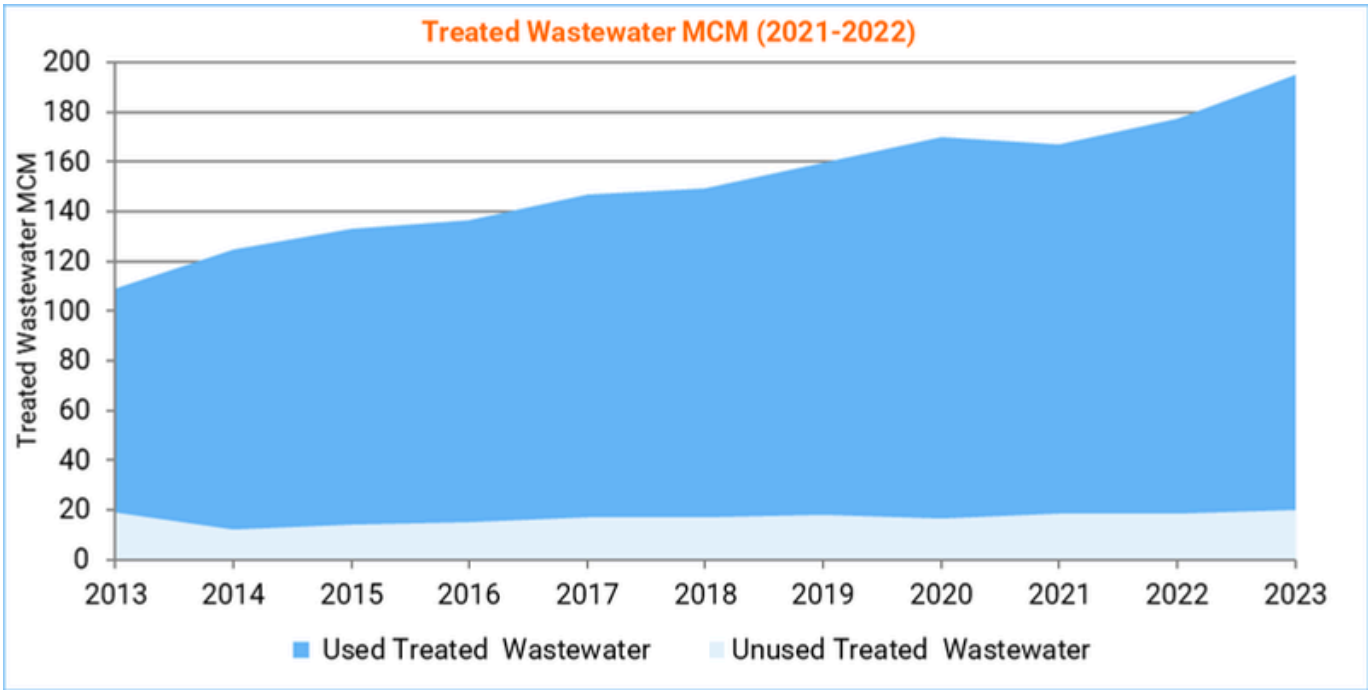
| Year | Conforming Percentage |
|---|---|
| 2014 | 99.60% |
| 2015 | 99.50% |
| 2016 | 99.62% |
| 2017 | 99.67% |
| 2018 | 99.70% |
| 2019 | 99.60% |
| 2020 | 99.40% |
| 2021 | 99.50% |
| 2022 | 99.70% |
| 2023 | 100% |

## Drinking Water Supply Share (Liter/Capita/Day) 2013–2023

| Year | Water Supply |
|---|---|
| 2013 | 123 |
| 2014 | 132 |
| 2015 | 128 |
| 2016 | 127 |
| 2017 | 125 |
| 2018 | 124 |
| 2019 | 123 |
| 2020 | 125 |
| 2021 | 138 |
| 2022 | 126 |
| 2023 | 128 |

## Treated Wastewater Volumes (MCM) 2013–2023

| Year | Treated Wastewater (MCM) | Used Treated Wastewater (MCM) | Unused Treated Wastewater (MCM) |
|---|---|---|---|
| 2013 | 128 | 109 | 19 |
| 2014 | 137 | 125 | 12 |
| 2015 | 147 | 133 | 14 |
| 2016 | 151 | 136 | 15 |
| 2017 | 164 | 147 | 17 |
| 2018 | 167 | 149 | 17 |
| 2019 | 178 | 160 | 18 |
| 2020 | 187 | 170 | 17 |
| 2021 | 186 | 167 | 19 |
| 2022 | 196 | 177 | 19 |
| 2023 | 215 | 195 | 20 |



# Wastewater Treatment Plants in Jordan 2023

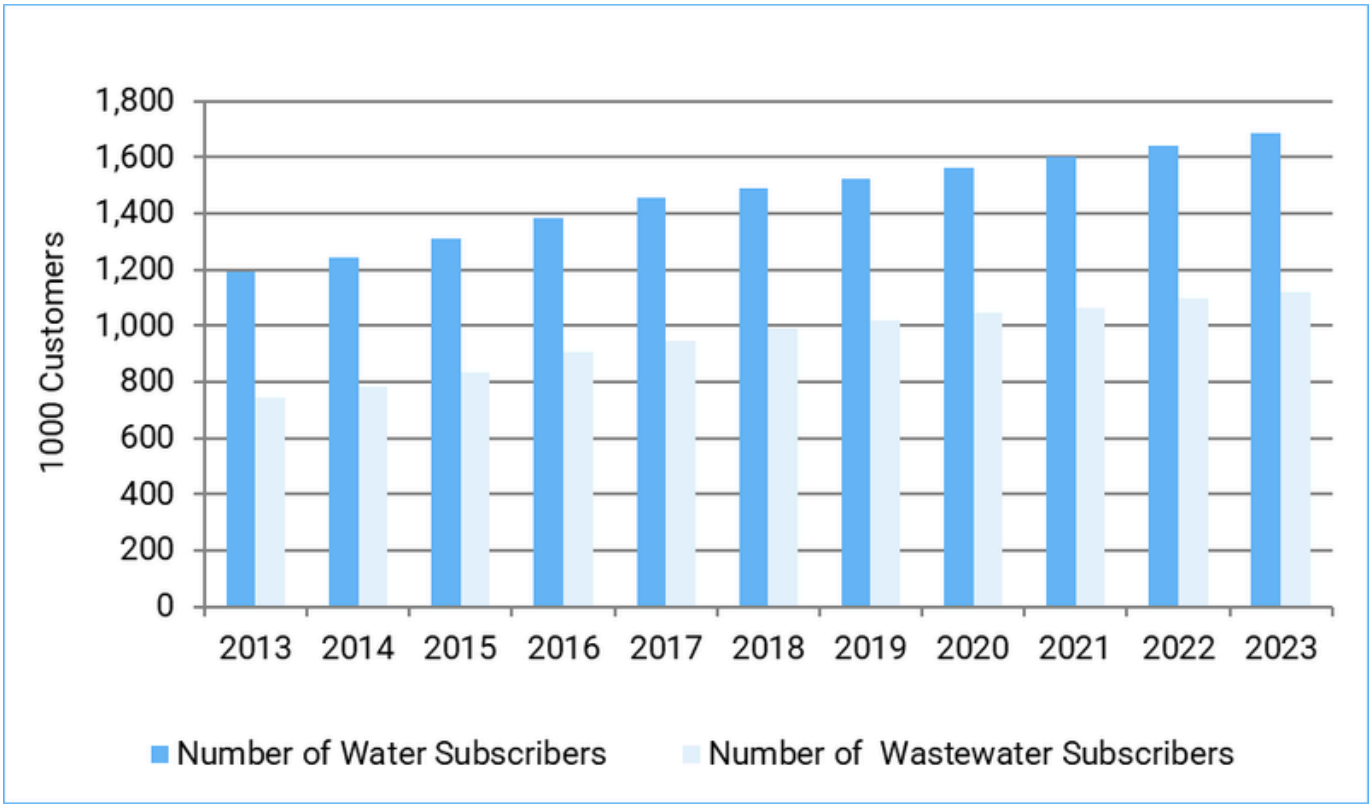
| Name of WWTP | Stations developed and under development | Design capacity (m3/day) | Actual load flow / 2023 (m3/day) | Technology | Operation Year | BOD5 Design |
|---|---|---|---|---|---|---|
| Mechanical Aqaba | Developed | 40000 | 23938 | Activated sludge | 1986 | 500 |
| Albaqaa / Ain Albasha | | 14900 | 27211 | Biological filters | 1988 | 800 |
| Alfoheis and Mahis | under study for expansion | 2400 | 4426 | Activated sludge | 1997 | 950 |
| Irbid Central / foa'ara | under development | 13358 | 8965 | Activated sludge | 1987 | 1095 |
| Jarash (east) | Developed | 9500 | 3989 | Activated sludge | 1983 | 1130 |
| Almearad | Developed | 10000 | 3164 | Activated sludge | 2011 | 600 |
| Alkarak | under development | 1000 | 1200 | Activated sludge | 1988 | 800 |
| Kufr Najah | Developed | 9000 | 3406 | Activated sludge | 1989 | 600 |
| Madaba | under study for expansion | 7600 | 8543 | Activated sludge | 1989 | 950 |
| Almafraq Natural | Developed | 5500 | 5230 | Aerated basins +MBBR | 2017 | 708 |
| Maan | Developed | 3900 | 2289 | Activated sludge | 1989 | 600 |
| Alramtha | under development | 5400 | 4213 | Activated sludge | 1987 | 1000 |
| Alsalt | under development | 7700 | 8584 | Activated sludge | 1981 | 600 |
| Altafelih | Developed | 5000 | 2151 | Activated sludge | 1988 | 1060 |
| Wadi Alarab /doa'ara | under development | 21000 | 17652 | Activated sludge | 1999 | 850 |

# Wastewater Treatment Plants in Jordan 2023

| Name of WWTP | Stations developed and under development | Design capacity (m3/day) | Actual load flow / 2023 (m3/day) | Technology | Operation Year | BOD5 Design |
|---|---|---|---|---|---|---|
| Wadi Hassan | under study for expansion | 1600 | 1972 | Activated sludge | 2001 | 800 |
| Wadi Musa | | 3400 | 3485 | Activated sludge | 2000 | 500 |
| Tal Almantah | Developed Activated sludge | 400 | 489 | Biological filters + Activated sludge | 2004 | 2000 |
| Alshobak / sahareeg | | 350 | 178 | Natural basins | 2010 | 1850 |
| Alsamraa | Developed From natural to mechanical | 365000 | 410643 | Activated sludge | old 1984 / new 2008 | 700 |
| Almansorah | | 50 | 11 | Drying basins | 2010 | 1850 |
| South Amman | | 52000 | 35145 | Activated sludge | 2015 | 750 |
| Wadi Alshalaleh | under study for expansion | 13700 | 14573 | Activated sludge | 2014 | 762 |
| Mutah, Almazar and Aladnaneih | | 7000 | 2526 | Activated sludge | 2014 | 673 |
| North Shoneh | | 1200 | 993 | Natural basins | 2015 | 2200 |
| Nauor | Developed From natural to mechanical | 17000 | 10418 | Activated sludge | 1997 | 670 |
| Alakedar | | 4000 | 1664 | Natural basins | 2005 | 2000 |
| Allajon | | 1200 | 868 | Aerated basins | 2005 | 1500 |
| Zaatari refugee camp | | 3200 | 2600 | MBR+TF | 2015 | 1500 |

## Number of Water and Wastewater Subscribers 2013 - 2023

| Year | Number of Water Subscribers | Number of Wastewater Subscribers | Percentage of Household Served in Sewer Systems |
|---|---|---|---|
| 2013 | 1,190,831 | 742,763 | 62% |
| 2014 | 1,240,360 | 780,661 | 63% |
| 2015 | 1,308,043 | 834,093 | 64% |
| 2016 | 1,382,628 | 906,291 | 66% |
| 2017 | 1,455,417 | 946,917 | 65% |
| 2018 | 1,491,326 | 989,416 | 66% |
| 2019 | 1,524,191 | 1,016,774 | 67% |
| 2020 | 1,563,566 | 1,044,004 | 67% |
| 2021 | 1,604,025 | 1,062,856 | 66% |
| 2022 | 1,641,991 | 1,098,661 | 67% |
| 2023 | 1,683,460 | 1,120,581 | 67% |



## Cost Analysis for Water Authority and Water Companies in Million JD

| Description | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|
| Running Costs (O&M) without interests | 230 | 236 | 215 | 243 | 206 | 274 |
| Capital Costs divided into: | | | | | | |
| 1. Self-Financed expenses | 173 | 171 | 143 | 160 | 166 | 196 |
| 2. Expenses covered by International loans | 41 | 43 | 19 | 29 | 21 | 41 |
| 3. Expenses covered by external grants | 24 | 26 | 17 | 15 | 49 | 40 |
| Payments of installments and benefits (external + internal) | 68 | 57 | 35 | 36 | 29 | 23 |

## Energy Consumption per Billed Water with Energy Consumption Rate

| Year | Electricity Consumption (GW.h) | Billed Water (MCM) | Electricity Consumption Rate (KW.h/CM) |
|---|---|---|---|
| **Water Authority of Jordan** | | | |
| 2022 | 1689 | 260 | 6.5 |
| 2023 | 1782 | 292 | 6.1 |
| **Jordan Valley Authority** | | | |
| 2022 | 43.65 | 159 | 0.27 |
| 2023 | 42.4 | 173.6 | 0.24 |
| **Water Sector** | | | |
| 2022 | 1732.7 | 419 | 4.14 |
| 2023 | 1824.4 | 465.6 | 6.34 |

# KEY FACTS

Jordan is composed of **15 surface** water basins and **12 groundwater** basins

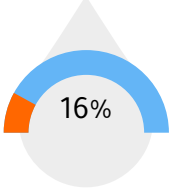
Less than **61 m3** of **annual renewable fresh water resources** is available per person (below global line for absolute water scarcity of **500 m3**)

Of the **12** main aquifers underlying Jordan, **10** are being **depleted** beyond their recharge volumes

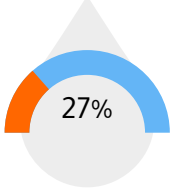
The shared water with neighboring countries is around **26%** of the total water resources


## SOURCES OF WATER FOR ALL USERS In 2023

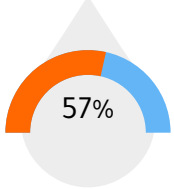
**Treated Wastewater**




**Surface Water**

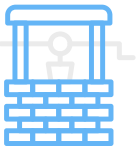



**Ground Water**



# KEY FACTS

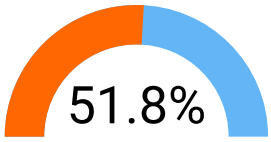
Quantity of traditional water resources available for different purposes is around 1008 MCM annually



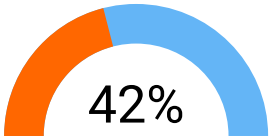
The number of working wells in Jordan exceeds 3454 wells

The groundwater level in the main aquifers drops at a rate of 2 meters per year, but the decline in some depleted areas reaches 5 to 20 meters

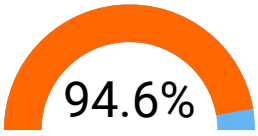
- The safe yield abstraction quantity from renewable groundwater is 275.5 MCM, while the safe yield abstraction quantity from nonrenewable groundwater for 50 years is about 143 MCM
- Quantity of over pumping from groundwater 2023 is about 280.5 MCM



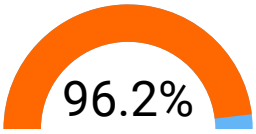

of available water is used in Agriculture




of which is groundwater sources




of water sources are described as “safely managed” (SDGs)

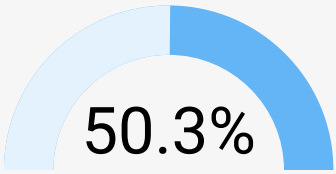



of population are connected to piped water supply in urban areas and the percentage is 88.1% in rural areas

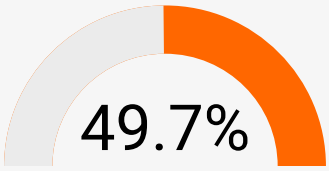
The increase in demand for Domestic water in the northern governorates has increased by 40% in the last few years as a result of hosting Syrians

# KEY FACTS

The percentage of the Jordanian population who has a water supply for 24 hours/week or less is estimated at 50.3%

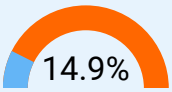



While the water supply for 49.7% of Jordanians ranges from 24-48 hours/week

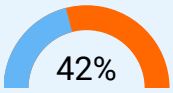



**The estimated water demand quantity for all sectors is 1202 MCM in 2023**


of the drinking water supplied to the capital comes for sources distanced 125 to 325 km away and elevate up to about 1200m with 5 pumping stages

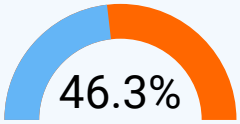



from electricity is consumed in water pumping and other water services




of the drinking water supplied to northern governorates comes from sources distanced 20 to 76 km away and elevated up to about 1100m with 5 pumping stages in elevation (translated into higher cost for water supply)

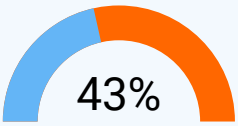
The estimated non-revenue water is



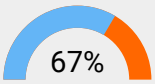

in 2023

It is divided to more than 50% as an administrative loss and less than 50% physical losses from the networks

Comparing to




in 2010




of **households** have a sewer connection; only **3%** have a sewer connection in rural areas. **88.5%** of sanitation systems are described as safely managed

Each Syrian refugee costs the water sector around **440JD/year**, in financial, environmental, and economic costs

**Ministry of Water & Irrigation**

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This booklet is based on an original concept developed by Geologist Thair Al-Momani and further refined by the Ministry of Water and Irrigation (MWI)

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