



**The Hashemite Kingdom of Jordan  
Ministry of Water & Irrigation**



**Water Situation in Jordan  
Prepared by  
Eng. Bassam Mahd Saleh  
Assistant Secretary General  
For  
Water Affairs**

# Introduction

- Jordan is categorized between the arid and semi arid countries, and can be considered one of the most ten water stressed countries in the world, with less than 150 cubic meters (CM) annual per capita of fresh water resources, while the world water poverty line is 1000 CM.
- The Ministry of Water & irrigation is working very hard for additional water resources, and for efficient management of water distribution and use in order to meet the demand of population increase and development.

- **Jordan is divided into 15 surface water basins and 12 ground water basins, some of which extend to neighboring countries.**
- **Water resources depend on rainfall which varies in quantities, intensity and distribution from year to year, with most fall between the months of October and May.**

# Average Annual Rainfall

## • Jordan Valley

50-300 mm (5.7%)

## • High Land

400 – 600 mm (2.9%)

## • Desert Area (Badia)

50 – 200 mm (91.4%)

## Annual quantities (MCM):

• Wet Years 11000

• Dry years 5800

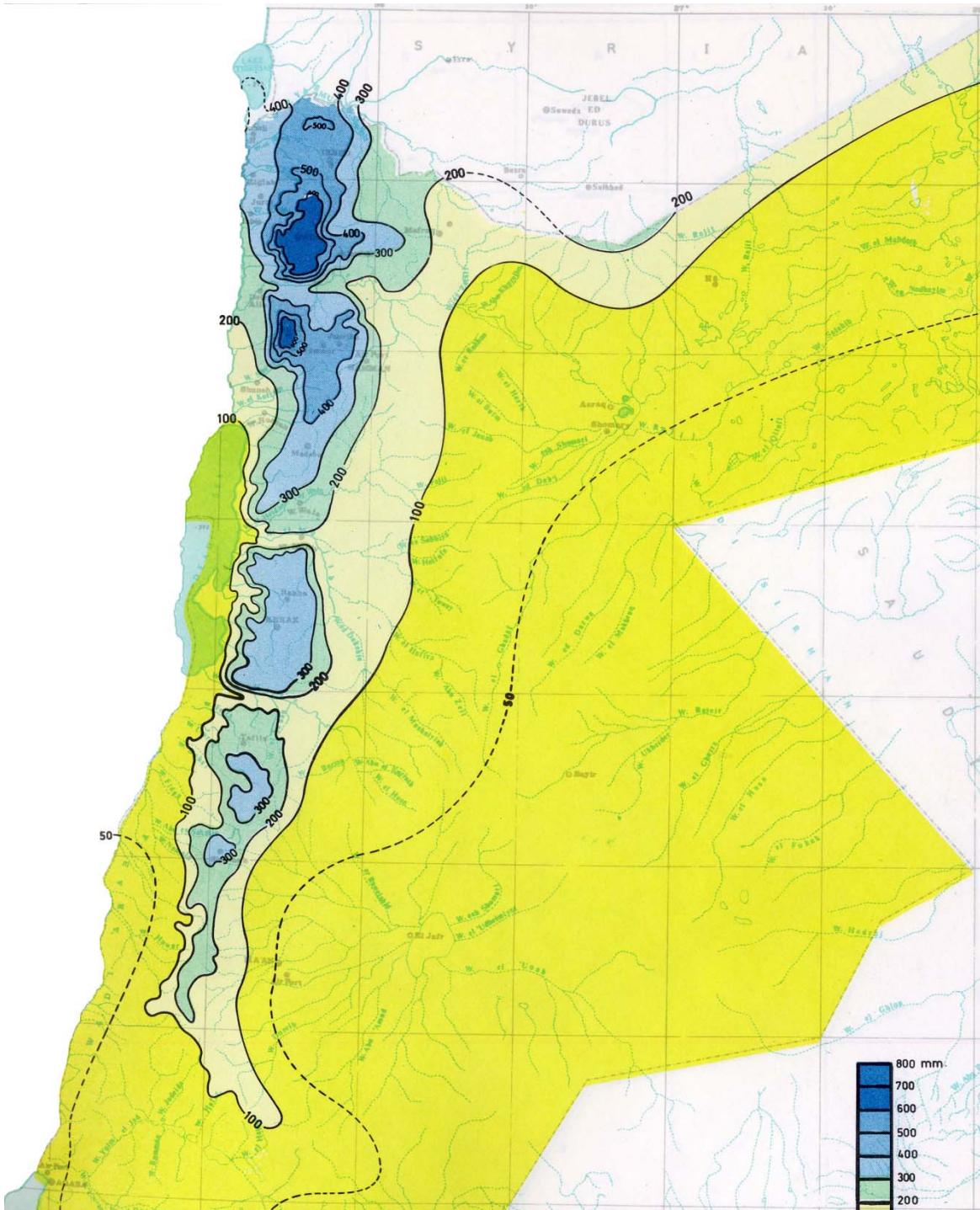
• Annual average 8300

**What is used from these**

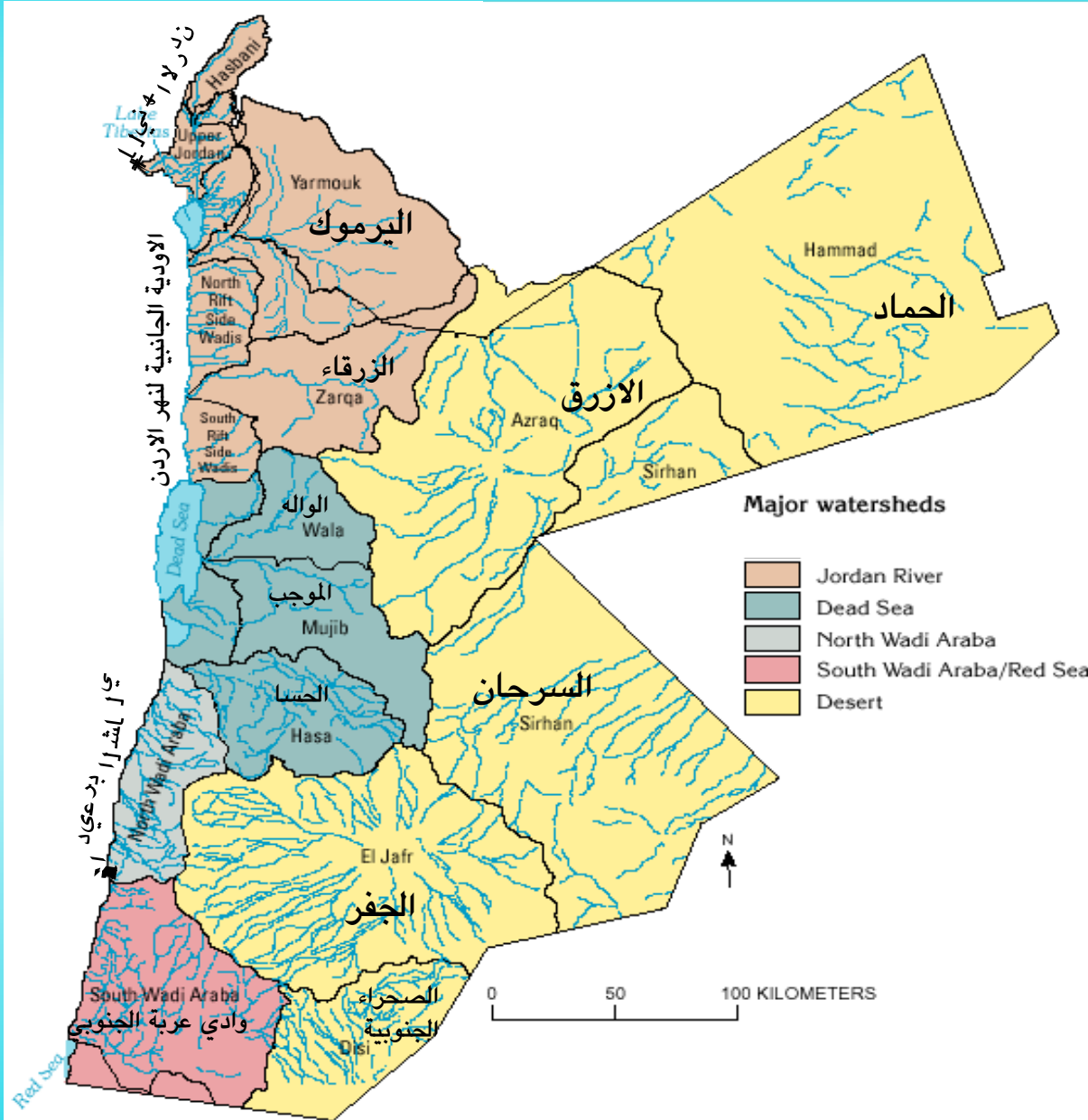
**qua**

**n**

**ties as surface and ground water is 8%**



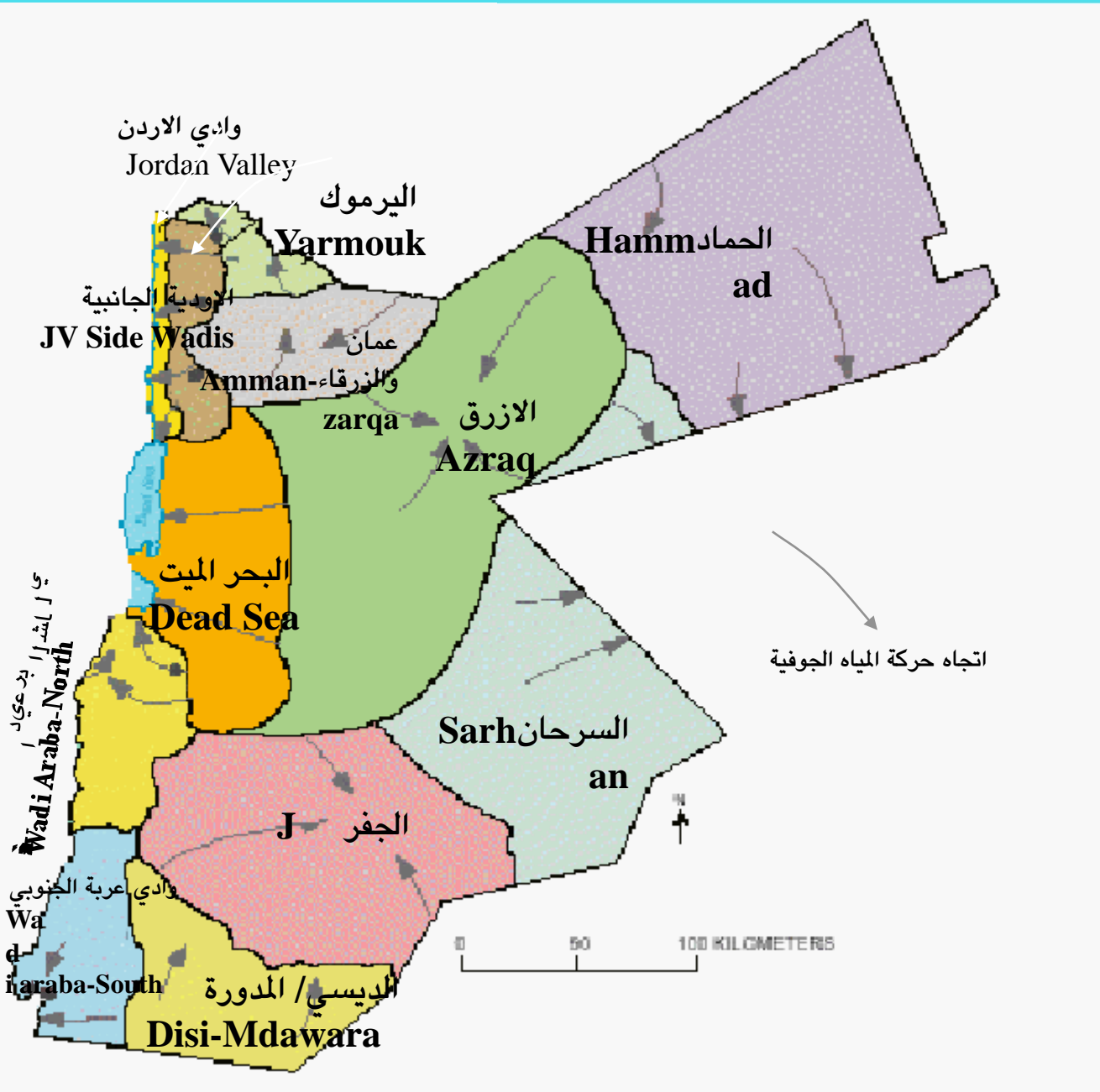
# Surface Water Basins



Annual Discharge MCM	Basin
166	1) Yarmouk*
84	2) Zarqa
58	3) Northern Side wadis
58	4 Southern Side Wadis
8	5) Jordan Valley
102	6) Mujib & Wala
43	7) Dead Sea Side Wadis
43	8) Hasa
41	9) Azraq
24	10) Hammad
18	11) Sarhan
13	12) Jafr
1	13) Southern Desert
46	14) Wadi Araba - North
8	15) Wadi Araba - South
713	Total

\* Jordan share after the construction of Wehda dam + storage in Lake Tberias

# Ground Water Basins



Safe Yield MCM/yr	Aquifer
60-70	1) Amman-zarqa
30-35	2) Azraq
30-35	3) Yarmouk
28-32	4) Jordan River Side Wadis
15-20	5) Jordan River
40-50	6) Dead Sea
11-12	7) Hammad
7-10	8) Sarhan
7-10	9) Jafr
2-3	10) Disi / Mdawara
5-7	11) Wadi Araba / North
4-6	12) Wadi Araba / South
240-294	Total

# Future Water Resources

## DISI Project:

Water quantities that can be exploited from DISI basin for drinking purposes will mount to 100 MCM starting in 2011.

## Red Sea – Dead Sea Water Conveyance Project:

Water quantities that can be exploited from desalination of Red Sea water will be around 570 MCM starting in 2022.

## Surface Water Resources:

Additional annual average surface water resources that can be exploited = 139 MCM (in addition to the currently exploited 395 MCM).

### **Non-Conventional Water Resources:**

- **Effluent from 34 waste water treatment plants = 89 MCM in 2020 (in addition to the currently exploited 85 MCM).**
- **Desalinated brackish and Red Sea water desalination at Aqaba = 65.5 MCM in 2020 (in addition to the currently exploited 31 MCM).**
- **Return flow to groundwater = 26 MCM (in addition to the currently available 56 MCM).**

**Total new future Resources =  $100+570+139+89+65.5+26 = 989.5$  until year 2022.**

**Available Current Resources = 842 MCM**

**Total available Resources by 2022 = 1832 MCM**



# Water Supply & Demand

Year	2007	2010	2015	2020	2022
Population (Million)	5.729	6.094	7.516	7.516	7.805
Population Growth	2.2%	2.2%	2.2%	2.2%	1.9%
Domestic Needs (MCM)	366	382	418	463	481
Industry, Tourism & Remote Areas	80	114	151	182	192
Agriculture	1080	1000	1000	1000	1000
Total Needs (MCM)	1526	1496	1569	1645	1673
Water Supply (MCM)	867	933	1083*	1143	1662**
Deficit (MCM)	-659	-563	-484	-502	-11

\* DISI starts at 2011

\*\* Red – Dead starts at 2022

**The above table shows that there still be water shortage by 2022 if other measures are not taken in the short, medium and long terms**

# **MMI Actions to Face Water Shortage**

- **Water shortage can be reduced by not less than 20% if we implement the proper management practices to raise efficiency and reduce losses, and by obtaining Jordan's rights in the trans-boundary water resources.**
- **The implementation of mega projects and at the same time implement a modern management strategy aiming at reducing the demand and very efficient use and protection of available resources.**

# Measures Foreseen Towards The Private Sector Participation

- **Amendments of laws to allow for different forms of PPP.**
- **Public awareness programs aiming at:**
  - **Reflecting the value of water and efficient use**
  - **Importance of private sector's role in enhancing the services**
- **The Programme Management Unit established to:**
  - **Reduce UFW**
  - **Prepare for contracts under PPP**
  - **Form basis for a regulatory body**

**shall be converted to a Water Regulatory Body**

# Measures Taken Towards The Sector's Support

- **Provide economic incentives aiming at stimulating and making the projects attractive to the private sector.**
- **National Water Policy and Strategy were updated in 2008. This documents contain comprehensive guidelines aiming at:**
  - **Improving resource and service management and protecting water quality and quantity,**
  - **Improving performance efficiency in utilities and human resources.**
  - **Increasing the participation of the private sector in water resources management and development.**

# Measures Taken Towards The Private Sector Participation

- **Pricing of water services in relation to type of services and type of use besides the cost recovery element.**
- **limit the un-planned expansion of networks, balance the supply and demand in all sectors and improve administrative issues.**

# **Future Major Water Projects**

**aiming at**

**Balancing Supply and Demand**

# List of proposed water projects/ Water Sector / WAJ/ (2008-2016)

No.	Project Name	The Estimated Cost (MJD)	Description/ Components	Fes. Study	Funding
1	Water Supply and desalination of Hisban Wells.	70	<p><b>Phase I:</b></p> <p>Drilling and equipping new wells in Hisban Area.</p> <p>Construction of desalination plant in Hisban area to desalinate 20 million cubic meter of water per year.</p> <p>Construction of transmission pipelines between the wells and the desalination units and to the closest point at Zara Maeen Pipeline.</p> <p><b>Phase II:</b></p> <p>Upgrading of desalination plant to desalinate 30 million cubic meter of water per year.</p> <p>Transmission pipeline with approximately total length 42 Km to Nau'r reservoir.</p> <p>Construction of new pumping stations to deliver the water from the desalination unit to Nau'r reservoir.</p>	Japanese Study	Waiting Fund

# List of proposed water projects/ Water Sector / WAJ/ (2008-2016)

2	Rehabilitation and restructuring of Russifa Area/ phase II	12	<p>New and rehabilitation of primary, secondary and tertiary pipe lines ranging in size from (20mm-600mm).</p> <p>Construction of new reservoirs.</p> <p><b>phase I funded by Chinese Government (6.3 MJD)</b></p>	<p>A preliminary study for the required works in phase II</p>	<p>Waiting Fund</p> <p><b>phase I funded by Chinese Gov.</b></p>
3	Rehabilitation and Expansion of the water networks in south & middle Jordan Valley	15	<p>Pipelines: Replacement of more than (60.000m) of transmission and distribution mains (100-300 mm) diameter and about (70.000m) of distribution pipes (63mm).</p> <p>Rehabilitation of 6 booster pump stations.</p> <p>Construction or replacement of 7 reservoirs.</p>	<p>Waiting the approval of Japanese Government to fund study and construction</p>	<p>Waiting Fund</p>
4	Rehabilitation and Expansion of the water facilities in southern Governorates (Tafeileh & Ma'an)	20	<p>Pipelines: more than (68.000) m of distribution and transmission and about 192.000m of tertiary Pipe lines.</p> <p>Construction of 15 new reservoirs in both governorates.</p> <p>Construction of one booster pump station in Tafeileh.</p> <p><b>Expected to fund from JICA</b></p>	<p>Fes. Study is available</p> <p>Detailed design and tender document is completed</p>	<p>Expected to be funded by JICA</p>



# List of proposed water projects/ Water Sector / WAJ/ (2008-2016)

5	W L RP /Karak/stage (II)	50	<p>Rehabilitation of secondary and tertiary distribution system of approximately 1250 Km length ranging in size from (25-400 mm), &amp; replacing by HDPE &amp; DI pipes, and H.C's and fittings.</p> <p>Rehabilitation of primary systems of approximately 50 Km length ranging in size from (200 -400 mm), &amp; replacing by DI pipes, and fittings.</p> <p>Construction of new reservoirs ranging in capacity from (1000-4000 m<sup>3</sup>)</p> <p>Rehabilitation of existing pumping stations.</p>	Fes. Study is available & prepared by KFW	<p>Waiting Fund</p> <p>phase I is funded by KFW</p>
6	Improvement & Expansion of Water Network and Transmission mains in Various areas in the Kingdom.	40	New transmission mains are required, and rehabilitation and replacement of existing ones. These transmission mains (100mm-400mm) with different lengths cover areas all over the Kingdom and identified on priority basis.		

# List of proposed water projects/ Water Sector / WAJ/ (2008-2016)

7	Poverty Reduction Projects and Royal grants Housing Project.	31	<p>New and rehabilitation of existing pipe lines and house connections ranging in size from (3/4" – 8") with approximately total length 500 Km.</p> <p>New and rehabilitation of existing reservoirs, and pumping stations</p>	A preliminary study for the required works in these areas is available	Waiting Fund
8	Rehabilitation and expansion of water facilities in Central Governorates	100	Expanding and upgrading the water transmission and primary distribution system in the middle governorates. Including pipelines with different diameters (100-600 mm) and pumping stations and making zoning for areas in each governorate to get gravity supply.	Fes. Study is available & prepared by engicon	Waiting Fund
9	Rehabilitation and Improvement of water networks north Governorates (WLRP)	200	<p>New pipelines to establish supply and pressure zones (300-600).</p> <p>New distribution and house connections (63m-200m).</p> <p>New and rehabilitation of pumping stations, wells, and reservoirs</p> <p><b>The projects C1, C2, C3, C4 is funded by KFW (64%) &amp; WAJ 36%, with Total cost 25 MJD, and under implementation .</b></p> <p>To fund the remaining cost.</p>	<p>Fes. Study is available</p> <p>The detailed Design is prepared for projects C1, C2, C3, C4</p>	as mentioned in the description

# List of proposed water projects/ Water Sector / WAJ/ (2008-2016)

10	Improvement of Transmission mains in north Governorates :		<b>Feasibility study for Northern Governorates Water Transmission Pipelines was awarded to CDM Consulting firm</b>
10.1	Houfa-Zatari Transmission System	<p>50</p> <p>Construction of new pump station of zatary in Mafraq governorate including installation of pump station equipments.</p> <p>Installation of the new zatary pump station yard piping comprising a steel 1200 mm pump suction header and 1000 mm steel discharge header</p> <p>Approximately 48 Km D.I pipe and take offs ranging in size from (400-1000 mm) diameter with air release valves, gate valves, butterfly valves, and wash outs. This transmission line extending from the new Zatary pump station to the existing reservoir in Hofa.</p> <p>The project implementation will be started at the end of this year</p>	<p>The detailed design is prepared by CDM</p> <p>Funded by USAID</p>
10.2	Um Lulu- Jarash Transmission System	<p>10</p> <p>Approximately 39 Km transmission pipeline from Um Lulu –Jarash , will be connected and supplied from the zatary pipeline, ranging in size from (400-500 mm).</p>	<p>as mentioned above</p> <p>waiting fund</p>
10.3	Hofa –Ajloun Water transmission system	<p>11</p> <p>Approximately 32 Km transmission pipeline from Hofa pump station to Ajloun, will be connected and supplied from the zatary pipeline, ranging in size from (200-800 mm).</p>	<p>as mentioned above</p> <p>waiting fund</p>

# List of proposed water projects/ Water Sector / WAJ/ (2008-2016)

11	Rehabilitation and expansion of water net works in Greater Amman (areas not covered by CIP Projects)	200	<p>Restructuring and rehabilitation of pipelines with different diameters.</p> <p>Construction of new pumping stations and reservoirs</p>	Miyahuna Projects	waiting fund
12	Rehabilitation of Greater Amman Network (Replacement of Galvanized pipes and H.C's)	100	replacement of 2" Galvanized pipes and H.C's in the district zones that have not been taken into consideration in the CIP Project (the replacement including pipes < or = 200mm) with H.C's.	Miyahuna Projects	waiting fund

# Current and Future PPP Transactions

## 1-As-Samra Wastewater Plant under BOT

- A 25-year contract to build, operate and transfer a wastewater treatment plant. Plant capacity: 267000 m<sup>3</sup>/day serving the two largest cities in Jordan (Amman & Zarqa- 2.3 million pop.)
- Financial setup: Mixed GOJ, USAID Grant +Private finance (Equity & Debt)

## 2- DISI BOT Project

- A 25-year contract for water conveyance system to draw of 100 MCM/year of potable water from Disi aquifer to Amman ( 300Km pipeline). GOJ grant + private finance (Equity+Debt)

# Current and Future PPP Transactions

## **3 Zara Ma'en Water Desalination Project**

- D B O project to desalinate and

convey to Amman 45 MCM/year of brackish water in the Jordan Valley.

## **4 Amman Water Company (Myahuna) and Aqaba Water Company (AWC)**

- Corporate entities-state owned limited liability companies
- Autonomous, functioning on commercial basis
- 

Myahuna & AWC will invite investors for partnership in various PPP forms.

## **5 Northern Governorates Management Contract**

- M C for water & wastewater services in various governorates for four governorates in the north of Jordan for a duration of 5 years.

# DISI Water Project



- The project aims at the exploitation of around 100 MCM/year of DISI aquifer groundwater for drinking purposes in Amman.
- The project will include the digging of 55 wells in addition to the pumping stations, storage reservoirs and a 325 km pipeline (1600mm diameter).
- The construction cost is around \$ 1 billion and the implementation period is around four years.

