

The Jordan Valley Water Association – JVWA

Israel technology forefront of Water, Waste Water & Irrigation projects / System description

Background

The Jordan River streams south from Mount Hermon on Israel-Lebanon-Syria borders, dividing between the Galilee Mountain and the Golan Heights, down to the Sea of Galilee continuing along the Syrian-African geological fault to the Dead-Sea where it stops.

Some of the first civilizations, starting as early as 1.5 million years ago discovered in the Jordan Valley and some well known later events took place on the river banks and the lake shores such as the Baptizing of Jesus and his Walking on the water, Jacob's struggle with the angels and Jericho fight, to name a few.



CTRL-click to enlarge map

The intensive modern agriculture in the Jordan Valley started with the development of the water projects in the beginning of the 1930's.

The heart of the cultivated land is in the immediate vicinity of the Kinneret Lake (Sea of Galilee) with the city of Tiberias to the West, the Jordan River and its accompanying streams to the North and the Yarmukh River with its streams to the east. It was only natural that the water systems developed in the area relied on these water sources and continued growing to their present size.

The Jordan Valley Water Association (JVWA) was officially established in 1978 by the settlers-farmers as an agricultural cooperative operated by its owners for production and distribution of water for the area's 12 Kibbutzim (cooperative settlements) located around the lake Kinneret.

JVWA holds unique position in Israel offering full water & waste water (WW) services to its owners-clients, including:

- Drinking water supply
- Irrigation water supply
- Waste water management
- Water and WW billing
- Water management solutions development



JVWA accounted for availability and quality of all water products, from pumping stations on the lake shore, to the last irrigation dripper and a dwelling house in the remote kibbutz in the valley. Because of the growing needs and the continuous drying out of the water resources in the Middle-East, JVWA is involved now in innovative and important projects, such as:

- Desalination of secondary water resources
- Water resources sharing with the neighboring kingdom of Jordan
- Water management systems development



System Description

1. Applications

JVWA manages;

- 30 pumping stations, 115 pumps ranging 15-1,300 HP.
- Drinking water treatment plant
- 6 operative water reservoirs
- 45 WW pumping stations
- 1 WW treatment plant
- 2010-2015 expansion & upgrade project including desalination plant



There are 4 distinguished piping networks:

- a. Drinking water - Low pressure system, filling the operative reservoirs from the sources and distribution for consumers usage
- b. Irrigation - High pressure system, from the sources to the fields
- c. WW – collection hub for each settlement, gathering all Jordan Valley sewage to the treatment plant, using part of the treated water for irrigation
- d. Salty water collection for desalination and usage



Point of interest

Waste Water treatment in the Jordan Valley region;

Israel is a leading country in the reuse of waste-water (WW) for agricultural irrigation (70%).

JVWA aim is not only to prevent the risks of WW mixing with lake, rivers and aquifer water but to treat it to the point of agricultural irrigation usability for the world famous Jordan Valley crops.

2. Control

Technology updates history;

1980	Remote I/O to control	Motorola Moscad
1985	PLCs in pumping stations, Line + RF communication, Control Center & HMI	TI – Siemens PLCs
1995	Real Time RF	
2000+	System wide Upgrade and expansion	Unitronics, Siemens, Koyo and more



Control capabilities maintain a real-time status of the system processed from thousands of registers.

3. communication

JVWA current communication network send/receive thousands of messages 24/7.

The system runs several two-way communication means:

- Real-Time comm over RF public band, maximum distance of 20 miles/32 km
- Wireless I/O
- comm on the Internet via Cellular carriers



Point of interest

Communication resilience;

The Jordan Valley has some unique communication characteristics:

- *Border area between Israel & Jordan, no common regulations applicable*
- *Both armies are using strong transceivers*
- *Civilian services (taxi, ambulance, Police, national utilities) and citizen are using the rest of the radio bandwidth*

AGM developed a rugged RF communication protocol to overcome this saturated-turbulent radio environment using public RF bands.

In addition, intelligent software agents are incorporated in devices to manage communication redundancy in case of connection failure.

4. System operations

JVWA operates quiet a small and modest control center, most of the time unmanned, using off-the-shelf standard HMI, writing its own databases, applications and screens.

JVWA operations team includes 3 operators/maintenance technicians for the drinking & irrigation system + 2 WW system dedicated operators/technicians.



Point of interest

Costing & billing matters;

Energy price is the major factor in water production-distribution cost. Israel has long gone for differential electricity tariffs, higher price steps for pick usage hours.

All farmers were encouraged to use water smartly by direct link made by the JVWA billing system between the differential energy prices to back-to-back water usage tariff. The success of this smart move led to return-on-investment of the system-wide upgrade project in less than 3 years.

5. AGM



Since 1996, JVWA outsource the communication & control responsibilities to AGM.

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