Challenges Facing Integrated Development of Lower Jordan under the Halt of Peace Process

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The Jordan Valley is located along the Jordan Rift Valley Fault between two closed water bodies (Tiberias Lake and the Dead Sea) which are connected by the Jordan River, and the Jordan Valley is considered to be the lowest areas on earth - 50-350 meters below sea level.
The Jordan River Basin drains an area within five countries.
The Jordan River is a small transboundary river when compared to the Nile Basin or the Euphrates Basin.
A Riparian with No Water Rights

Since 1967, Palestinians of the West Bank have not had access to the Jordan River waters.

The groundwater resources of the Mountain Aquifer (Western, Northeastern and Eastern) have been the major source of water supply for all purposes.
West Bank Water Resources

Groundwater is the only source for water supply in the West Bank.

The West Bank includes three groundwater basins:

- **Eastern Basin**
  Recharge = 172 Mcm/year
  Abstraction = Pal: 62, Isr 137

- **Western Basin**
  Recharge = 362 Mcm/year
  Abstraction = Pal: 22; Isr 389

- **Northeastern Basin**
  Recharge = 145 Mcm/year
  Abstraction = Pal 36; Isr 146
There are 25 settlements in the Lower Jordan River Valley, including the Dead Sea area.

The total area of these settlements is 13 km², with a total population of 5,825.

These 5,825 people have essentially stopped all Palestinian development in the Jordan River Valley.
Schematic Cross-Section showing the layering system and relationship between the Mountain Aquifer and Alluvial Deposits.
Spatial distribution of average Nitrate (mg/l) in the Jordan Valley
Spatial distribution of average Chloride (mg/l)
A Picture of Development

- Possible
- Logical
- Potential
- Planned
- Implementable
Development of the Palestinian Side of the Lower Jordan River Valley

- Minimal development since 1948
- Frozen development from 1967-1994
- Promising development from 1994-2000
- Damage and confinement from 2000 to-date
Type of Projects

- Storage dams or water retention structures on main wadis of the Western Bank of the Lower Jordan River Valley, Palestine

- Geological studies, rehabilitation and development of major springs, including civil works and storage reservoirs
Type of Projects

• Feasibility and technical studies for artificial recharge of aquifers from seasonal runoff or treated wastewater for either seasonal storage or barrier for salt water intrusion.
  – Feasibility and technical studies and implementation of the use of winter runoff waters collected in flood plain areas, such as Marj Sanour of Jenin District.

• Implementation of pilot projects for artificial recharge and aquifer storage and recovery utilizing excess surface flows or treated wastewater.
Type of Projects

• Hydrological and meteorological monitoring networks, including gauging, monitoring and sampling systems with all necessary equipment and vehicles (for water and soil monitoring).

• Seismic and geophysical equipment for geological and water resource assessment studies.

• Pilot projects for the use of renewable energy (solar and wind) for water extraction and/or distribution.

• Research and pilot studies for the use of brackish water in agriculture and industry – and brackish water desalination using renewable energy.
Type of Projects

• In depth study of existing cropping patterns with a recommendation for a change in policy towards economic rainfed cropping (or with supplemental irrigation) in the entire Jordan River Basin area ... examples: almonds, olives (with quality grading specifications), herbs and spices, barley, vetch and maize/sorghum (not corn), and jojoba.

• And for brackish water use - industrial tomatoes and melons (cantaloupes), for example.

  – Note: The number of irrigable donums in the Lower Jordan River Valley – Palestinian Side – is 200,000. Currently, 71,898 donums are irrigated (when possible).
West Ghor Canal

Proposed in Johnstan plan 1953
- Water allocation
- Regional cooperation

Palestinian share was estimated at 240Mcm/yr to be used for the development of JV.
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**Integrated Water Resources Management by:**

*Harvesting the flash flood water in Wadi El-Qilt that is characterized by an average discharge of 8 Mcm/yr.*

**Main Objectives of the project:**

- increasing the potentiality of artificial recharge in the Quaternary Aquifer and therefore enhancing the quantity and quality of groundwater.
- preventing the floodwaters from escaping to the Jordan River.
- Increasing possibility to expand the irrigated land area.
- Increasing water supply for industrial uses and recreation areas.
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How we can implement this project?

**General Approach**

Three technical alternative structures are recommended and can be adopted for this project, including:

- Spreading Ponds or Dams
- Retention Dams
- Diversion structure
Scope of Work

Phase I:
• Economic feasibility study for the project.
• Reviewing previous related studies and data collection.
• Field Reconnaissance and site investigation including surveys for the proposed sites.

Phase II:
• Preliminary engineering design for the proposed structure
• Hydrological and hydrogeological surveying for the selected site.
• Carrying out Environmental Impact Assessment for the project.
• Design schedule time for project implementation

Phase III:
• Final design for engineering and economic feasibility and cost estimation of the project.
• Project implementation and monitoring
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B. Infrastructure (wells and springs rehabilitation, water networks system and treatment plant)

1. **Wells Rehabilitation** to include the following:
   - Mechanical Maintenance, by installing new pumps and electrical cables in selected wells (about 25 wells).
   - Well head-protection actions to prevent any source of pollution (most of wells are in need of this action).
   - Installing skimming wells to maximize the exploitation of the finite thickness of freshwater lenses – plus scavenger wells.
   - Drilling new production wells near the recharge area. (about 5 wells are proposed in the northwestern side of Jericho area).
   - Long-term extensive monitoring program for water-level, quality and pumping rate.
2. **Springs Rehabilitation** to include the following:

- Replace the old open concrete channels by new closed pipes systems to minimize water losses for Auja, the Duyk group and Ein Sultan Springs.

- Install protection fence around each spring to prevent any kind of pollution.

- Long-term extensive monitoring program should be implemented for measurement of spring discharge and water quality.
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3. Waste Water Networks and Treatment Plant

Main Objectives of the project:

- Replace the cesspits by constructing wastewater network to collect the sewerage. And construct central wastewater treatment plant for the Jericho –Aqabt Jaber- Auja areas to serve more than 30,000 inhabitants.

- Protect groundwater from the pollution of sewerage infiltration.

- Water reuse for agriculture.
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Public Awareness
Capacity Building
Dissemination of Information
The combination of political strife, resource overuse, and contaminated sources means that freshwater scarcity in the Jordan River Basin will reach critical levels.

The problem is not only quantity, it is also quality.

Critical resource threats include:

Pollution of freshwater by industrial activities and untreated human wastes, and

Contamination of rivers, lakes and aquifers due to runoff from fertilizers and pesticides.
Conclusion:

The task is to solve actual problems that have occurred, or will occur, both in the Jordan River Basin as a whole – and in specific areas within countries.

The ever-dwindling supply of freshwater in the Jordan River Basin (both quantity-wise and quality-wise) – and the irrevocability of inappropriate policy measures by some – requires regionally unified, and internationally supported, definitive, and ecologically sound changes to current policies and practices to insure an adequate future water supply for all peoples in the region.
Conclusion:

The gap between water demand and water consumption in Palestine has widened since 1948. The population has increased, but the quantity of available freshwater has stayed essentially the same. The access to water resources has been constrained and restricted due to the political situation.

Throughout the Middle East, there is a gap between water supply and water demand.

In Palestine, this gap is growing with time because water supply is artificially constrained by the stagnation of the Peace Process. This gap is having SEVERE adverse effects on both current and future Palestinian socio-economic development.
**Recommendations:**

Meeting the sustainability challenge for water resources development in the Jordan River Basin will require an advanced level of regional management.

The regional water resources management structure (institutions and organizations) must manage TWO systems:

- The natural water resources system (existing water, and floods and droughts);
- And the human activity system (water demands and pollution.)
Recommendations:

Regional Management in the Jordan River Basin must be:

Multi-purpose:
- domestic water supply, irrigation, industry, and nature

Have Multi-Objectives:
- economic productivity, environmental quality, social equity, and human health.

Through the use of multiple means:
- physical structures, regulations, dissemination of information, and economic incentives.