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TRENDS RESEARCH & ADVISORY

RESILIENCE AND ADAPTIVE CAPACITY IN NATIONAL WATER SYSTEMS

GLOBAL CASE STUDIES ON MITIGATING WATER RISKS

BY: DR HAZIM EL-NASER

CHAIRMAN OF THE MIDDLE EAST WATER FORUM

FORMER MINISTER OF WATER AND AGRICULTURE, JORDAN

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DEFINITION OF RESILIENCE AND ADAPTIVE CAPACITY

- **Resilience in Water Systems**
  - Ability to withstand and recover from challenges
  - Challenges include climate change, population shocks, infrastructure, and policy failures
- **Adaptive Capacity**
  - Ability to learn and adjust to evolving conditions
  - Essential for long-term water security
- **Importance of Building Resilience and Adaptive Capacity**
  - Critical in regions facing increasing scarcity risks
  - Necessary to address climate impacts
- **Case Studies**
  - Examples from around the world that demonstrate various aspects of resilience for sustainable water management:

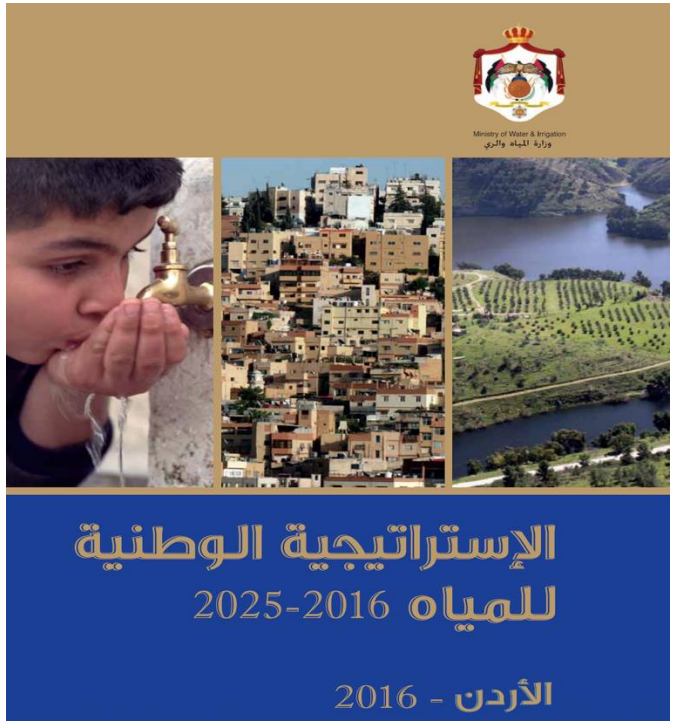
Jordan, Kuwait and Singapore

JORDAN'S CASE STUDY

Zatari Syrian Refugees Camp, 2nd largest worldwide

- **Significant Demographic Shifts**
  - Population grew from 6.9 million to 10.9 million between 2010 and 2020
  - Arrival of over one million Syrian refugees
  - Earlier migrations of Palestinian, Iraqi, and other groups
- **Increased Water Demand**
  - Increased strain on Jordan's limited water resources
  - Domestic water demand in northern governorates climbed by more than 40% after the influx of Syrian refugees
  - Water scarcity as a potential source of tension
- **Government's Response**
  - High priority on water resource management

GOVERNMENT STRATEGIES AND INVESTMENTS

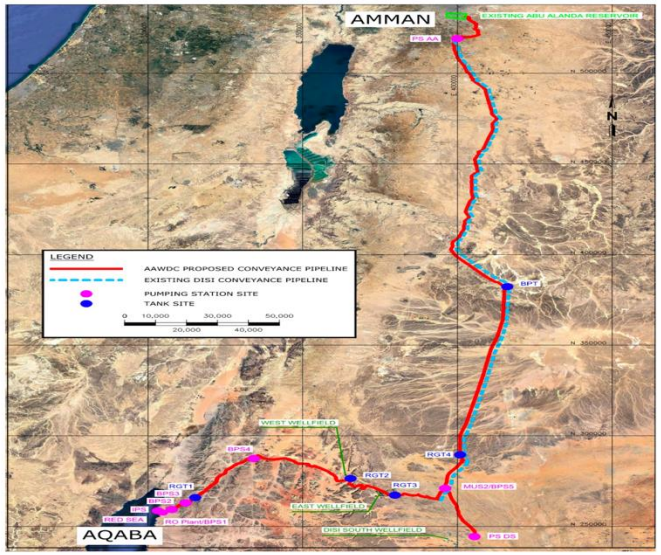


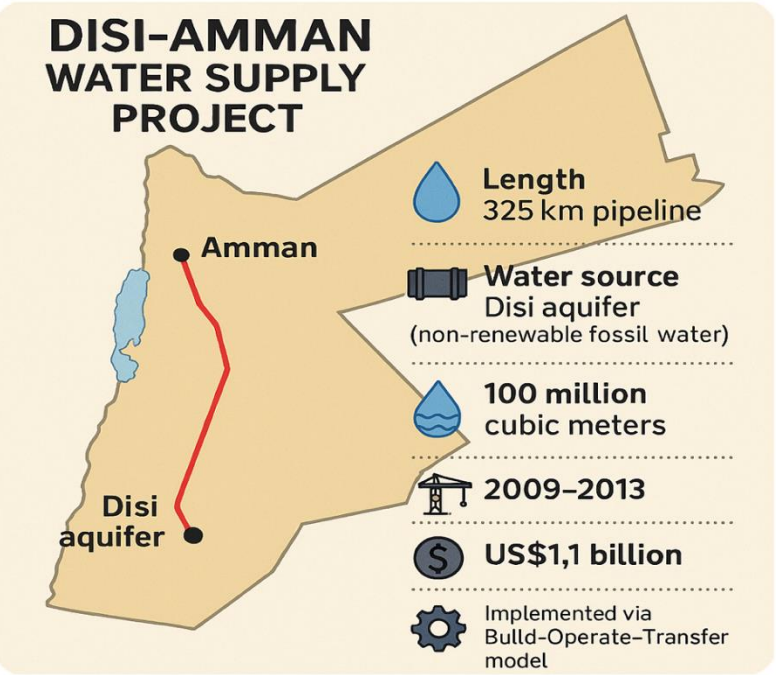
- **High Priority on Water Management**
  - Government of Jordan prioritizes water resource management due to scarcity and climate change impact
- **Disi-Amman Water Supply Project**
  - Pipeline transporting water from Disi aquifer to Amman
  - Strengthened Resilience

PROJECT OVERVIEW AND IMPLEMENTATION

- Project Completion and Water Delivery
  - Completed in 2013 after four years of construction
  - Delivers 100 million cubic meters of water annually
  - Water transported 325 kilometers from Disi aquifer to Amman
- Importance of the Project
  - Supplies 30% of Amman's water
  - Accounts for 6% of Jordan's total consumption

Large-Scale Water Systems, ensure water resilience in arid environments and the ability to absorb demographic shocks





KUWAIT'S CASE STUDY

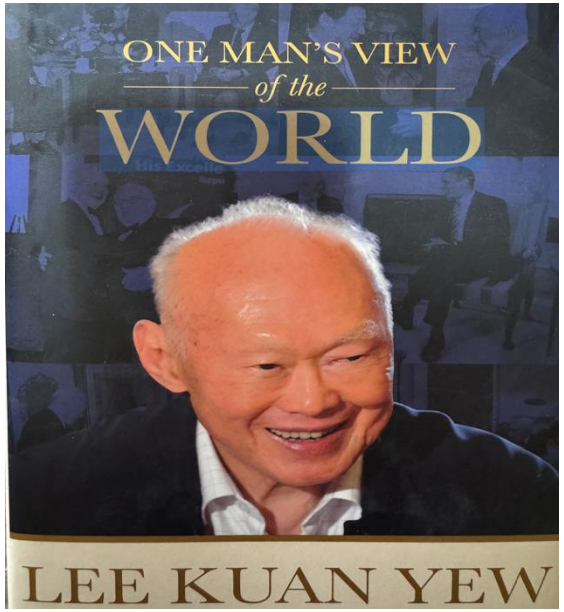
SULAIBIYA WASTEWATER TREATMENT AND RECLAMATION PLANT

- **Technological Innovation and Integrated Management**
  - Transforms wastewater into a valuable resource with capacity of 600,000 m3/d
  - Enhances water security in Kuwait
- **Largest Facility Using Advanced Technology**
  - Energy-efficient reverse osmosis
  - Ultrafiltration membrane technology
- **Strategic Planning and Expansion**
  - Addresses escalating water demands
  - Serves 60% of Kuwait's population
- **Private Sector Involvement**
- **Supporting Sustainability**

- ✓ ***Considered as the First Wastewater Treatment Plant in the Arab Region to Treat Wastewater to the Level of Crystal Water, a Real Substitute for Agri. and Industry.***
- ✓ ***Water Produced from Sulaibiya Plant Exceeds the World Heath Organization (WHO) Standards for Potable Water.***

SIGNIFICANCE IN KUWAIT'S WATER MANAGEMENT

- Technical Achievement
  - Represents a significant technical milestone in wastewater treatment by using RO at final stage
- Addressing Water Scarcity
  - Crucial in Kuwait's strategy to combat water scarcity
- Urban Challenges
  - Helps manage urban water-related issues effectively
- Private Sector Involvement
  - Pioneers the role of private sector in wastewater management
- Advanced Technologies
  - Utilizes cutting-edge technologies for efficient treatment and reuse



SINGAPORE'S WATER MANAGEMENT
THE LEE KUAN YEW'S VISION

- Ambitious Vision for Water
  - Transforming vulnerability into strength
  - Turning scarcity into abundance
- Key Principles
  - Catch, conserve & reuse every drop of rain
- Water Security as National Security
  - Reduce dependence on external sources
  - Achieve water independence through diversification and innovation
- Investment in Infrastructure
  - Build reservoirs, treatment plants, and drainage systems

RECOMMENDATIONS

- Governments should establish, at the highest level, inter-ministerial water scarcity coordination groups. These groups should be tasked with aligning national priorities, facilitating cross-sectoral collaboration, and driving comprehensive water policy reform. Their responsibilities must include supporting ongoing policy revisions, building technical capacity across institutions, leading the development of robust sustainable water management strategies that based on innovation and technology.
- Secure long-term investment in water infrastructure, maintenance, and innovation through public-private partnerships, international cooperation, and dedicated national resources, to sustain water security through the adoptation of regional and global lessons-learned, digitilization, proven technologies in desalination, wastewater recycling, and data-driven irrigation technologies, in order for the region to strengthen its adaptive capacity, mitigate water risks, and secure its water future for generations to come.
- Invest in ambitious, large-scale water and wastewater projects to generate new and additional water resources, integrating innovative engineering and robust environmental safeguards to mitigate water scarcity, strengthen long-term resilience, stimulate economic development, foster regional collaboration, and drive technological advancement.
- In cooperation with TRENDS RESEARCH & ADVISORY formulate an international advisory group on "Water Systems Resaliance & Risks Mitigation".

THANK YOU

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