

Evento finale della 7^a edizione della Community Valore Acqua

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Main partner



Junior partner



Partner





Smart Governance & Sustainability of the New Delta Project

Addressing Water Scarcity in Egypt

Nile Water • Virtual Water • Desalination

Egypt's Water Scarcity Challenge

>100M
Projected Population

≈ 97%
Reliant on the Nile

<1700 m³ Water Stress
<1000 m³ Water Scarcity
<500 m³ Absolute Scarcity

Virtual Water Imports

 Food Imports


 Saves Nile Water

 Market Risks

Efficient Nile Water Use


▶ Modern Irrigation
▶ Crop Optimization
▶ Wastewater Reuse

Desalination & Solar Energy


▶ Reverse Osmosis
▶ Solar Desalination
▶ Unlimited Supply


Desalination Solutions

▶ Reverse Osmosis ▶ **\$1.50** ⇒ **\$0.50 / m³**

▶ High Energy Demand

Strategic Timeline for Egypt

Short Term 5–10 Years

 Virtual Water Imports

Medium Term 20–40 Years

 Irrigation & Reuse

Long Term 40+ Years

 Desalination & Greenhouses

Integrated Water Security Strategy

 Virtual Water >  Efficient Nile Use >  Desalination & Innovation

Source: <https://escholarship.org/uc/item/43q236m8>

Strategic Response to Water Scarcity

Egypt's Water Reality – Why a New Strategy?

- Severe water scarcity
- Rapid population growth
- Hosting millions of refugees
- Economic development pressures

High Risks & Uncertainty

- End of historically stable Nile flow patterns
- Upstream interventions (GERD)
- Climate change impacts
- Increasing uncertainty in water management

Strategic Response: Second Generation of Irrigation

- Flexible systems to absorb shocks
- Maximizing productivity of every water drop
- Integration of advanced technologies
- Resilient irrigation management





New Delta Project

Contributes to Achieving Egypt's Food Security

↔ **2.2** →

Mn feddans

Total project area, with a target of reclaiming one million feddans.



5Mn
new job opportunities



93% arable land

Suitable for growing all types of crops.



New Delta Project

The project includes:

Establishment of industrial complexes such as packing and packaging stations, agricultural product processing units, export stations, livestock production facilities, and dairy processing units. Two major sub-projects:



"Future of Egypt" Project:



Located along the extension of the new "Rod El Farag-Dabaa" axis.

EGP 5 BN

Total investment in the project

500k feddans

Total project area



200k feddans cultivated by 2021 using the available groundwater in the area.



1600 modern center-pivot irrigation systems utilized, with the land cultivated twice a year.

500k Feddan Land Reclamation Project South of the Dabaa Axis:



- ▶ Located west of the "Future of Egypt" project, near the Old Delta.
- ▶ **500k feddans** total project area.
- ▶ **6mn cubic meters/day** Capacity of the station to be built for agricultural wastewater treatment area.

The New Delta: A National Landmark

- Reclaiming 362,000 acres
- Largest agricultural water reuse project globally
- Over 96% construction completed
- Transition toward smart management



Technical & Hydraulic Complexity

Complex Water Sources

- Integration of 7 drainage sources
- Treated wastewater reuse
- Capacity: 6.5 million m³/day
- Complex hydraulic operation



Massive Infrastructure Components



- 114 km transport canal
- Major pumping stations
- Siphons and regulators
- Crossings under roads and railways

Hydraulic Challenges



- Managing large water volumes
- Elevation differences across the system
- Precision control to minimize water losses
- Stable distribution across irrigation areas



Role of NWRC

- Technical consulting and supervision
- Design review
- Hydraulic testing and validation
- Safety and operational assurance



The 7 Pillars of Smart Management

Pillar 1: Hydraulic Capacity & Resilience

- Ensuring stable flow under peak demand
- Handling sudden supply variations
- Enhancing system flexibility

Pillar 2: Structural Integrity & Asset Safety

- Monitoring cracks and settlement
- Seepage detection
- Sensor-based structural monitoring



Pillar 3: Water Quality & Smart Blending

- Real-time monitoring of salinity
- Pollution control
- Optimized blending of reused water

Pillar 4: Energy Efficiency

- Optimizing pumping station operations
- Reducing electricity consumption
- Lower carbon emissions

Pillar 5: Climate Change Adaptation

- Resilient hydraulic design
- Mitigating evaporation losses
- Preparedness for extreme weather



Pillar 6: Digital Twin Technology

- Virtual replica of the canal system
- Real-time simulation and testing
- Improved operational planning

Pillar 7: Decision Support System (DSS)

- Centralized operational dashboard
- Data-driven decision making
- Integrated monitoring and control



Sustainability & Roadmap

Predictive Maintenance Using AI

- Transition from reactive to predictive maintenance
- Early detection of structural or operational risks
- Reduced maintenance costs

Research-to-Operations (R2O)

- Translating research into operational tools
- Supporting engineers and decision makers
- Continuous innovation



Institutional Capacity Building

- Training digital water management experts
- Developing technical and analytical skills
- Strengthening institutional capabilities



Roadmap for Global Scaling

- New Delta as a global water management model
- Transferable solutions for water-scarce regions
- Opportunities for international collaboration



Conclusion

"**We** don't just build canals; we build
Sustainable & **Smart** systems for the future."

Thanks you...

