Way Forward

(Irrigation v 2.0)

Selected Pillars

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Why Irrigation System 2.0 ? .. Planning for the Future

The Second Generation of the Irrigation System 2.0

1. Water Treatment & Desalination

2. Digital Transformation

3. Smart Management

10. Global & Regional Role

9. Awareness

8. Human Resources Development

4. Resilient Infrastructure, NBS

5. Adaptation & Mitigation

6. Governance

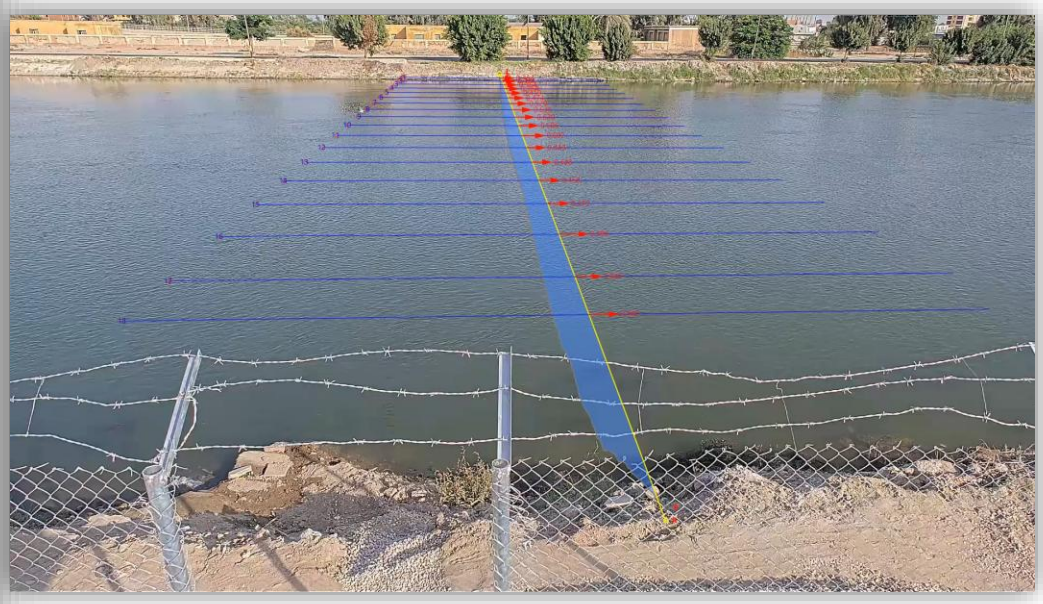
7. Restoring Riverplain

1. Shift Toward Volumetric-based Water Distribution

Traditional Techniques for Measuring Discharge in Open Channels

1. Shift Toward Volumetric-based Water Distribution

Cameras for Measuring Discharge in Open Channels



Surface Water Velocity Analysis

1. Shift Toward Volumetric-based Water Distribution

30%

15%

5%

Current Practice

- Manual gauge readings.
- Operation decisions based on maintaining required levels.
- Telemetry network established for wireless stage data collection.

Digital Transition

- Updating outdated rating curves (15 of 155 control points completed).
- Machine learning models developed to predict water levels.
- Creation of prototype Telemetry DSS to visualize water levels and discharge.
- Using Smart tools (Cameras) to estimate discharges in open canals

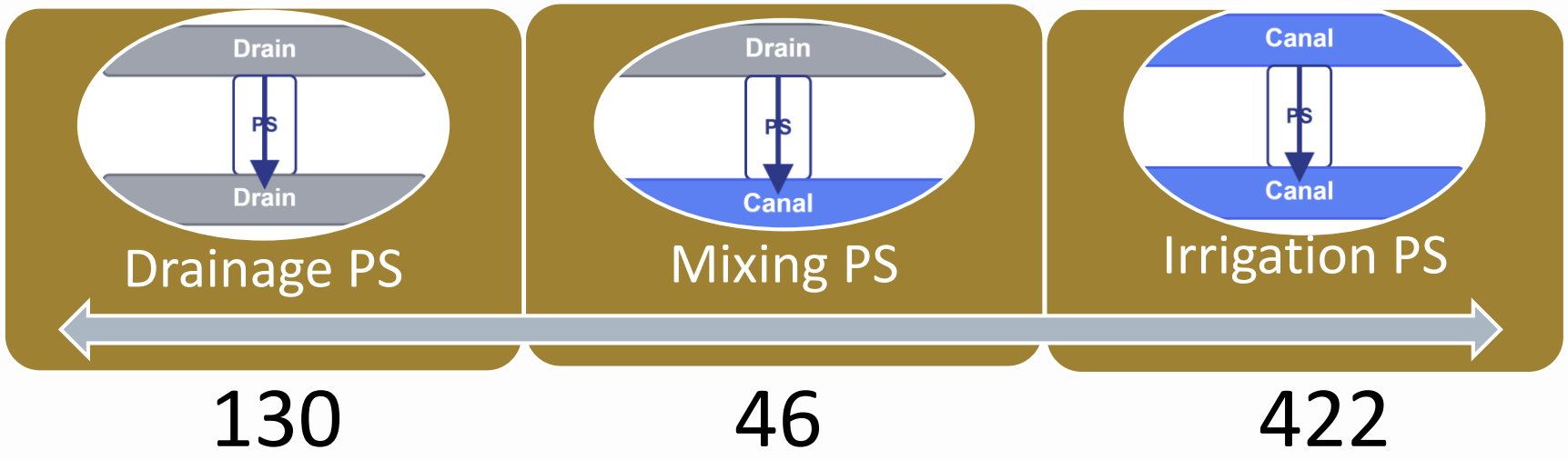
Smart Calibration & Automation

- Calibration and validation of existing SCADA systems at major barrages.
- Linking SCADA data streams with Telemetry DSS for real-time gate operation.
- Integrating machine learning models to forecast water requirements

Intelligent Water Management

- Deployment of discharge sensors (e.g., SonTek SL, ADCPs) connected to telemetry.
- Integration of drones for flow estimation.
- Implementation of AI-driven discharge forecasting and flow optimization.
- Full integration of the RIBASIM planning model with operational tools for water allocation

2. Pumping Stations: Artery of Egypt's water system



2,571 gigawatt-hours annually, nearly **1.5% of Egypt's total power consumption**,

Generate around **one million tons of CO_2 emissions each year**, roughly **389 tons per gigawatt-hour**.

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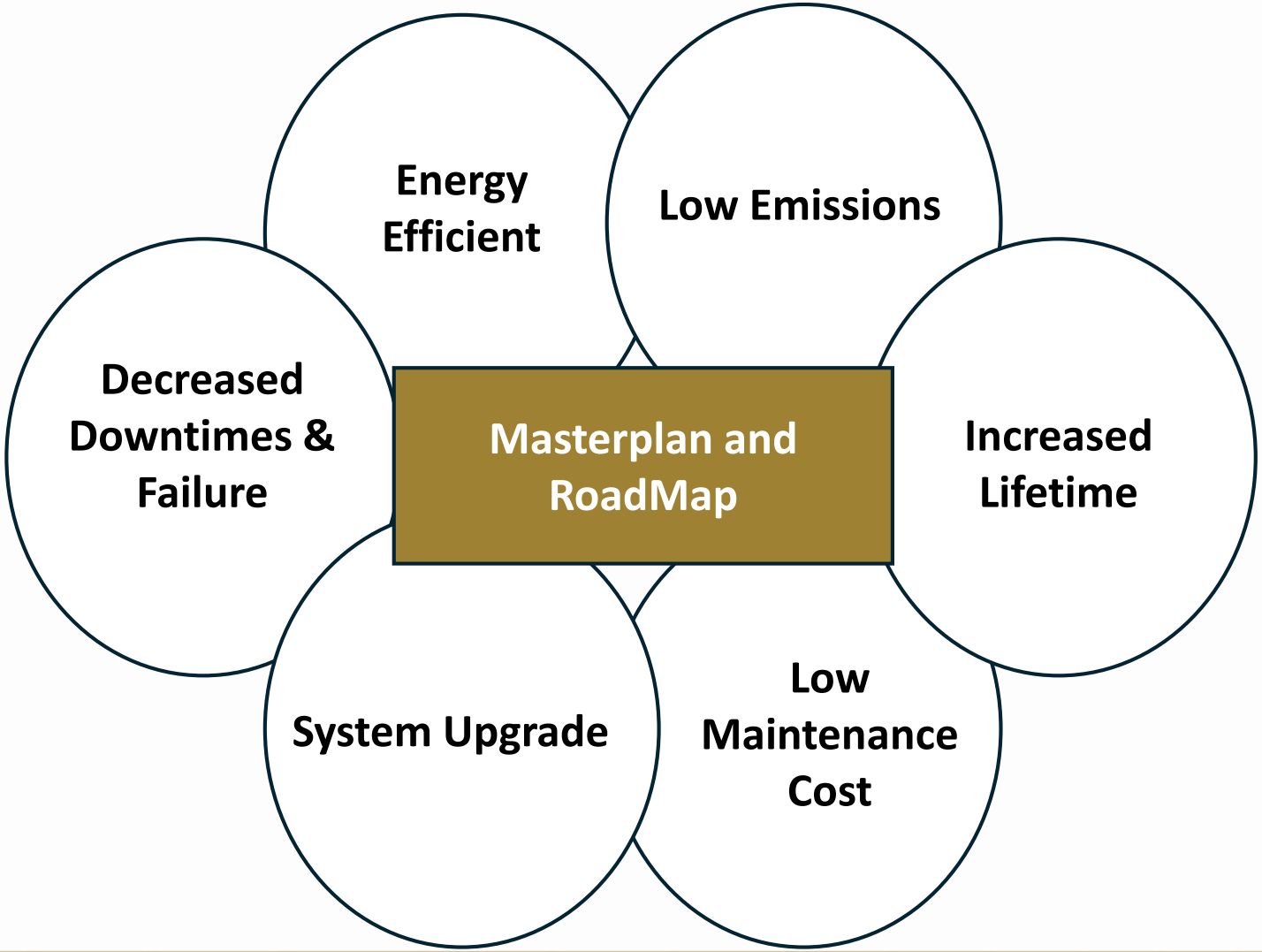
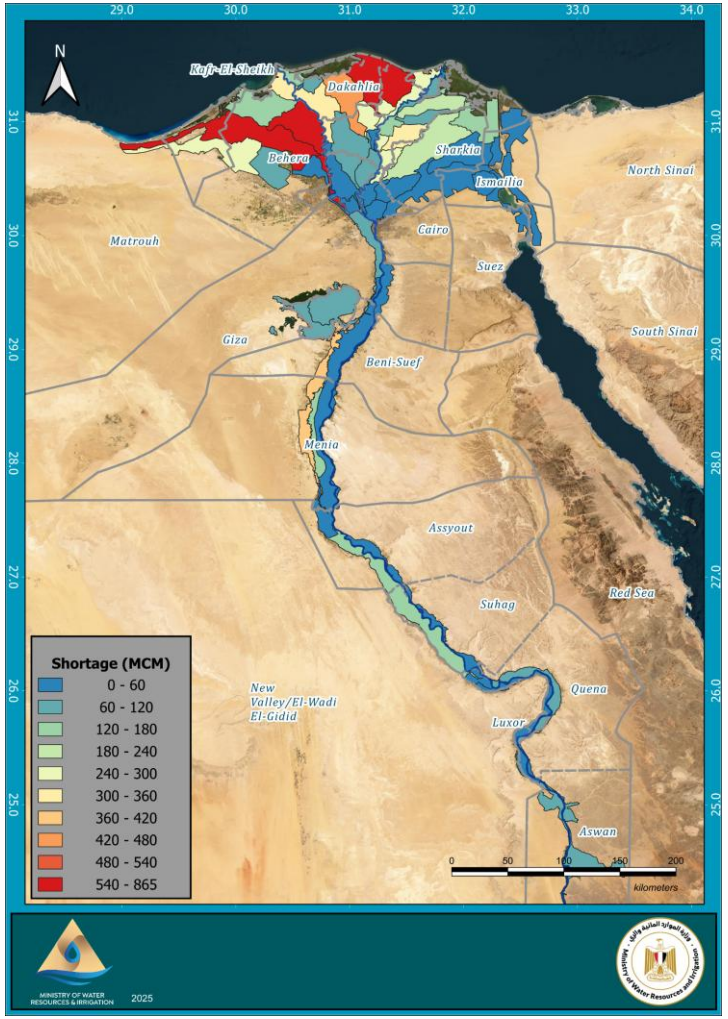
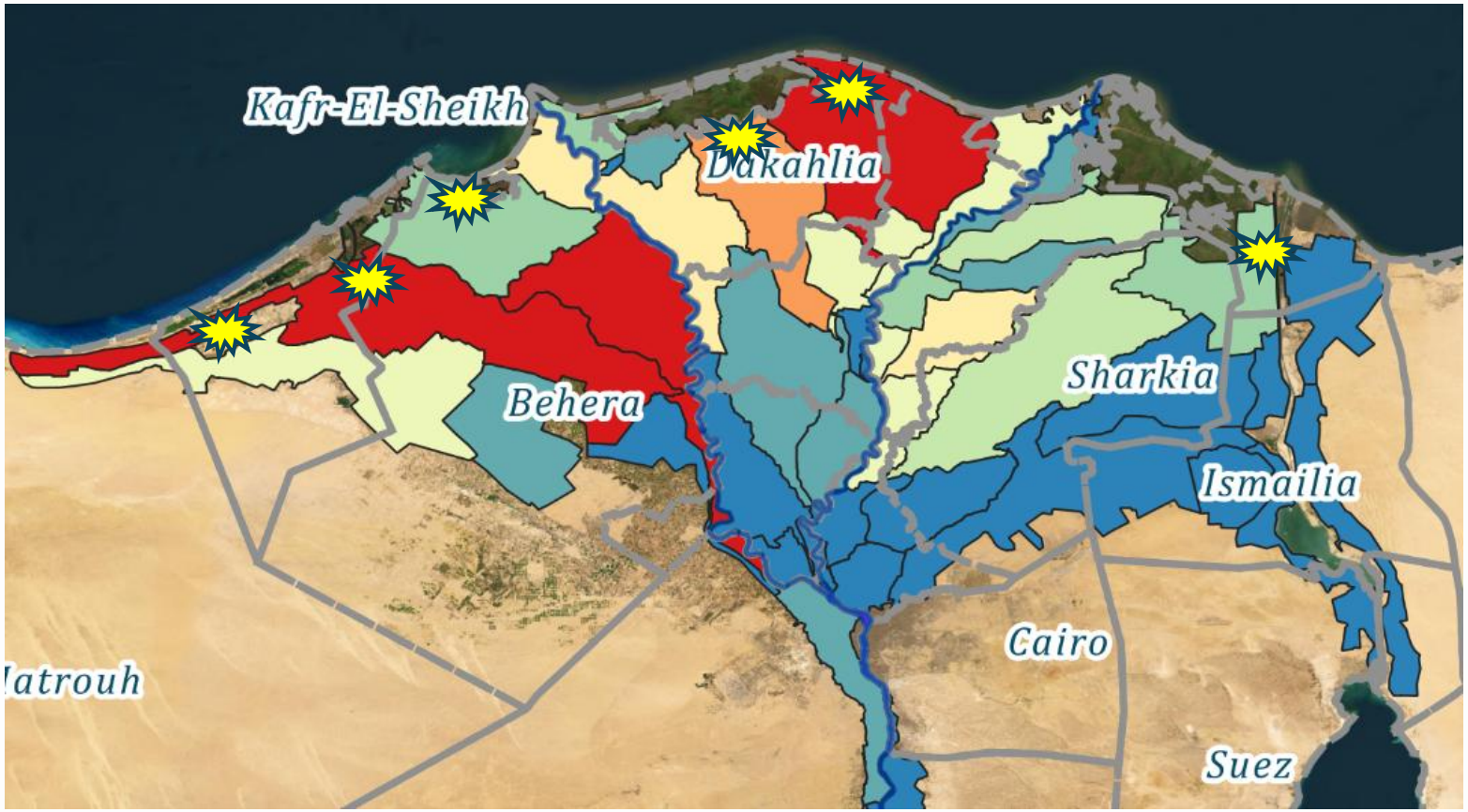


Example: Updated system in Tabia PS

- 20% Decrease in Power Consumption
- Decrease in CO2 by 25K ton/year
- 50% Decrease in O & M cost
- 60% Decrease in downtime
- Payback period: max 3 years years

3. Intensive Water Reuse





TDS increases drastically above 2000 PPM

3. Intensive Water Reuse - Roadmap

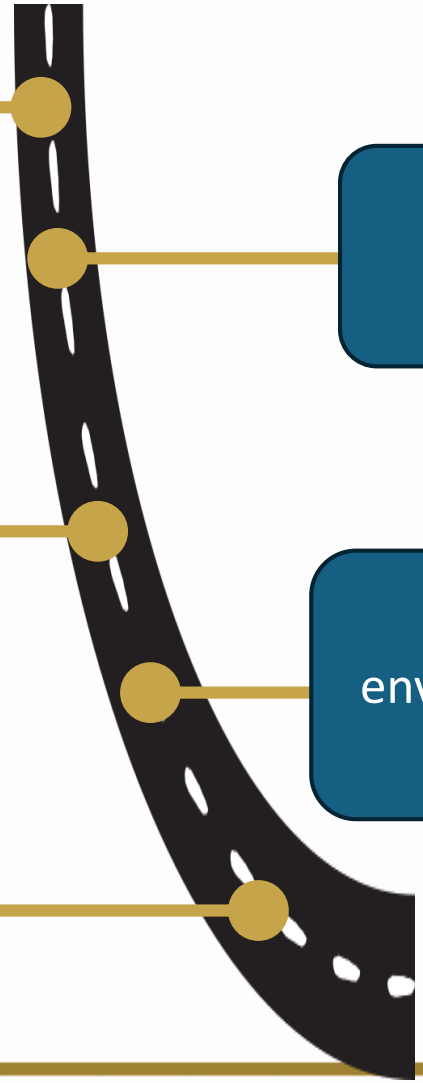
Assessment of untapped agriculture drainage water (quantity and quality constraints)

Assessment of Hotspots with water shortage (Realtime, and simulation predictions)

Designing a Master plan that includes:
1- Mixing at hotspots
2- Usage in Fish farming
3- Cultivation of Salt tolerant crops
4- Renewable energy powered desalination for high value crops

Assessment of social, economic, and environmental impacts for each component (including Brine Management)

Piloting and verification to establish a scalable sustainable Masterplan



4. Modern Irrigation

Modern Irrigation Priorities:

1. New Lands Illegally Using Flood Irrigation, Violating Drip Irrigation Obligations (approx. 500,000 Fed.)
2. Lands Depending on Groundwater, That Uses Flood Irrigation (Small Holder Farmers, Low Income)

Requirements:

- Technical Assistance for Data Gathering
- Financial Support for Conversion