

**Aqua Minds**

AI-Powered GERD Monitoring & Early  
Warning System

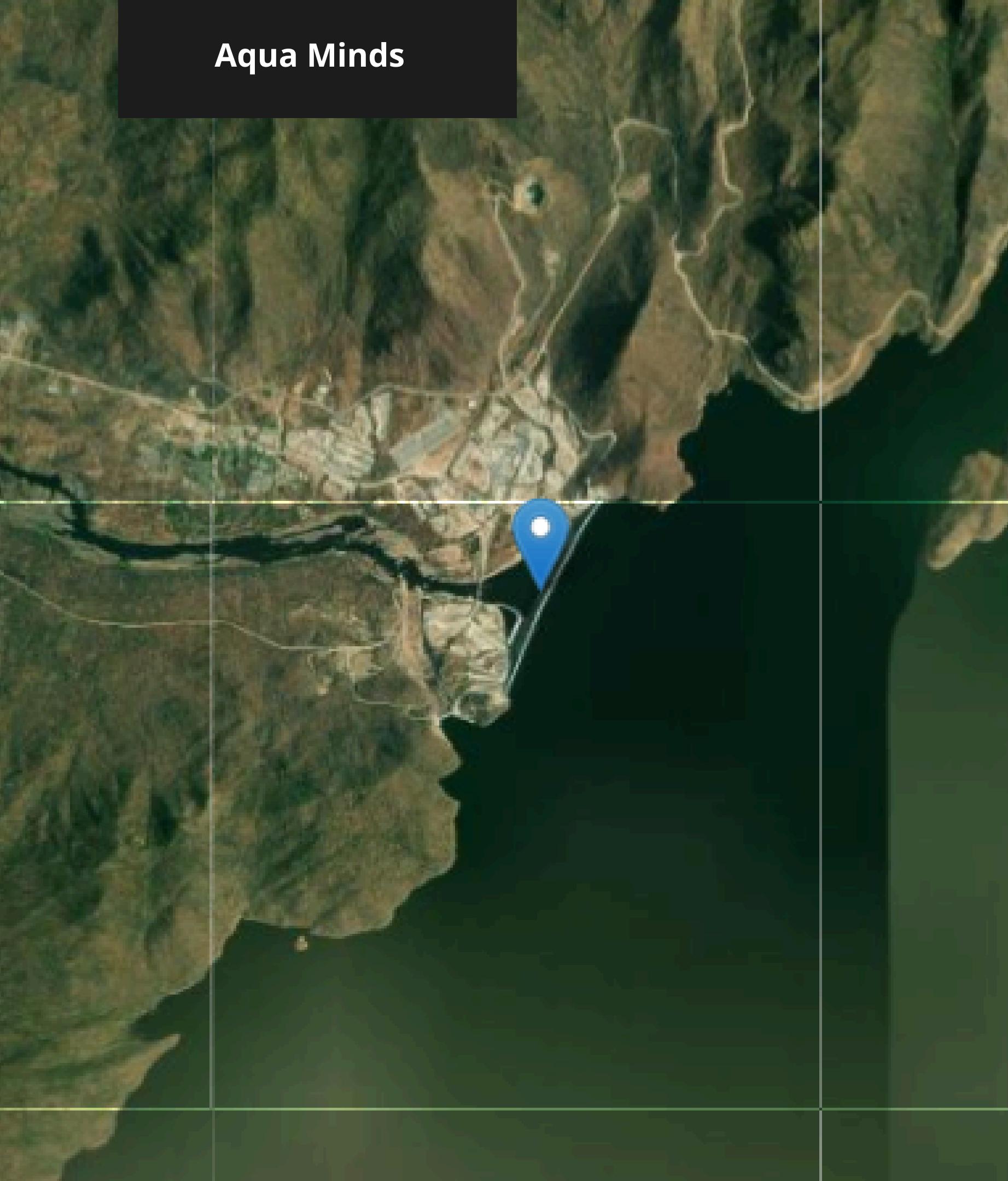
# GERD MONITORING

Multi-Satellite Data Integration for Nile River Water Security



**Digitopia**





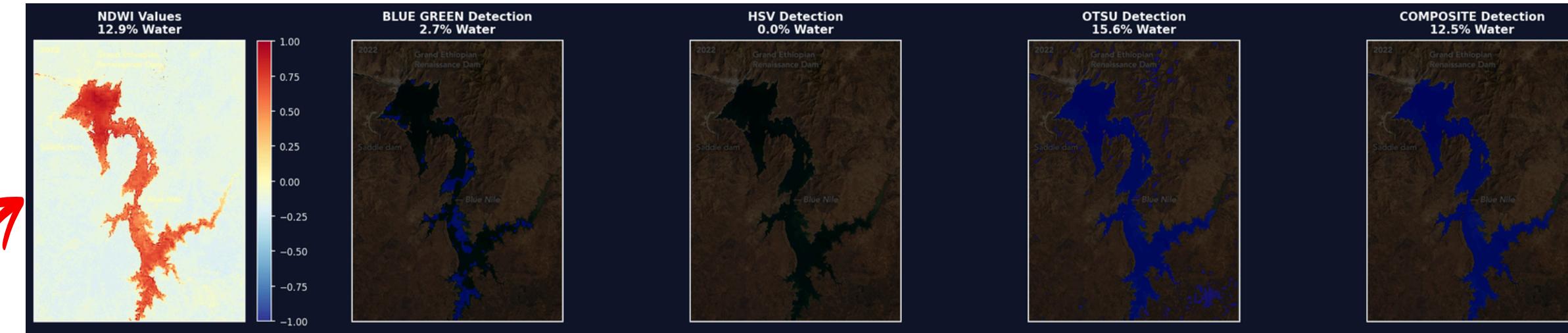
## About the GERD Monitoring System

- The GERD Monitoring System integrates data from 4 major satellites (DAHITI, Copernicus, Sentinel-1, GPM/ERA5) to monitor water levels and provide early warnings for Egypt, Sudan, and Ethiopia.
- 94.7% accuracy in water detection
- Real-time monitoring with ML predictions

# Key Features

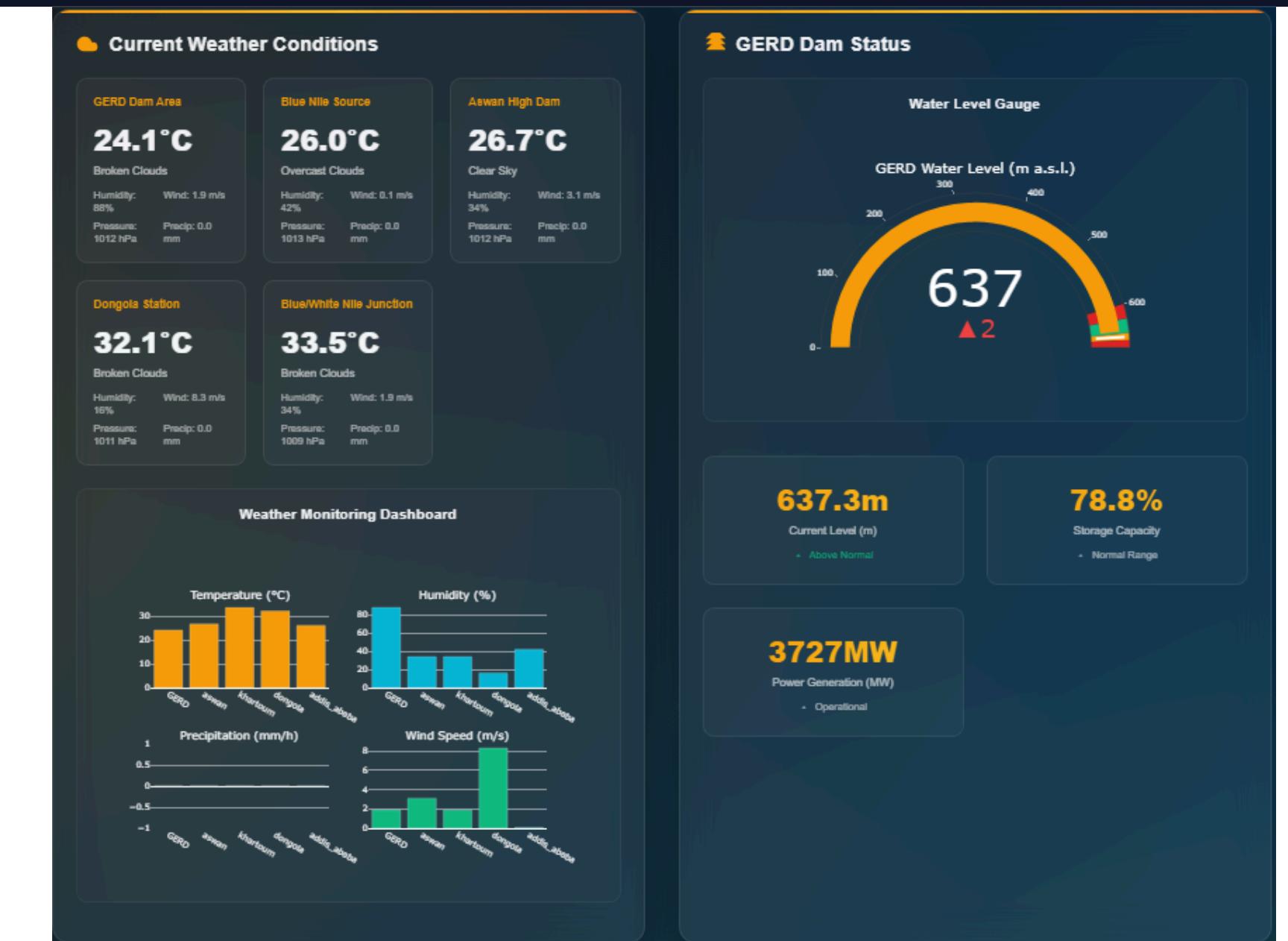
01

Multi-Algorithm Water Detection NDWI, HSV, OTSU, and composite algorithms for accurate water body detection. 847+ images processed with 94.7% accuracy.



02

Real-Time Monitoring Live weather data, water level tracking at 6 Nile stations, 7-365 day forecasts with interactive visualizations.



# About Technology

## Multi-Source Data Integration

Four satellite sources combined for 15-20% better accuracy than single sources. Daily updates covering 2011-2024 GERD history with 30-300m resolution.

### Copernicus

Near real-time river water level monitoring

Update: Daily

Resolution: 300m

### DAHITI

Water level altimetry from multiple satellite missions

Update: Daily

Resolution: Point measurements

### GPM/ERA5

Precipitation and meteorological data

Update: Daily/Hourly

Resolution: 0.25°

### Sentinel-1

SAR-based water extent mapping

Update: 6-12 days

Resolution: 10m

## Technical Documentation

Comprehensive technical guides, system specifications, and operational procedures for water monitoring systems.

### USGS Water Quality Data Collection Standards

National Field Manual for Water-Quality Data Collection - official USGS protocols

[PDF](#) [USGS](#)

### Water Monitoring Technologies

USGS comprehensive guide to measuring and monitoring water resources

[GUIDE](#) [Live docs](#)

### USGS Water Services API

REST APIs for accessing USGS water data from 1.9 million monitoring sites

[API](#) [Live service](#)

## Training & Education

Educational materials, training courses, and certification programs for water management professionals.

### NASA ARSET Water Quality Training

Advanced training on satellite monitoring of inland water quality using Landsat and Sentinel

[NASA](#) [Online course](#)

### Satellite Imagery Processing for Water Monitoring

NASA ARSET training on processing satellite imagery for water quality assessment

[TRAINING](#) [Multi-session](#)

### Landsat Science Training Resources

50+

## Research & Publications



Latest research papers, scientific studies, and peer-reviewed publications in water resource management.

### Global Multi-Sensor Water Index Dataset

Scientific Data: Surface water mapping using Landsat-8 and Sentinel-2 satellites

[NATURE](#) [2025](#)

### Sentinel Satellites for Water Monitoring

Comprehensive review of Sentinel constellation applications in inland water monitoring

[JOURNAL](#) [2023](#)

### World Bank Water Resources Management

Global water security research, policy frameworks and development strategies

[POLICY](#) [World Bank](#)

# Our Vision

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01

World's most comprehensive satellite water monitoring for transboundary rivers

02

Empower stakeholders with real-time intelligence for equitable water distribution

03

Pioneer AI + satellite technology for regional water cooperation

# Our Mission

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**01**

Continuous accurate GERD monitoring using multi-satellite integration

**02**

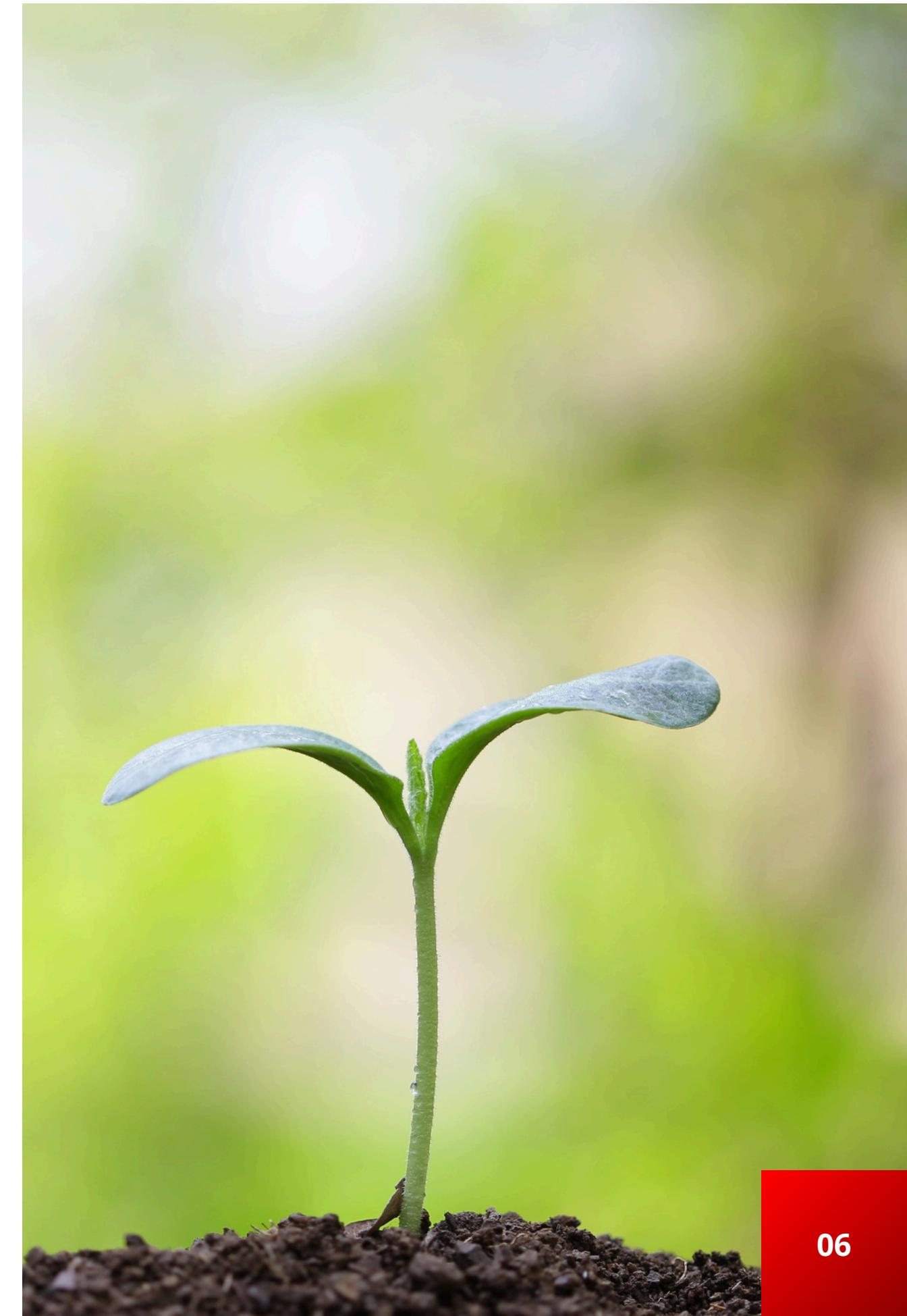
ML predictions for water levels (7-365 days forecast)

**03**

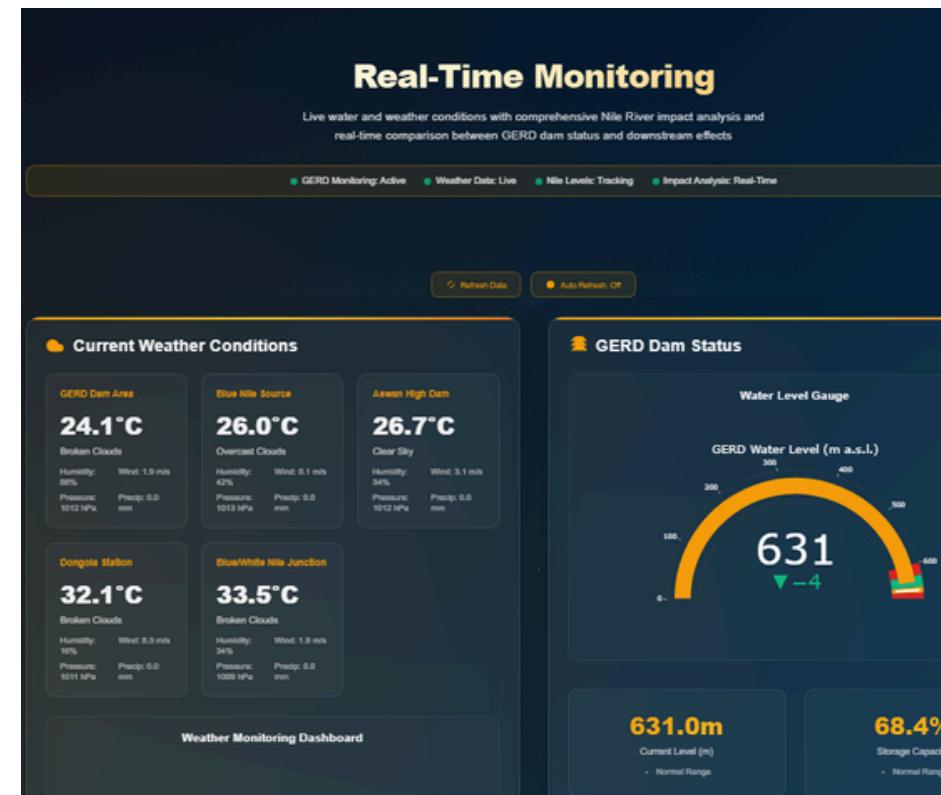
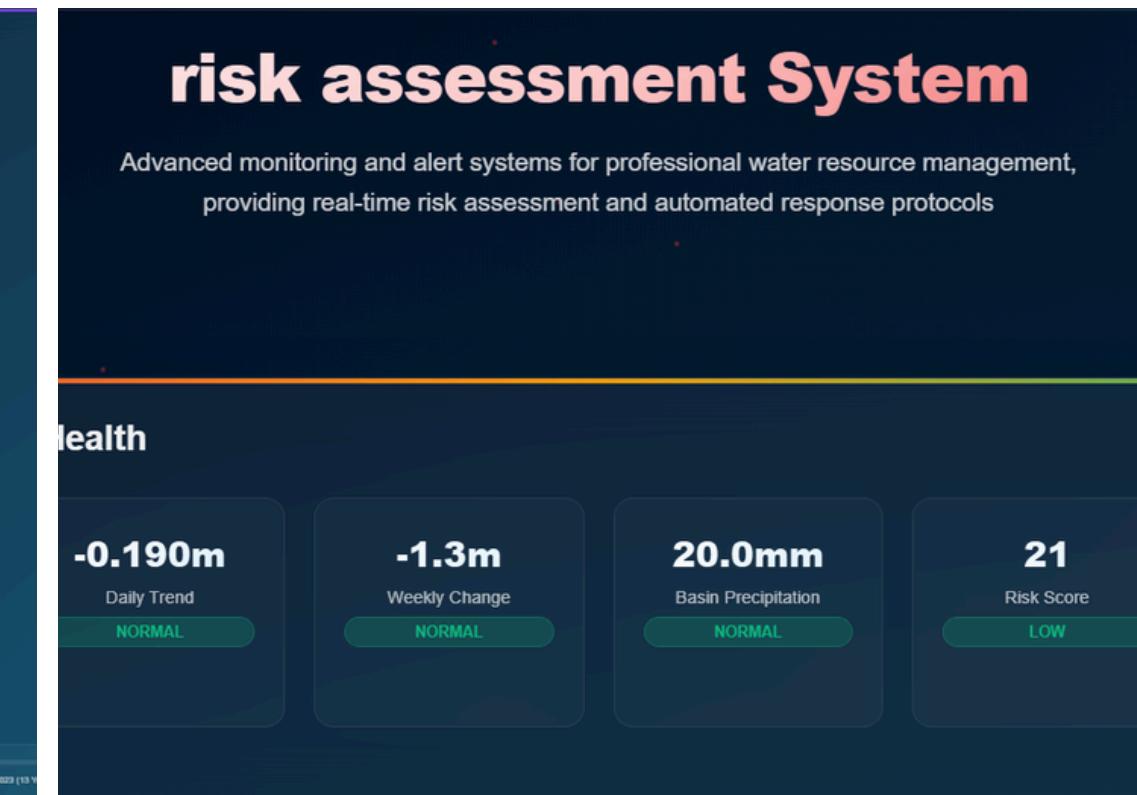
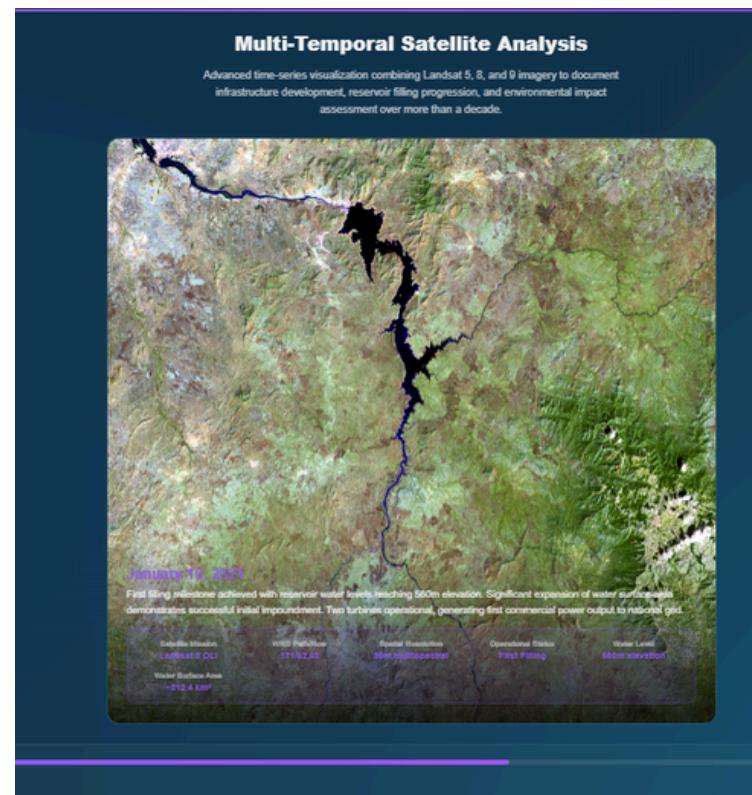
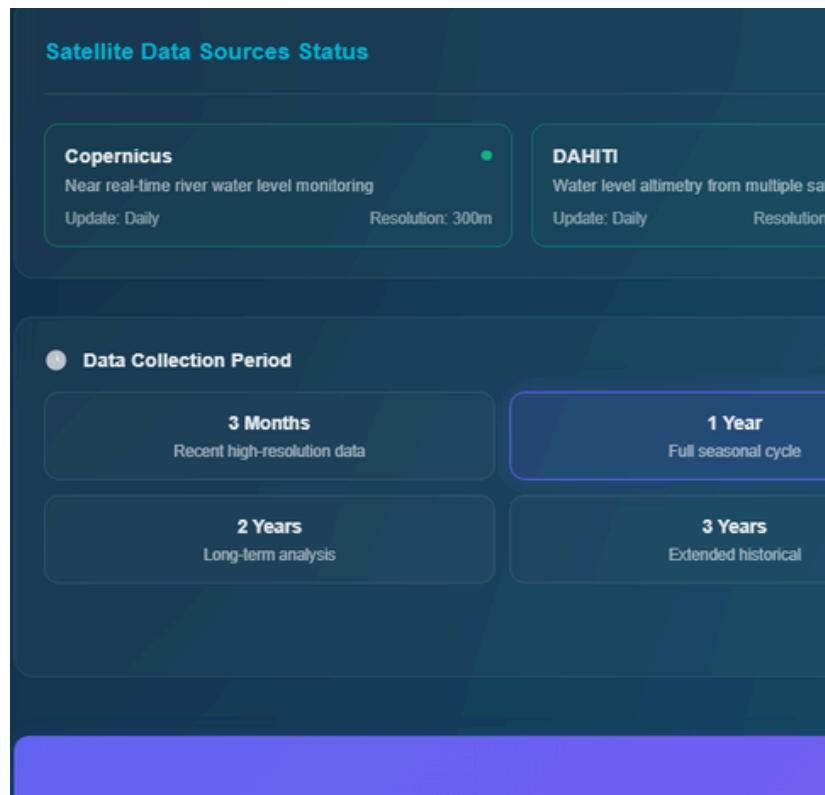
Comprehensive impact assessment (agriculture, energy, economy, security)

**04**

Accessible APIs and tools for researchers, governments, NGOs



# Key Achievements



satellite images | predictions | 94.7% accuracy

Tracked 3 GERD filling phases (2020-2023), 0→40 billion m<sup>3</sup> reservoir expansion, 6 Nile monitoring stations from Blue Nile to Mediterranean.

# Meet Our Team

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**NABIL ADEL**  
TEAM LEADER

**Nour El Banna**



**Mariam Hossam**

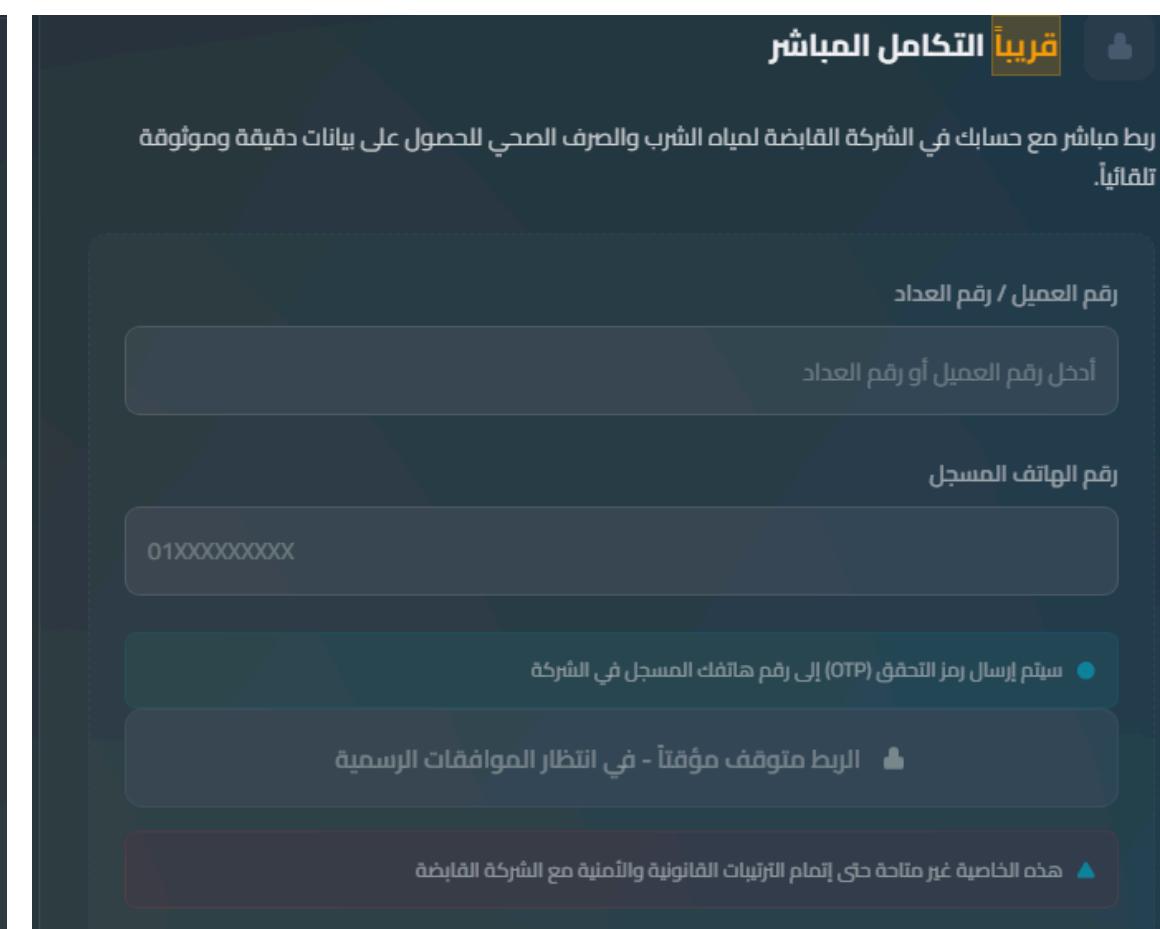
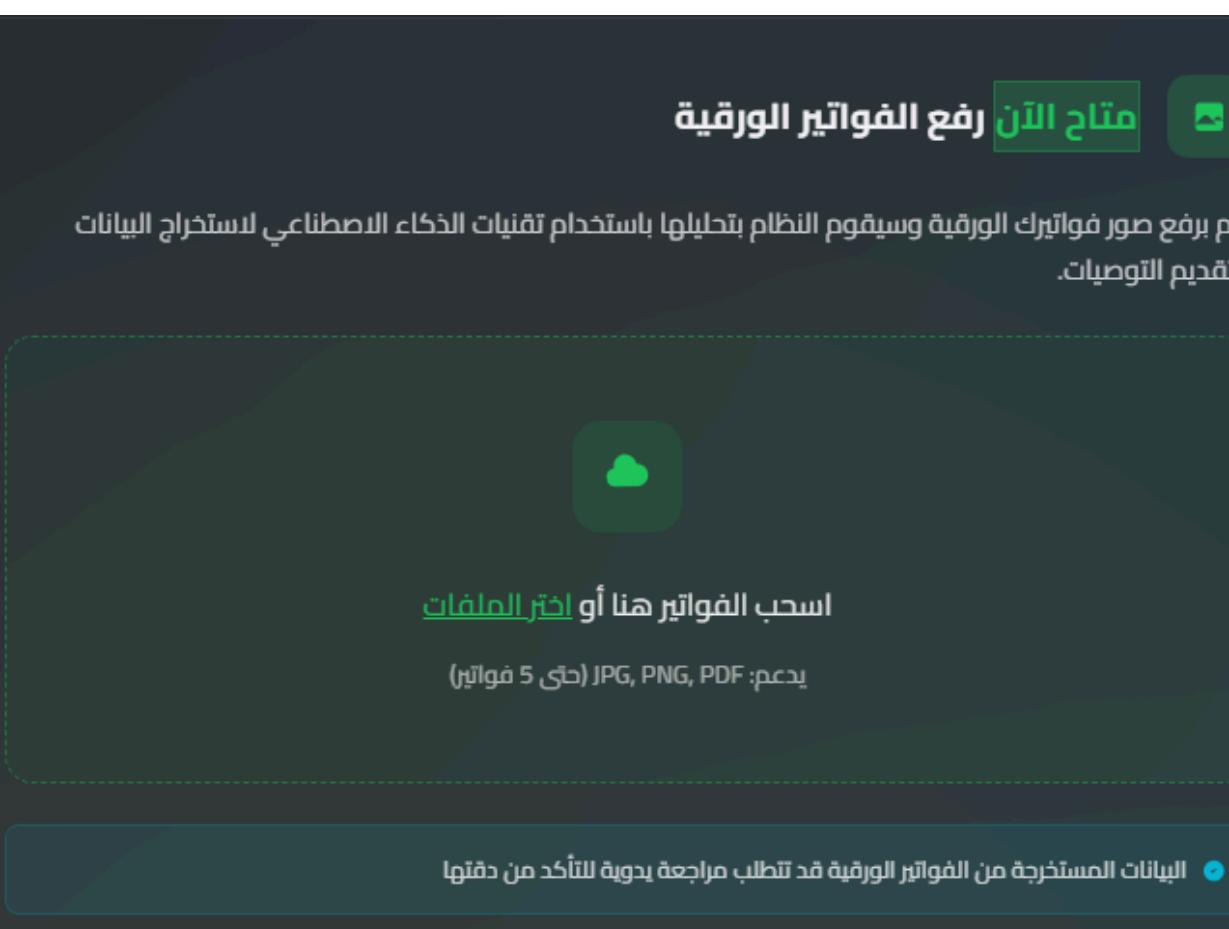


**Hazem Farouk**



**Menna Zaki**





## Two Ways to Use:

Direct Integration (Coming Soon)  
Automatic connection with water company databases

- Link your account number
- Auto-fetch monthly bills
- Real-time consumption tracking
- No manual uploads needed

# Smart Water Bill Analyzer

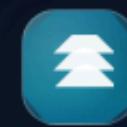
## What It Does:

AI-powered tool that analyzes your water bills to track consumption, identify waste, and provide personalized savings recommendations.

## Paper Bill Upload (Available Now)

Instant OCR scanning of physical bills

- Drag & drop or click to upload
- Supports: JPG, PNG, PDF (max 5MB)
- Arabic & English text recognition
- Extract consumption data in seconds



# AI-Powered GERD Monitoring

Revolutionary satellite imagery analysis with advanced AI algorithms, real-time predictions, and comprehensive environmental impact assessment

**847**

Satellite Images Processed

**94.7%**

AI Accuracy Rate

**12.3K**

Predictions Generated

# THANK YOU