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International Commission on Irrigation and Drainage (ICID)



Dr Madhuri Rampalli
Knowledge & Partnerships Manager
Vassar Labs, India

**Application of Remote Sensing, AI/ML in Smart
Irrigation**

2nd Indo Global Irrigation Summit
24-25 June 2026, New Delhi India

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APPLICATION OF REMOTE SENSING, AI/ML IN SMART IRRIGATION

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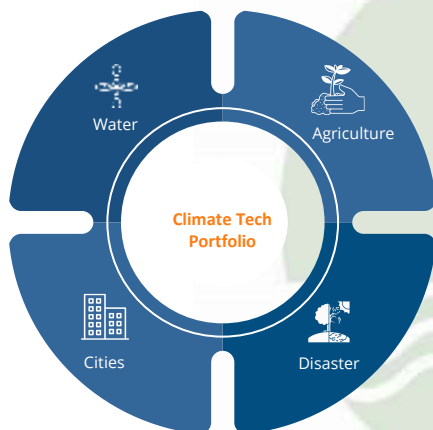
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About

We are a global Climate Tech company leveraging technologies such as AI, GenAI, Remote Sensing, Cloud Computing, Big Data, and Digital Twins etc. to build solutions for effective monitoring and management.



Overview:

Building scalable Digital Public Infrastructures which are interoperable, cloud agnostic and low code integrations.

6+
Country Scale
Projects

17+
State Level
Projects

40+
Implementations for
Fortune 500s



Founded in 2014



420+ employees from IITs, NITs, ISB, IIMs



HQ: Woburn, MA, USA
 Dev Centre: Hyderabad, India

Leadership Profile



LAXMI PRASAD PUTTA
 FOUNDER

1996

IIT Madras

1998

MIT, Boston
 Masters



NIKHILESH KUMAR
 CO-FOUNDER & CEO - CLIMATE

2007

2014

ISB, Hyderabad
 MBA In Operations,
 Strategy and
 Leadership



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Customer Profile

Key National and Global Clients (6+ Active Engagements with Country Scale Global Govt. Agencies)



Key Enterprise F500 Clients (Ready deployments with F500 companies & Multilateral Agencies)



State Govt. Implementations (10+ State Scale Implementations)



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Relevant Experience: Large Scale Digital Water Management from Source to Supply



Saudi Arabia
Water Resources Information
Management System



City
Water Management &
Decision Support



World's Largest Lift
Scheme Optimization for
Govt. of Telangana



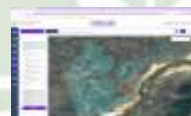
India
Water Resources
Information System



State Scale
Water Resources
Management System



Flood
Forecasting Early Warning
System



Canal Irrigation &
Monitoring Management
for Odisha



Reservoir Operations
& Hydropower
Optimization

- Integrated Digital Water Management platform deployed across **8+ cities** serving **1.3M+ people**
- Digital Twin deployed covering **1832 Km water conductor system** for real time monitoring
- Covering More than **35 Major Irrigation Projects** covering **120 million hectares farmlands** across **3 states**
- Flood monitoring done for **406 reservoirs** and **35 river basins**

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Key Deployments – Agriculture DPI and Climate Smart Systems

Andhra Pradesh - AIMS
Comprehensive agriculture information & management system



Andhra Pradesh - IIATP
Monitor and track all the activities as per World Bank norms



Andhra Pradesh - AIMS 2.0 (DPI)
State Agriculture Data Hub and Technology Platform



Haryana AIMS
Comprehensive Farmer Database, enabling scientific crop planning & harvesting assessment

- **8 State Level Projects**

- **35+ Major Irrigation Projects**



Haryana - MICADA (IISIF)
The system aims to increase crop yield and optimize inputs while building climate resilience



Kerala - KATHIR (DPI)
Integrated agriculture data hub and digital farmer services platform



Telangana CAMS
Canal Irrigation Monitoring database enabling efficient water usage



Odisha CAMS
Canal Irrigation Monitoring at Orissa enabling efficient water usage

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Digital Public Infrastructure for Water

[Click To Play - aquaWISE](#)

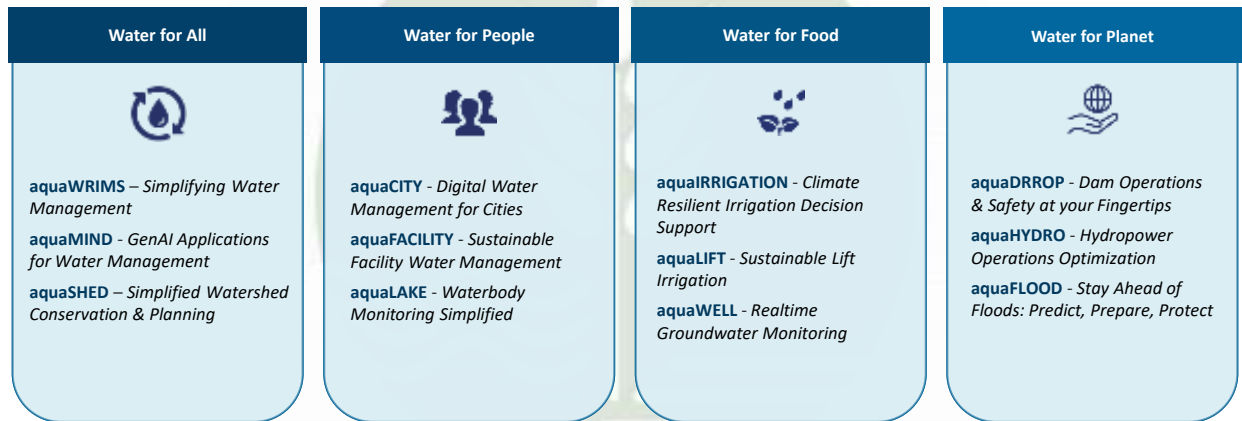
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Products powered by aquaWISE

aquaWISE provides a suite of 20+ products available as SaaS or custom solutions, deployable on customers' cloud or local infrastructure, designed to meet a wide range of water management needs across various scales and environments.



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Technical Architecture



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aquaIRRIGATION: Platform for Smart & Sustainable Irrigation**Managing**States : **3** Projects: **30** Area : **120 Mha****Helping**Farmers : **30 M**Govt officers: **1200****Monitoring****Type of Assets:** Dams, Barrages, Rivers, Canal, Regulators, farms, borewells.**Objective:****aquaIRRIGATION** optimizes irrigation with real-time monitoring and data-driven management. It integrates canal network monitoring, source tracking, and conjunctive water use to balance surface and groundwater resources.**Real Time Monitoring:**

Tracks Canal Releases, Crop Sown Information, Soil Moisture and Ground water Status in the command area

**Conjunctive use of Water:**

Integrates both sources dynamically, helping recharge aquifers and improving water sustainability for over 30% of irrigation demand.

**Automated Irrigation Scheduling:**

Adjusts water releases based on crop stages and climatic conditions, improving yield by up to 12% while reducing excessive withdrawals

**Minimizing Water Loss:**

Reduces seepage and operational inefficiencies, leading to a 10-20% reduction in water losses in canal systems.

**Boosting Agriculture Productivity:**

By ensuring precise water supply, farmers experience up to 15% yield improvement, enhancing food security and profitability.

**SMS notifications:**

Automated alerts to engineers & policymakers via SMS and WhatsApp, App Notifications

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aquaIRRIGATION: Platform for Smart & Sustainable Irrigation**Objective:**

Integrate real-time data from IoT sensors, remote sensing, and crop models for precise, efficient irrigation management. Enable efficient water allocation and advanced crop models to optimize water use, boost yields, and reduce waste. Remotely manage systems, customize irrigation strategies, and access detailed reports for informed decisions.

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Command Area Monitoring & Irrigation Planning

- Enables remote monitoring, predictive maintenance, and **optimized water delivery across the canal system**
- Estimate **precise water needs** based on crop type, growth stage, soil, and weather
- **Digitally model the entire irrigated** command area to visualize and manage water distribution
- **Plan water releases** in alignment with crop stages, soil moisture, and water availability



Digital Twin of Canal Network



Crop Water Requirement



Command Area Digital Twin



Irrigation Scheduling planning

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Last Mile Visibility on Canal Networks

Automated web-based interactive canal monitoring system:

- Brings canal-wise irrigation (i.e., water release) and crop information into the decision support system in both GIS and MIS Based system .
- Tracks entire canal irrigation practice followed in the field.
- Individual field level engineers can use to monitor the various information related to their jurisdiction.
- Visualize water releases information at distributary, minor and sub minor level, cycle-wise water release information for each distributary, minor and sub-minor canals.



Monitoring Canal Supply till sub-minor level



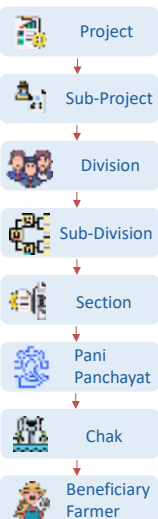
Monitoring Canal Operation till Water User Association, Chak Level and Crop Plot Level

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Water User Society



**Last Mile Adoption
& GenAI Co-Pilot**



Click to play

Integration of Operational hierarchy, Irrigation officer, Pani Panchayat and Beneficiary



Click to play: GenAI based Irrigation Decision Support



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Monitoring Water Stress, Ayacut Analysis and Field Level Irrigation Planning

Crop Water Stress, Surface Wetness and Irrigation

Crop water stress and helps in understanding areas under critical water stress. This dashboard forecasts 10-day water needs, highlights dry spells, and estimates water to save crops.



State to Farm level Crop Water Stress Monitoring



Ayacut & Gap Ayacut Analysis



Farm Level Irrigation Forecast



Minor Irrigation Tanks Monitoring

Satellite data allows continuous monitoring of water bodies by assessing historical trends and catchment health, detects unauthorized land use, and alerts authorities.

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Unified Database

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Digitization of Farms

High-resolution satellite imagery and AI digitize farm boundaries, enhancing farm intelligence by integrating cadastral and farmer data



Bring Visibility for Each Farmer

It consolidates a farmer's comprehensive profile and facilitates Direct Benefit transfers, tracking scheme efficacy across geographic and demographic indicators



Link Crop Sown Data

Crop sown data at farm level is linked to estimate crop acreage at higher levels from village to state level



Crop detection and Classification



Crop Growth Monitoring

The real-time system analyses satellite images for Crop Health Monitoring at different growth stages considering soil moisture and other climatic factors - providing immediate risk insights. The module can be drilled-down to individual farm level.

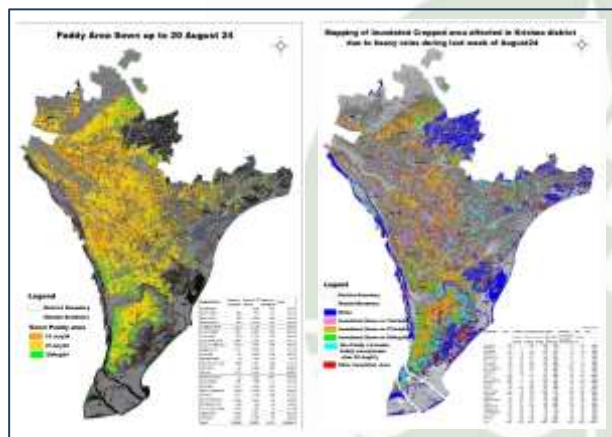


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Extreme Event Alerts, Crop Loss Assessment and Harvest



Paddy crop in Krishna District, Vijayawada, Andhra Pradesh



Crop assessment caused due to cyclone



Early Season Drought Monitoring Dashboard



2D Flood Simulation and Early Warning System



Remote sensing powered harvest progress tracking

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Thank You

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