जल शक्ति मंत्रालय
MINISTRY OF
JAL SHAKTI
सत्यमेव जयते

NWIC

बायसेग-एन
BISAG-N
एमईआईटीवाई MeitY

GIS-Based Water Data Platform for Integrated Water Resource Management in India

A Unified Geospatial Platform for Water Resource Data Management and Decision Support

GOVERNMENT OF INDIA · MINISTRY OF JAL SHAKTI

Jal Shakti Data Management System | Jal Shakti Decision Support System (JDSS)

BISAG-N · National Water Informatics Centre (NWIC) · Department of Water Resources, River Development & Ganga Rejuvenation

PROBLEM IDENTIFICATION

Fragmentation of Water Resource Data in India

1

Scattered Data Repositories

Water-related data is maintained independently by CWC, CGWB, NWDA, NMCG, JJM and numerous other central and state departments, resulting in scattered, duplicated, or incomplete records.

2

Absence of a Unified Platform

With more than 89 agencies and 36 States/UTs each maintaining separate records, no single platform offers a comprehensive view of the nation's water resources.

3

Limited Decision Support

Most existing systems are limited to data storage or dissemination and do not provide the analytical capability required for informed decision-making.

4

Reactive Rather Than Predictive Planning

In the absence of an integrated view, planning tends to respond to events such as floods and droughts after they occur, rather than anticipating them.

OBJECTIVE

To consolidate India's water and allied-resource data onto a single geospatial platform, enabling every agency to access consistent information, perform standardised analysis, and plan on the basis of shared evidence.

PROBLEM IDENTIFICATION

The Specific Case: Water-Stressed Districts

Many districts have falling groundwater levels, and many have worsening water quality in both groundwater and surface water. If these issues aren't caught early, action comes too late.

Groundwater Indicators

- Depth to water table, measured against the long-term average
- Rate of decline in water level over recent years
- GWRA (Ground water resource assessment) — safe, semi-critical, critical, or over-exploited
- Contamination parameters, including fluoride, arsenic, nitrate and salinity

Surface Water Indicators

- River and reservoir water-quality trends over time
- Seasonal variation in flow and storage levels
- Compliance against drinking and irrigation water-quality standards
- Reduction in the extent of water bodies over time

This is the specific case the remainder of this presentation follows from data, to visualisation, to analytics, to planning, to decision-making, to monitoring, and finally to impact.

THE DATA DRIVEN PLATFORM

Data Flow: Acquisition to Application

Acquisition

Data is acquired from sensors, satellite imagery, State data centres, and agencies including CWC, CGWB, IMD and NMCG.

→

Standardisation

Each data layer is validated and organised into a common schema for consistency across sources.

→

Analysis

Maps, models and forecasts are generated from consolidated data using GIS tools and machine learning techniques.

→

Dissemination

Validated data and insights are made available through dashboards, a self-service portal, and API based data feeds.

→

Application

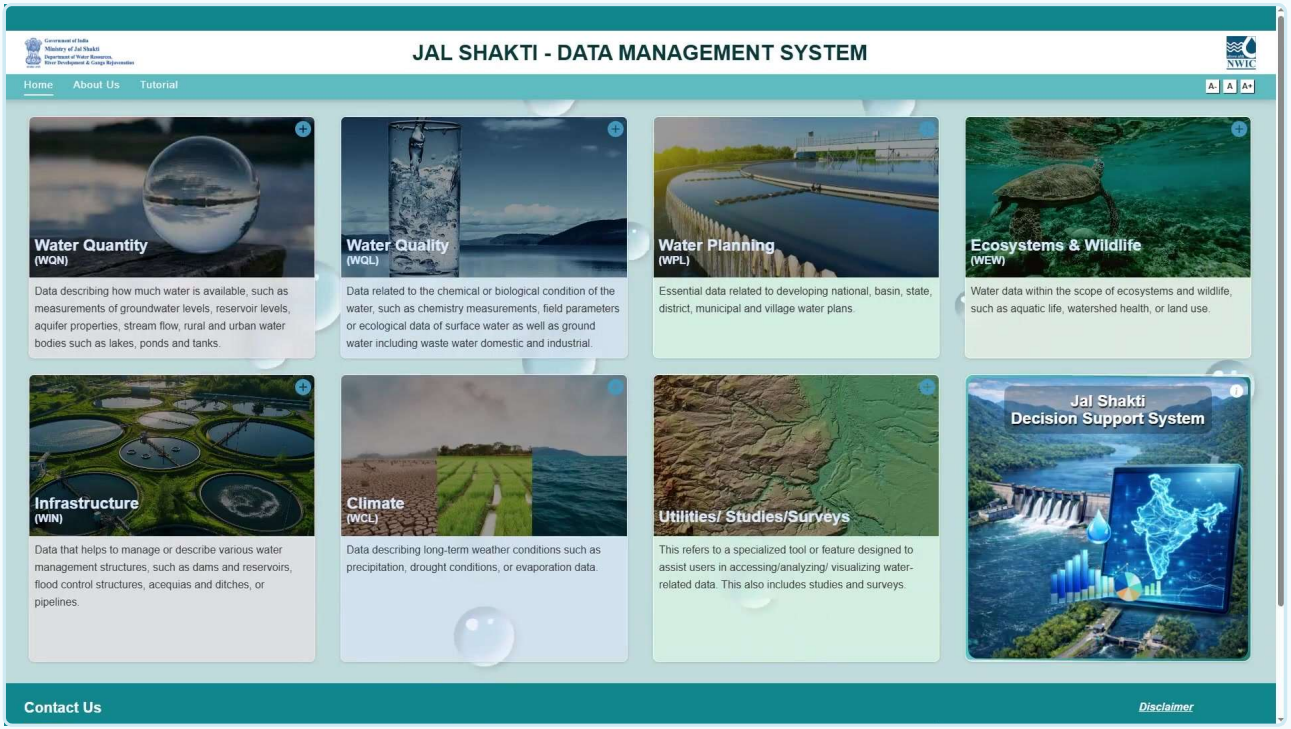
State-level decision support systems, project monitoring tools, and Department (Agency) oriented applications operate on this common information base.

Technology Platform

This system is built in-house, supporting the vision of Aatmanirbhar Bharat

The Jal Shakti Data Management System Homepage

The homepage lists seven data categories, each with a brief description, helping users find the right dataset before they go further into the platform.



jalshakti-data.gov.in — Jal Shakti Data Management System homepage

THE DATA GROUPS

Data Themes and Classification

Water Quantity (WQN)

Groundwater levels, reservoir levels, aquifer properties, stream flow

Water Quality (WQL)

Chemical, biological and anthropological condition of surface and ground water

Water Planning (WPL)

National, basin, state, district and village-level water planning, Glacial Lakes Inventory

Ecosystems & Wildlife (WEW)

Aquatic life, watershed health, land use land cover, Forest Cover, Ramsar Sites

Infrastructure (WIN)

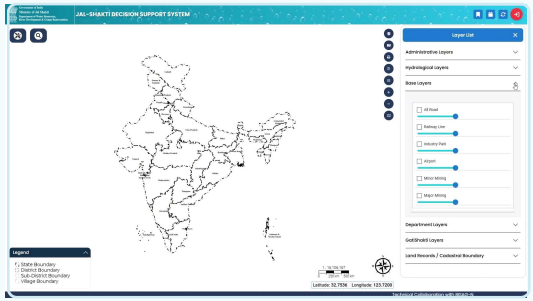
Dams, reservoirs, canals, flood control structures, pipelines

Climate (WCL)

Rainfall, drought conditions, evapotranspiration, soil moisture

Utilities / Studies / Surveys

Tools for accessing, analysing and visualising water data, including studies and surveys



THE DATA DRIVEN PLATFORM

A Unified Repository for Water Resource Data

The Jal Shakti Data Management System, consolidates water and allied-resource data from across the country into a single repository. Groundwater-level and water-quality data the two themes central to identifying water-stressed districts sit alongside every other dataset within the same system.

7	1,700+	10+	59
Data Themes Covered	Data Layers Added	API Integration	Applications Developed

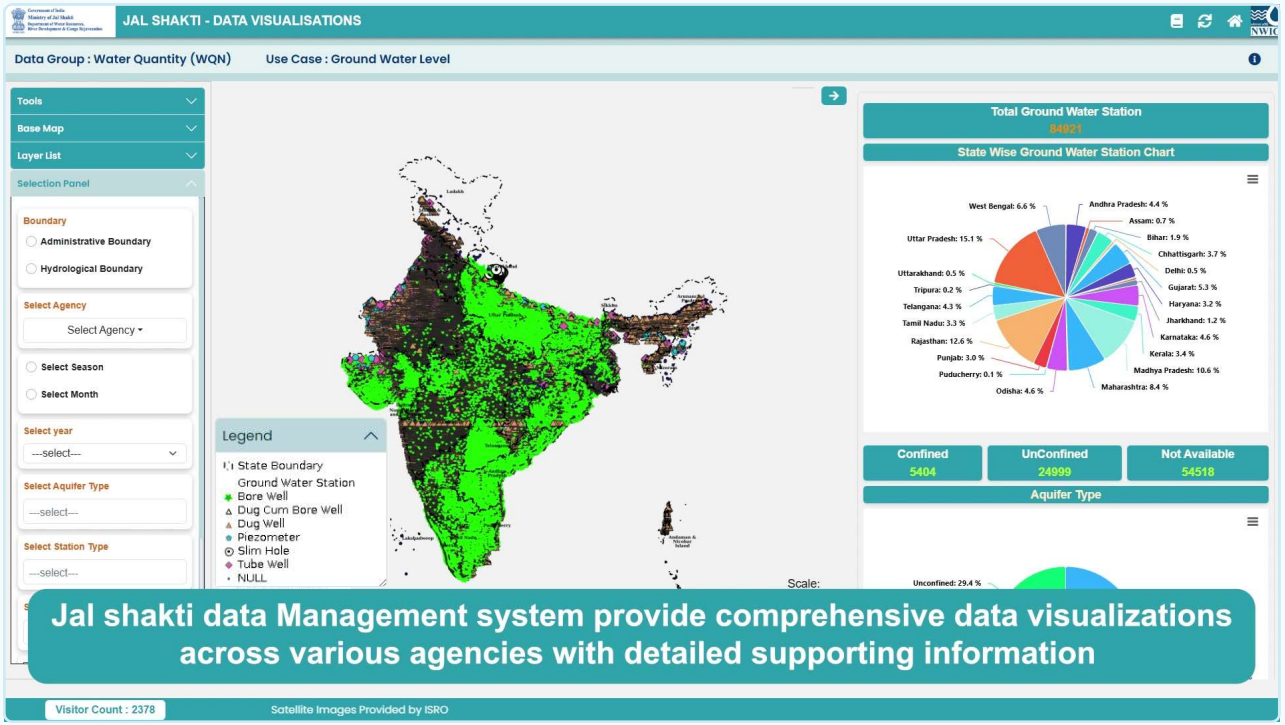
AGENCY PARTICIPATION

36 Internal Agencies of MoJS	36 States & UTs	17 External Ministries/Departments

ANALYTICS JSDV

Comprehensive Data Visualisation: Groundwater

This use case is to identifying water-stressed districts. The example below illustrates the Ground Water Level use case under the Water Quantity (WQN) data group the same structure applies to Water Quality (WQL) trends for both groundwater and surface water.



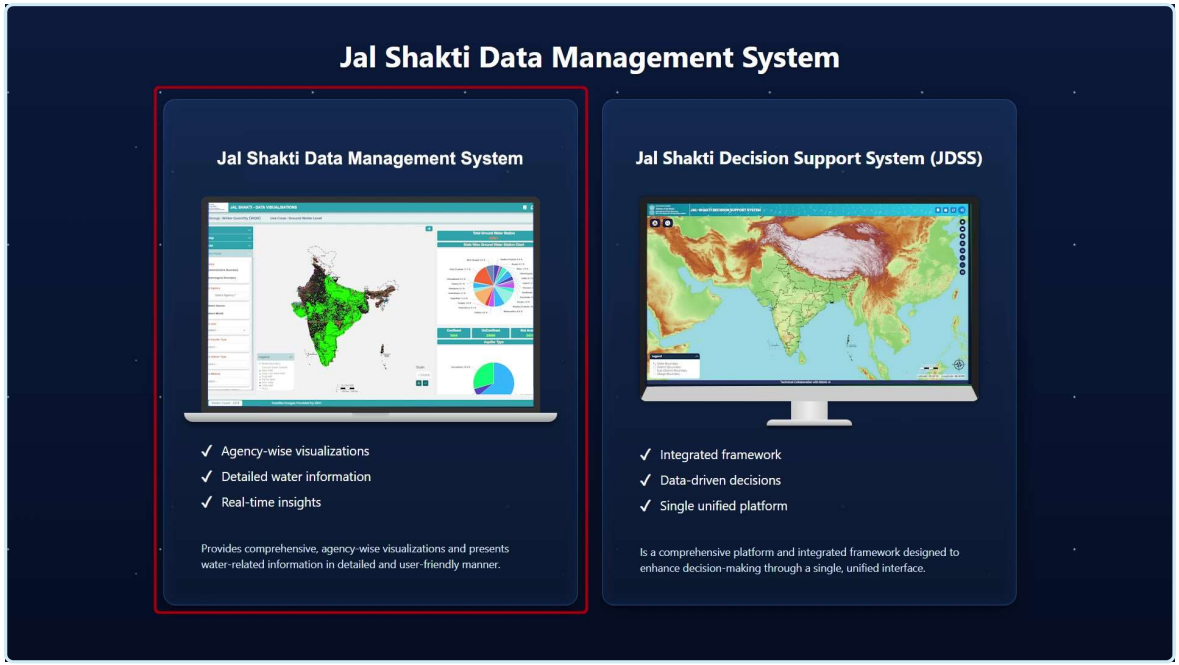
- State-wise distribution shown through an interactive percentage chart
- Stations classified as Confined, Unconfined
- Unconfined and heavily-drawn aquifers signal higher water-stress risk

The same module also analyses water-quality trends for groundwater and surface water.
Level and quality together identify and rank water-stressed districts, carried into planning and decision-making.

PLANNING

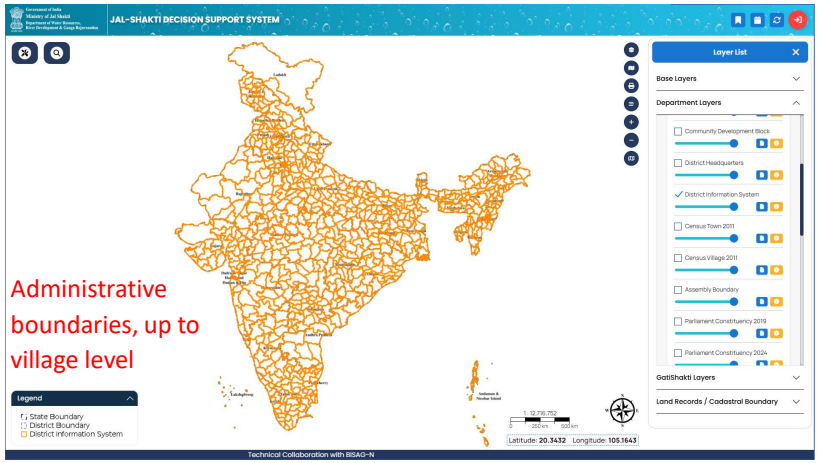
Two Complementary Systems, One Platform

While the Jal Shakti Data Management System provides detailed, use case-wise visualizations of water data, the Jal Shakti Decision Support System brings that data together into a single, unified platform for informed decision-making.

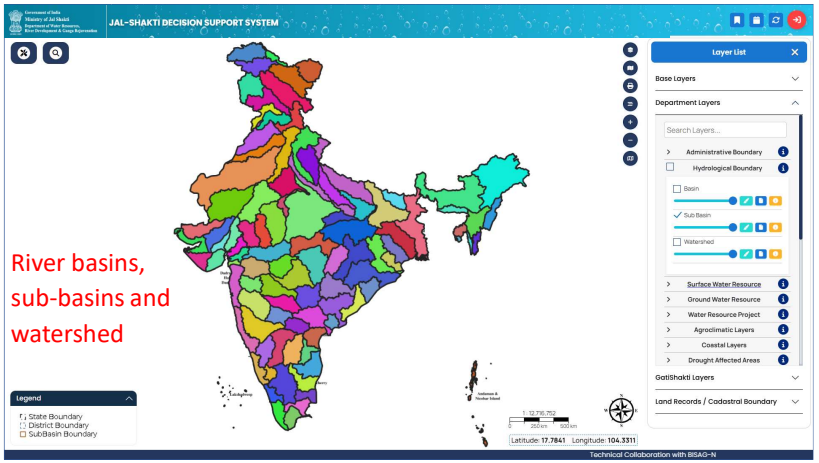


The Data Management System provides comprehensive, agency-wise visualisation of water-related information; the Decision Support System (JDSS) builds on this foundation as an integrated framework for evidence-based decision-making.

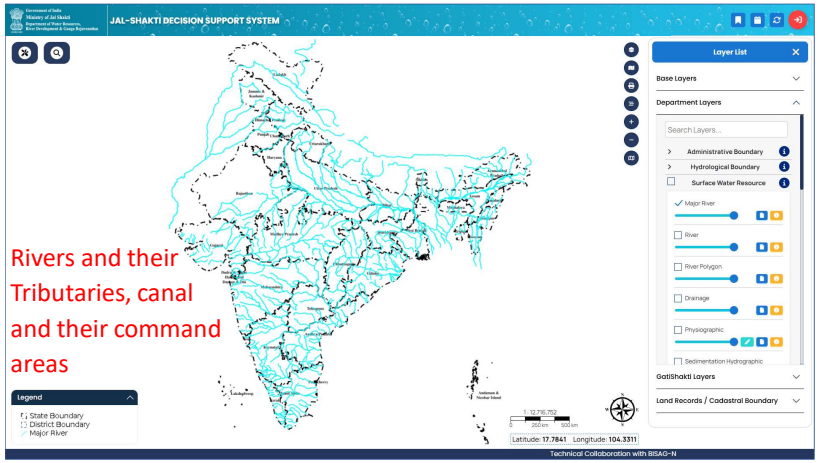
Layer-Based Access to Spatial Data



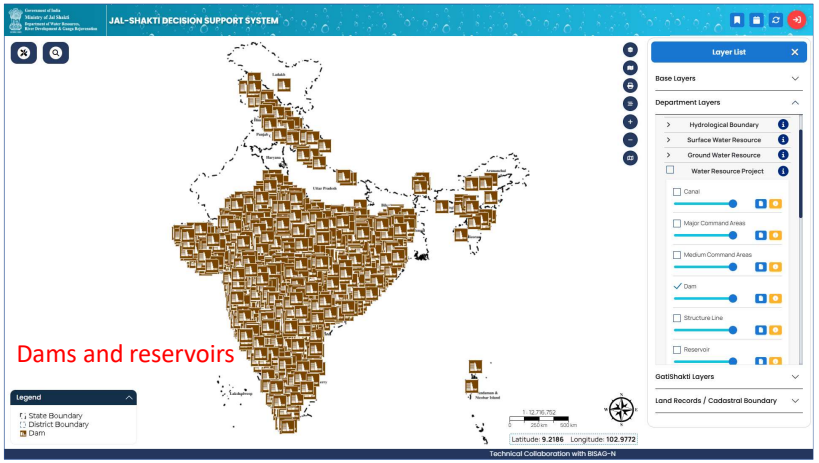
Administrative boundaries, up to village level



River basins, sub-basins and watershed



Rivers and their Tributaries, canal and their command areas



Dams and reservoirs

Selecting any layer displays its associated attributes such as administrative unit names, basin hierarchy, or dam and reservoir specifications providing direct access to detailed records from the map.

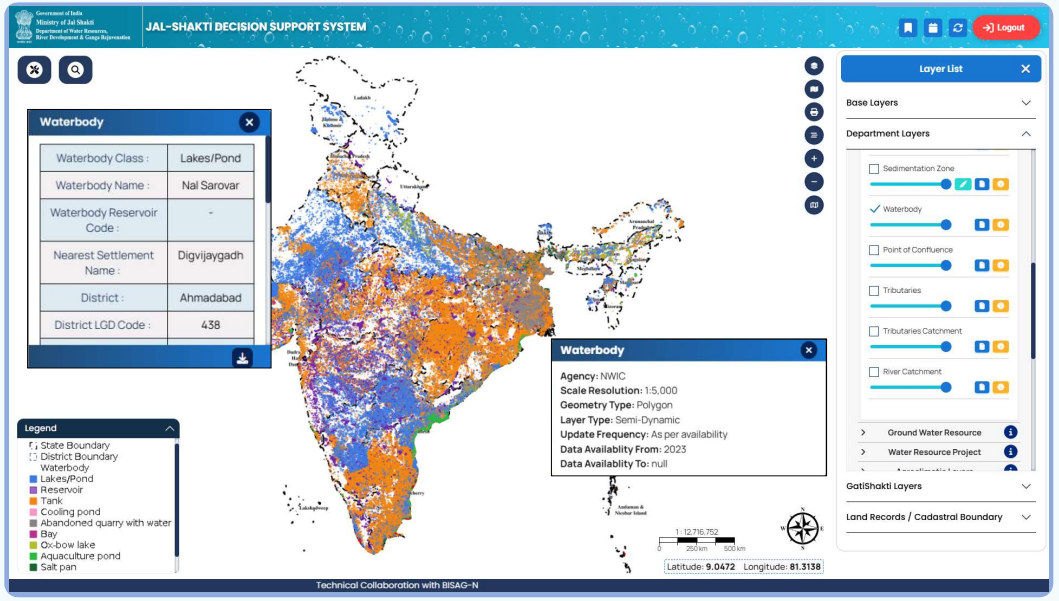
VISUALIZATION JDSS

A Consolidated View of India's Water Resources

The Jal Shakti Decision Support System (JDSS) presents every data layer on a single map like groundwater level, water quality, LULC etc. making it possible to plan and analyse without switching between multiple platforms.

Each layer is accompanied by structured metadata, including the source agency, date of collection, and methodology, accessible directly within the portal.

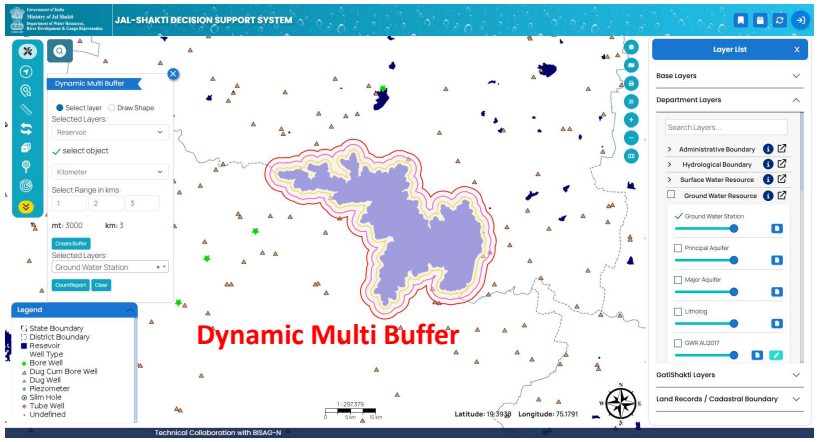
States with existing GIS infrastructure may integrate directly with the platform. States without such infrastructure are provided with a fully hosted solution.

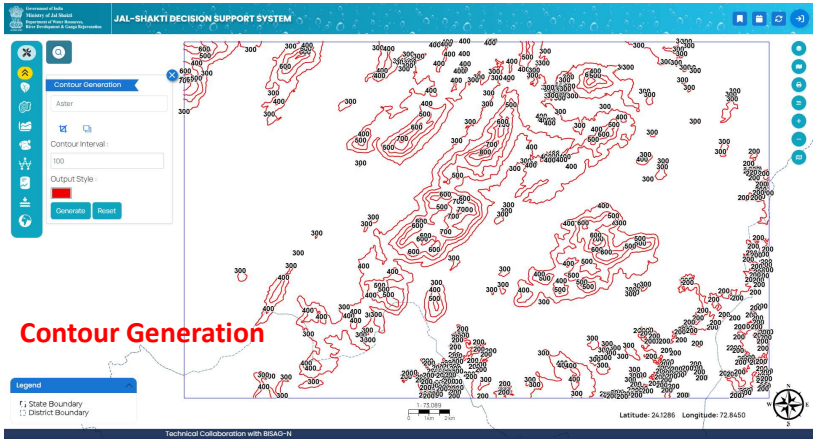


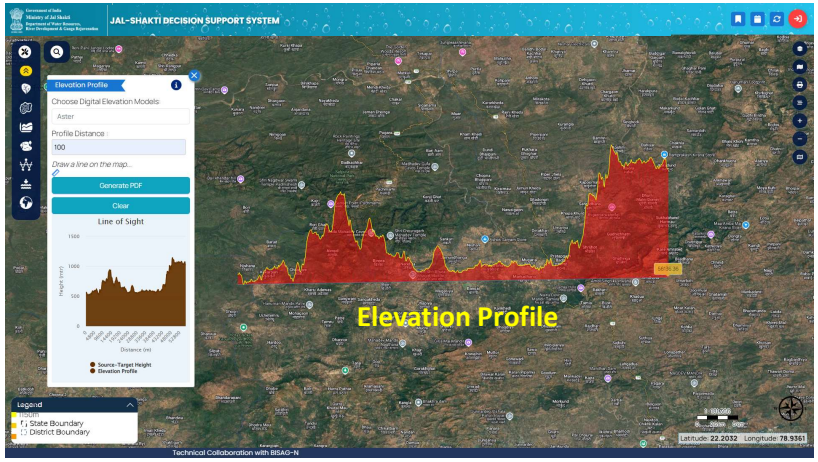
Jal Shakti Decision Support System — national base map with layer and tool panel

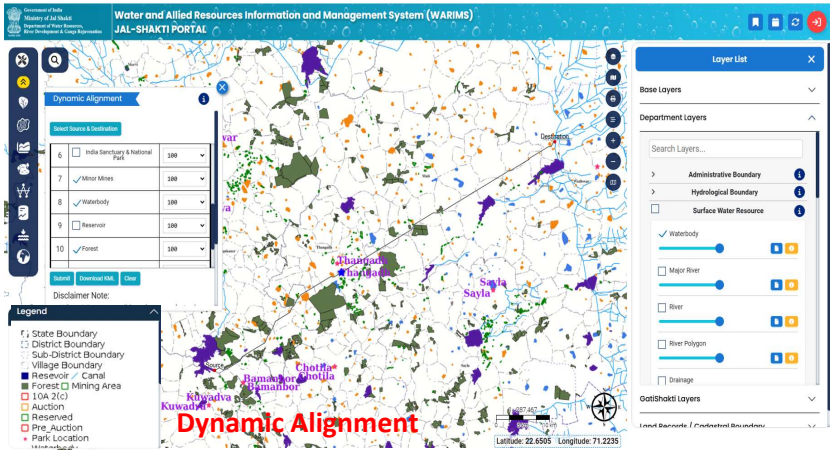
- **Search Functionality**
  Users may search by place, project or asset, and save frequently accessed locations.
- **Layer Control and Sequencing**
  Layers can be reordered by dragging within the list, determining which dataset is displayed on top.
- **Export and Printing**
  Map views may be printed or exported directly from the browser.
- **Base Map Selection**
  Users may switch between satellite imagery, terrain, and administrative base maps.
- **Satellite Data Support**
  High Resolution and Multi spectral Data Support

Analytical Tools for Spatial Decision Making









Additional tools include administrative drill-down from State to Village level, layer comparison, catchment and discharge calculators, site-suitability assessment for water storage structures, Query builder, Navigation, find location, Multi Buffer, Proximity and Site suitability.

DECISION MAKING

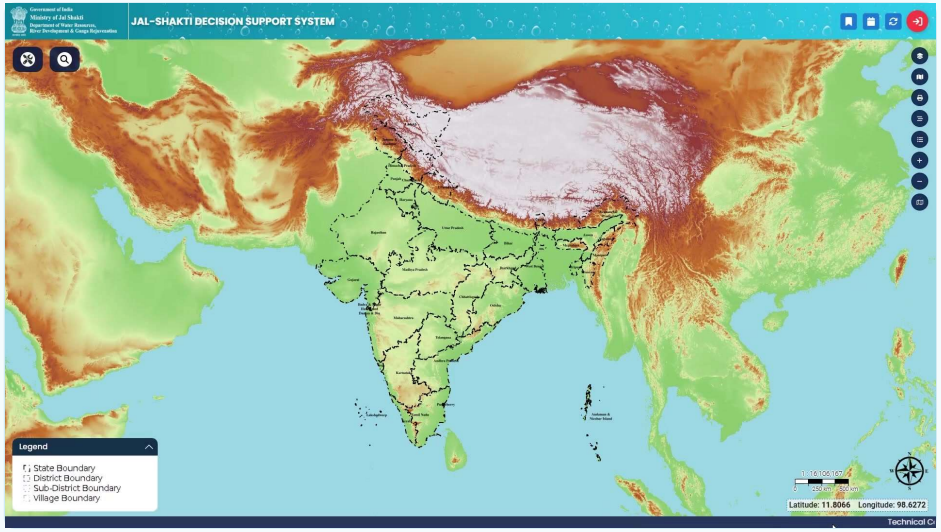
A Single Interface for Evidence-Based Decisions

The Jal Shakti Decision Support System (JDSS) integrates maps, analytical tools, and data within a single platform. Groundwater and Water Quality domains, in particular, are combined into a district-level water-stress picture that guides where action is prioritized.

Strategic Planning | **Increased Efficiency** | **Improved Decisions** | **Risk Mitigation**

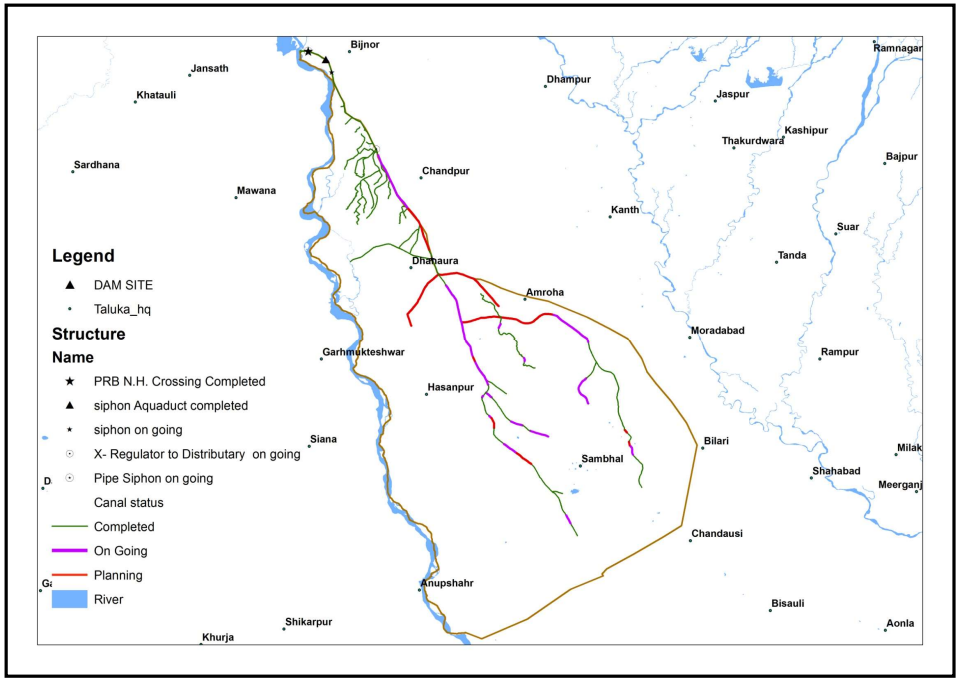
KEY FUNCTIONAL DOMAINS

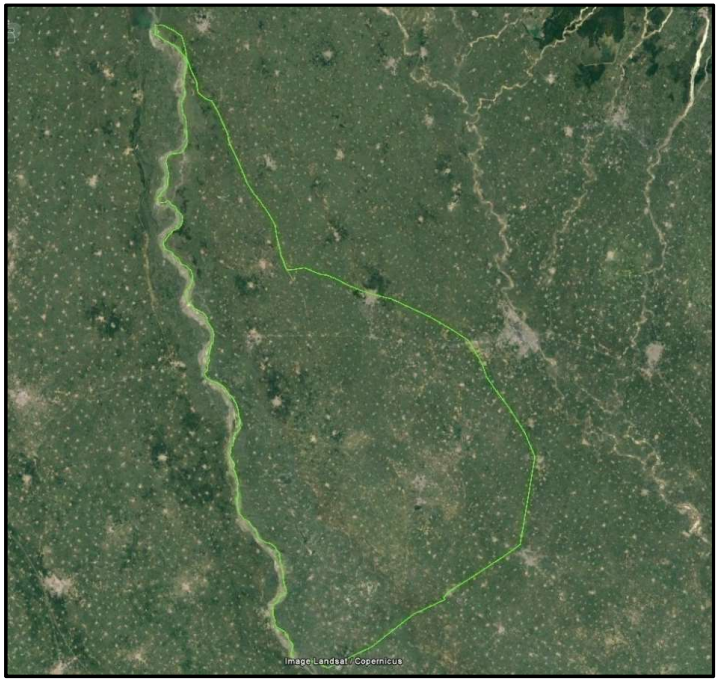
- Surface Water
- Water Utilisation
- Water Harvesting
- Project Management
- Knowledge Centre
- Groundwater
- Water Quality
- Event Analysis (Flood, Drought, Glacial Risk)
- Dam & Reservoir Health



Risk assessment dashboard within the Jal Shakti Decision Support System

Continuous Oversight of Project Implementation





Satellite and mobile application based project monitoring

WAY FORWARD

Strategic Priorities Going Forward



Inter-Governmental Convergence

Central and State Government schemes will converge on a single platform, enabling coordinated planning across ministries and States without duplication of effort.



AatmaNirbhar Bharat

All underlying technologies are indigenously developed under the AatmaNirbhar Bharat initiative and made uniformly available across the country.



In-House AI & ML

In-house developed artificial intelligence and machine learning capabilities will be deployed across departments to support planning and management, from forecasting to early warning systems.

Towards One Water, One Data

The Jal Shakti Data Management System is a valuable national resource for accessing and analysing water-specific data across the Country.

Thank You