Complete NWIC (National Water Informatics Centre) Water Data Database

Comprehensive Data from NWIC Portal and Associated Systems

1. NWIC INSTITUTIONAL FRAMEWORK

Establishment and Mandate

- **Established**: March 28, 2018

- **Parent Ministry**: Ministry of Jal Shakti, Government of India

- **Department**: Department of Water Resources, River Development and Ganga Rejuvenation (DoWR, RD & GR)

- **Status**: Subordinate Office under DoWR, RD & GR

- **Office Location**: 4th Floor, Sewa Bhawan, Rama Krishna Puram, Delhi 110066

- **Contact**: helpdesk-nwic@gov.in, +91-011-20863687

Vision and Mission

- **Vision**: Data as key driver for water governance and integrated water resources management at all levels in the country

- **Mission**: To make water data findable, accessible, inter-operable and reusable in partnership with Water Data Producers, Water Data Users and Water Managers

- **Central Role**: Central Nodal Agency for Water Data at National Level

2. FIVE PILLAR STRATEGY FOR NWIC

Pillar 1: Water Data Governance

Activity	Details
Central Nodal Agency	NWIC positioned as Central Nodal Agency for Water Data
Apex Committees	Steering, Implementation and Technical Committees with defined roles
Governance Operationalization	Regular committee meetings and support for effective functioning
SOP Development	Standard Operating Procedures for Central and State Water Data Hubs
Data Standardization	SOPs for data definitions, metadata, quality, inter-operability
State Ranking	Regular ranking of states based on water data published

Activity	Details
CWMI Development	Comprehensive Water Management Index preparation

Pillar 2: Water Data Publishing

Activity	Details
Dataset Inventory	Detailed inventory of 1,000+ water datasets and producing organizations
Jal Shakti Data Portal	Data catalogue, metadata, quality as per open data standards
WIMS Streamlining	Automated data entry through APIs without manual intervention
API Development	APIs for direct access to water datasets
Satellite Data Repository	Storage for satellite data, remote sensing, and DEM data

Pillar 3: Water Data Visualizations

Activity	Details
Simple Visualization	Charts, maps, graphics for all water datasets
Trend Analysis	Time and space analysis across geographic levels
Data Analytics	Visualization of water data analytics for insights
Complex Visualization	Multi-dataset integration for greater insights
NHP Integration	Leverage visualizations from National Hydrology Project

Pillar 4: Water Data for Decision Support Systems

- Domain organizations responsible for developing DSS, models, applications
- NWIC provides open, integrated, shared water data support
- AI/ML and Big Data analysis support for water management
- Advanced tools development under Advanced NHP

Pillar 5: Water Data for Innovations in Water Sector

- Focus areas for innovation in water sector
- Public-private partnerships for innovation
- Technology adoption for water management
- Research and development support

3. WATER INFORMATION MANAGEMENT SYSTEM (WIMS)

System Overview

- **Full Name**: Water Information Management System
- **URL**: https://india-water.gov.in
- **Type**: Integrated web-based data collection platform
- **Access**: Authorized users only (government agencies and stakeholders)
- **Maintenance**: Developed and maintained by NWIC

WIMS Functionality

- **Data Storage**: Central server for all water-related data
- **Data Frequency**: Six-hourly water level data recording
- **Telemetry Integration**: Connects with Digital Water Level Recorders (DWLR)
- **Real-time Capability**: Live data transmission and processing
- **Multi-agency Platform**: Different agencies and stakeholders update data
- **API Integration**: Automated data entry without manual intervention

WIMS Data Categories

1. **Groundwater Level Data**: Six-hourly measurements from telemetry systems
2. **Surface Water Data**: River flow, reservoir levels, water quality
3. **Meteorological Data**: Rainfall, evapotranspiration, temperature
4. **Water Quality Data**: Physical, chemical, biological parameters
5. **Administrative Data**: Project boundaries, infrastructure details

4. NATIONAL WATER DATA PORTAL (NWDP)

Portal Overview

- **URL**: https://nwdp.nwic.in
- **Purpose**: Public access platform for water data download
- **Data Format**: CSV files, API endpoints available
- **Coverage**: All 29 states and union territories
- **Update Frequency**: Real-time and periodic updates

Available Datasets by Category

Groundwater Level Data (2021-2025)

Six-Hourly Telemetry Data Available for All States:

- Andhra Pradesh
- Arunachal Pradesh
- Assam
- Bihar
- Chhattisgarh
- Chandigarh
- Delhi
- Goa
- Gujarat
- Haryana
- Himachal Pradesh
- Jharkhand
- Jammu & Kashmir
- Karnataka
- Kerala
- Maharashtra
- Meghalaya
- Madhya Pradesh
- Nagaland
- Odisha
- Punjab
- Puducherry
- Rajasthan
- Tamil Nadu
- Tripura
- Telangana
- Uttarakhand
- Uttar Pradesh
- West Bengal

Surface Water Quality Data

- **Source Agencies**: CWC, CPCB
- **Parameters**: Physical, chemical, biological parameters
- **Frequency**: Daily, monthly, seasonal monitoring
- **Geographic Coverage**: Major rivers, lakes, reservoirs

Soil Data

- **Daily Soil Data**: Moisture content, temperature, salinity
- **Coverage**: Agricultural regions, watershed areas
- **Applications**: Irrigation planning, crop management

Meteorological Data

- **Rainfall Data**: Historical and real-time precipitation
- **Evapotranspiration**: District-level ET data
- **Temperature**: Surface and air temperature measurements
- **Humidity**: Relative humidity measurements

5. INDIA-WRIS PLATFORM INTEGRATION

Platform Overview

- **URL**: https://indiawris.gov.in/wris/
- **Integration**: Seamlessly integrated with WIMS database
- **Purpose**: Data dissemination platform for public access
- **Technology**: Built on ArcGIS Server and ArcGIS platforms
- **Launch**: Revamped version launched July 30, 2019

India-WRIS Features

- **GIS Layers**: 130+ layers with 700+ attributes
- **Time Series Data**: 5-100 years depending on theme
- **Real-time Integration**: Connected to telemetry networks
- **Scale**: 1:50,000 scale for all new database creation
- **Projection**: WGS-84 datum and LCC projection

India-WRIS Modules

Static Modules

1. **Administrative Boundaries**: State, district, block boundaries

2. **Watershed Information**: Basin and sub-basin delineation

3. **Land Use/Land Cover**: Detailed land classification

4. **Geology and Hydrogeology**: Geological formations, aquifer mapping

5. **Topography**: Digital Elevation Models, contours

Semi-Dynamic Modules

1. **Litholog Data**: Borehole lithological information

2. **Aquifer Mapping**: Groundwater aquifer characteristics

3. **PMP Atlas**: Probable Maximum Precipitation data

4. **Reservoir Sedimentation**: Sediment accumulation studies

5. **Surface Water Bodies**: Waterbody mapping and classification

Dynamic Modules

1. **Real-time Telemetry**: Live groundwater and surface water data

2. **Reservoir Monitoring**: Current storage levels and inflows

3. **Weather Data**: Current meteorological conditions

4. **Water Quality**: Latest quality monitoring results

5. **Flood Information**: Real-time flood monitoring and forecasting

WRIS Tools and Utilities

Water Utilities (9 Major Tools)

1. **Data/Report Download**: Tabular data download functionality

2. **Data Availability**: Information on available datasets

3. **Feedback System**: User feedback and query management

4. **GEO Viewer**: Intuitive spatial data visualization

5. **Artificial Recharge Structure**: ARS data entry and management

6. **PMP Atlas Data Entry**: Precipitation data management

7. **WRIS WIKI**: Documentation and help system

8. **Meta Data**: Dataset metadata and documentation

9. **Mobile App**: Mobile application for field data collection

Specialized Tools

- **Online Feature Editor**: States can update irrigation projects
- **ARS Editor Module**: Update artificial recharge structure data
- **Map Generation**: Automated map creation as per area selection
- **Web Map Services**: Standardized web mapping services
- **3D Visualization**: Google Earth integration for 3D views

6. COMPREHENSIVE WATER MANAGEMENT INDEX (CWMI)

CWMI Overview

- **Developer**: NITI Aayog in collaboration with Ministry of Jal Shakti
- **First Launch**: June 2018
- **Purpose**: Annual snapshot of water sector status and management performance
- **Scope**: All states and union territories in India
- **Current Status**: Under review for continuation vs. discontinuation

CWMI Framework

- **Total Themes**: 9 major themes
- **Total Indicators**: 28 different indicators
- **Data Sources**: Both central and state government sources
- **Validation**: Independent Validation Agency (IPE Global)
- **Collaboration**: 24 states participated in data compilation

Nine CWMI Themes

1. **Source Augmentation and Restoration**: Waterbody restoration initiatives
2. **Source Augmentation (Groundwater)**: Groundwater enhancement measures
3. **Major and Medium Irrigation**: Supply side management
4. **Watershed Development**: Supply side management
5. **Participatory Irrigation Practices**: Demand side management
6. **Sustainable On-farm Water Use**: Demand side management
7. **Rural Drinking Water**: Access and quality metrics
8. **Urban Water Supply and Sanitation**: Municipal water services
9. **Policy and Governance**: Institutional framework assessment

CWMI Results and Impact

- **State Performance**: 80% of states improved water management scores
- **Average Improvement**: +5.2 points across participating states
- **Low Performers**: 16 out of 27 states scored less than 50 points
- **Population Impact**: Low-performing states account for ~48% of India's population

7. DATA VISUALIZATION AND ANALYTICS

Visualization Capabilities

- **Chart Types**: Bar charts, line graphs, pie charts, scatter plots
- **Map Visualizations**: Choropleth maps, bubble plots, heat maps
- **Time Series Analysis**: Trend analysis over multiple years
- **Spatial Analysis**: Geographic pattern analysis
- **Comparative Analysis**: State-wise and basin-wise comparisons

Advanced Analytics Features

- **Water Budgeting**: Macro-level water balance calculations
- **Evapotranspiration Modeling**: District-level ET estimates
- **Soil Moisture Analysis**: Real-time soil moisture monitoring
- **Drought Assessment**: Drought monitoring and early warning
- **Flood Analysis**: Flood risk assessment and inundation mapping

Decision Support Tools

- **District Snapshots**: Comprehensive district-wise water profiles
- **Basin Reports**: Detailed river basin analysis
- **Trend Analysis**: Long-term water resource trends
- **Performance Metrics**: Water management performance indicators
- **Scenario Modeling**: Future water availability projections

8. API SERVICES AND DATA ACCESS

API Catalog Features

- **REST APIs**: Standard REST API endpoints for data access

- **Data Formats**: JSON and XML format support

- **Authentication**: Secure API access with authentication

- **Rate Limiting**: Controlled access to prevent abuse

- **Documentation**: Comprehensive API documentation

Available API Services

1. **Groundwater Level API**: Real-time and historical groundwater data

2. **Surface Water API**: River flow and reservoir data

3. **Water Quality API**: Water quality monitoring data

4. **Meteorological API**: Weather and climate data

5. **Administrative API**: Boundary and infrastructure data

Data Download Capabilities

- **Bulk Download**: Large dataset download functionality

- **Filtered Download**: Area and time-based data filtering

- **Format Options**: Multiple file format options (CSV, JSON, XML)

- **Metadata Inclusion**: Complete metadata with downloaded data

- **Real-time Access**: Live data access through APIs

9. STATE WATER INFORMATICS CENTRES (SWIC)

SWIC Concept and Objectives

- **Purpose**: Empower states with digital, validated, online water resources information

- **Establishment**: State-level nodes of NWIC

- **Integration**: Connected to central NWIC platform

- **Data Federation**: Seamless data sharing between state and central systems

SWIC Functionality

- **Local Data Management**: State-specific water data management

- **Data Validation**: Local validation of water-related information

- **Reporting**: State-specific water resource reports

- **Visualization**: State-level dashboards and visualization tools

- **Capacity Building**: Training and technical support for state officials

SWIC Implementation

- **MoAs**: Memorandums of Agreement with implementing agencies
- **Progressive Integration**: Phased incorporation of state data
- **Technical Support**: NWIC provides technical assistance
- **Standards Compliance**: Adherence to national data standards

10. MONITORING NETWORKS AND DATA SOURCES

Groundwater Monitoring Network

- **CGWB Network**: 25,000 National Hydrograph Network Stations (NHNS)
- **Measurement Frequency**: 4 times per year (March/April/May, August, November, January)
- **DWLR Installation**: 5,260 Digital Water Level Recorders under NHP
- **New Piezometers**: 7,000 under PIB project + 2,000 under GWMR scheme
- **Telemetry Systems**: Real-time data transmission capability

Surface Water Monitoring

- **CWC Network**: Hydrological observation stations nationwide
- **Reservoir Monitoring**: 161 important reservoirs tracked by CWC
- **Real-time Data**: Live telemetry from water level monitoring stations
- **Flow Measurement**: River discharge and flow monitoring
- **Flood Forecasting**: Real-time flood monitoring and forecasting network

Water Quality Monitoring

- **CGWB Quality Network**: 15,259 groundwater quality monitoring locations
- **CWC Surface Water**: Surface water quality monitoring stations
- **CPCB Integration**: Central Pollution Control Board data integration
- **Parameters**: 85+ water quality parameters monitored
- **Frequency**: Regular monthly and quarterly monitoring

11. CLIMATE RESPONSE MONITORING NETWORK (CRMN)

CRMN Overview

- **Establishment**: Under National Hydrology Project by CGWB

- **Geographic Focus**: Tamil Nadu & Puducherry coastal tracts

- **Purpose**: Groundwater conditions and seawater intrusion monitoring

- **Coverage**: 450 km coastline length

CRMN Technical Specifications

- **Piezometers**: 60 piezometers with telemetric DWLR systems

- **Depth Range**: 30 to 300 meters depending on aquifer characteristics

- **Distance from Coast**: 100 meters to 34 kilometers inland

- **Districts Covered**: 12 districts in Tamil Nadu + 2 regions in Puducherry

CRMN Data Capabilities

- **Real-time Monitoring**: Water level, quality (Electrical Conductivity), temperature

- **Data Frequency**: Every six hours transmission

- **Parameters**: Groundwater level, electrical conductivity, temperature

- **Climate Response**: Effect of climate on groundwater conditions

- **Seawater Intrusion**: Real-time detection and monitoring

12. WATER DATA INVENTORY AND DATASETS

Complete Data Inventory (1000+ Datasets Target)

Spatial Datasets

1. **Administrative Boundaries**: All levels from national to village

2. **River Networks**: Complete river system mapping

3. **Watershed Boundaries**: Basin and sub-basin delineation

4. **Irrigation Infrastructure**: Canals, distributories, field channels

5. **Water Bodies**: Reservoirs, tanks, ponds, lakes mapping

6. **Groundwater**: Aquifer mapping, well locations

7. **Land Use/Cover**: Detailed land classification

8. **Topographical**: DEM, contours, slopes

9. **Geological**: Rock formations, soil types

10. **Climate**: Rainfall zones, temperature zones

Non-spatial Datasets

1. **Time Series Data**: 5-100 years of historical records

2. **Groundwater Levels**: Long-term water level trends

3. **Surface Water Flow**: River discharge measurements

4. **Reservoir Storage**: Historical storage data

5. **Water Quality**: Physical, chemical, biological parameters

6. **Meteorological**: Rainfall, temperature, humidity records

7. **Irrigation Statistics**: Area, efficiency, crop patterns

8. **Water Use**: Sectoral water consumption data

9. **Population**: Demographic data for water planning

10. **Economic**: Water-related economic indicators

Real-time Data Streams

- **Telemetry Data**: Six-hourly automated measurements

- **Weather Stations**: Current meteorological conditions

- **Reservoir Levels**: Real-time storage monitoring

- **River Flows**: Live discharge measurements

- **Water Quality**: Continuous quality monitoring

- **Flood Alerts**: Real-time flood warnings

13. TECHNICAL INFRASTRUCTURE

Technology Stack

- **GIS Platform**: ArcGIS Server and ArcGIS Online

- **Database**: Centralized SQL database systems

- **Web Technologies**: Modern web-based interface

- **Mobile Platform**: Mobile applications for field data collection

- **API Framework**: RESTful web services

- **Security**: Multi-layer security implementation

Data Standards and Formats

- **Spatial Reference**: WGS-84 datum, LCC projection

- **Scale Standards**: 1:50,000 for new database creation

- **Data Formats**: Shapefile, GeoJSON, CSV, XML, JSON

- **Metadata Standards**: International metadata standards compliance

- **Quality Standards**: Data quality assessment and validation protocols

Integration Capabilities

- **Multi-agency Integration**: Seamless data integration from multiple sources
- **Real-time Processing**: Live data processing and dissemination
- **Historical Archives**: Long-term data storage and retrieval
- **Backup Systems**: Redundant data backup and recovery
- **Performance Optimization**: High-performance data serving capabilities

14. CAPACITY BUILDING AND TRAINING

Training Programs

- **NWIC Training**: Regular training workshops for stakeholders
- **Technical Training**: GIS and database management training
- **Capacity Building**: Institution strengthening programs
- **User Training**: End-user training for portal navigation
- **Advanced Training**: Specialized technical skill development

Documentation and Support

- **User Manuals**: Comprehensive user guides and documentation
- **Help Systems**: Online help and support systems
- **Video Tutorials**: Step-by-step video guidance
- **Technical Support**: Dedicated helpdesk support
- **Best Practices**: Knowledge sharing and best practice documentation

15. COLLABORATION AND PARTNERSHIPS

Central Agency Partnerships

1. **Central Water Commission (CWC)**: Surface water data and infrastructure
2. **Central Ground Water Board (CGWB)**: Groundwater monitoring and assessment
3. **India Meteorological Department (IMD)**: Weather and climate data
4. **National Remote Sensing Centre (NRSC)**: Satellite data and remote sensing
5. **Central Pollution Control Board (CPCB)**: Water quality monitoring
6. **Survey of India (SOI)**: Topographical and survey data

State Government Collaborations

- **State Water Departments**: Primary data providers and users
- **State Pollution Control Boards**: Water quality data
- **State Remote Sensing Centres**: State-specific satellite data
- **Irrigation Departments**: Irrigation infrastructure and usage data
- **Revenue Departments**: Administrative boundary data

International Collaborations

- **World Bank**: National Hydrology Project support
- **International Research Institutes**: Technical collaboration
- **UN Agencies**: Global water initiatives participation
- **Bilateral Agreements**: Data sharing with neighboring countries

16. FUTURE ROADMAP AND DEVELOPMENT

Planned Enhancements

- **AI/ML Integration**: Artificial intelligence for water management
- **Big Data Analytics**: Advanced analytics capabilities
- **IoT Integration**: Internet of Things for enhanced monitoring
- **Mobile Applications**: Enhanced mobile platform development
- **Blockchain**: Data security and transparency through blockchain

Expansion Plans

- **District Level Data**: Expansion to district-level detailed information
- **Urban Water Systems**: Enhanced urban water management modules
- **Climate Change**: Climate change impact assessment tools
- **Water Trading**: Virtual water trade analysis capabilities
- **Predictive Analytics**: Future water scenario modeling

Innovation Initiatives

- **Hackathons**: Water-related innovation challenges
- **Startup Collaboration**: Partnership with water technology startups
- **Research Partnerships**: Academic and research institution collaboration
- **Technology Pilots**: Testing and implementation of new technologies
- **Open Innovation**: Open source development initiatives

This comprehensive database represents the complete collection of water data and information systems managed by NWIC (National Water Informatics Centre), including all associated platforms, datasets, monitoring networks, and technological infrastructure. The system encompasses over 1,000 spatial and non-spatial datasets, real-time monitoring from 25,000+ stations, and comprehensive water management information for all Indian states and union territories.

Primary Data Sources:

- National Water Informatics Centre (NWIC)

- Water Information Management System (WIMS)

- National Water Data Portal (NWDP)

- India Water Resources Information System (India-WRIS)

- Central Ground Water Board (CGWB)

- Central Water Commission (CWC)

- Ministry of Jal Shakti, Government of India