



NWIC Delivers Nationwide Water Information through a Single Window with ArcGIS

Client

The National Water Informatics Centre (NWIC)

Organization Profile

The National Water Informatics Centre (NWIC) is a subordinate office under the Ministry of Jal Shakti, Department of Water Resources, RD & GR with a mandate for timely and reliable water resources data acquisition, storage, collation & management and to provide tools for informed decision making for management of water resources of the country.

Project

Web based Water Geo-Hub on ArcGIS Server and ArcGIS Platforms.

Highlights

Esri India helped NWIC to achieve the following objectives:

- Build a comprehensive “Water Resources Information System” (WRIS) in the public domain towards making it easily available to users.
- Provide authoritative, and consistent data and information on India’s water resources and allied themes for planning, development, and management of water resources in the country.
- Development of a decision support system for informed decision making and strengthening the capacity of targeted water resources professionals and management institutions in India.
- Facilitate seamless collaboration with national/international research institutes and other agencies.

Website

www.indiawris.gov.in

Project Summary

The management of water resources is a highly complex and tedious task that involves the expertise of multidisciplinary domains and depends on reliable data and information which is accessible to all the stakeholders. Considering the challenges involved in the water resources sector, the Government of India took an initiative for developing a centralized platform to act as a repository of water resources and related data at the national level with administrative granularity up to the smaller units of governance at the state level as well as hydrological levels such as basin and sub basins. The first initiative towards the development of a centralized Water Resources information system under the project titled ‘Generation of database and implementation of web enabled water resources information system of India’ short named as India-WRIS WebGIS was undertaken in 2008 through collaborative effort of Central Water Commission (CWC) and National Remote Sensing Centre (NRSC). This was a standalone information system built on ArcGIS.

During 2016-17, the Government of India, through Department of Water Resources, River Development and Ganga Rejuvenation, Ministry of Jal Shakti (erstwhile Ministry of Water Resources, RD & GR) embarked upon a World Bank supported flagship program named National Hydrology Project with the objective of improving the extent, quality, and accessibility of water resources information, decision, basin level resource assessment/planning, development of decision support system and to strengthen the capacity of targeted water resources professionals and management institutions in India. On this foundation, India WRIS was revamped on the latest version of ArcGIS by integrating with the existing Water Information management System (WIMS) on a nationwide centralized database. A revamped and up-scaled India - WRIS was launched on 30th July 2019.

Esri India offered NWIC a Water Geo-Hub solution that encompassed software, application development, training, handholding, and support services. The solution provides nationwide water information to users through a “single window”, promoting a free exchange of data among various central and state agencies, while delivering reliable and timely data and insights for comprehensive projections of future water, and facilitating informatics based sustainable development of water resource management along with value added products and services to all stakeholders.

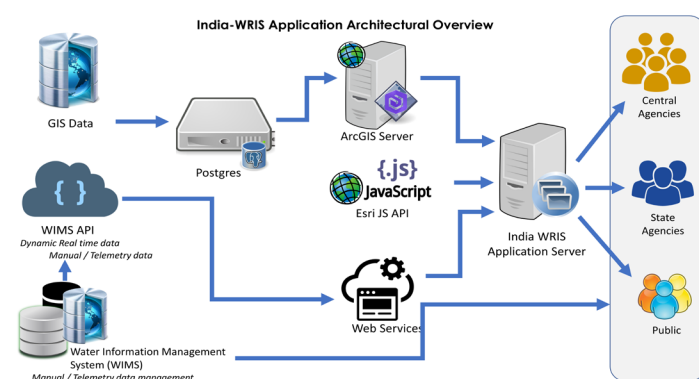
NWIC Mandate

Cutting across demand and supply, water challenges are becoming complex every passing day due to population growth, urbanization, excess withdrawals, and losses, while climate change, extreme weather events, deforestation, and pollution are worsening the situation further. India-WRIS is an important element to address these challenges, bringing all relevant water data on one nationwide platform, making information available to users and creating the basis for better management of our water resources. India-WRIS addresses the following challenges:

- Collection of available data from varied sources, generate new database, organize in standardized GIS format and provide scalable web enabled information system.
- Provision of standardized tools to create value added maps by way of multi-layer stacking of GIS database so as to provide an integrated view of the water resources scenarios.
- Facilitate easier, faster access, sharing of nationally consistent and authentic water resources data through a centralized database and application server to all water resources departments/ organizations.
- Build a foundation for advanced modeling and Spatial Decision Support Systems (SDSS) including an automated data collection system.

Solution

India Water Resource Information System (India-WRIS) is a web GIS-based application on the ArcGIS Server for scientific assessment of the water resources, development of analytical tools and Decision Support System (DSS) for informed decision making.



As a national Water Geo-Hub, India-WRIS maps the common ground for sustainable water resource management in the country. By providing nationwide water information to users through a “single window”, promoting free exchange of data among various central and state agencies, while delivering reliable and timely data and insights for

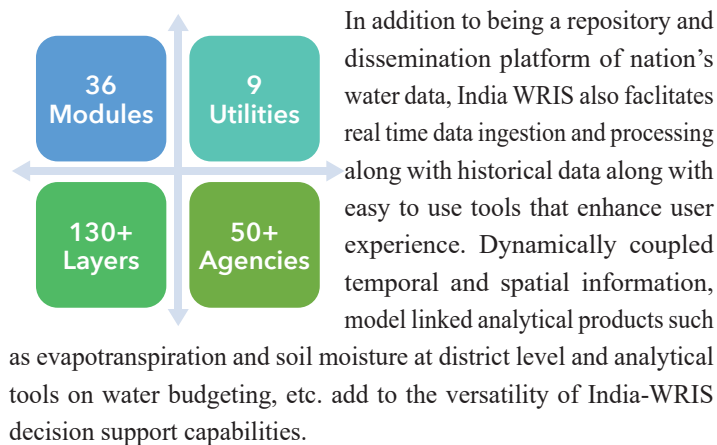
comprehensive projections of future water, India-WRIS facilitates informatics based sustainable development of water resource management along with value added products and services to all stakeholders.

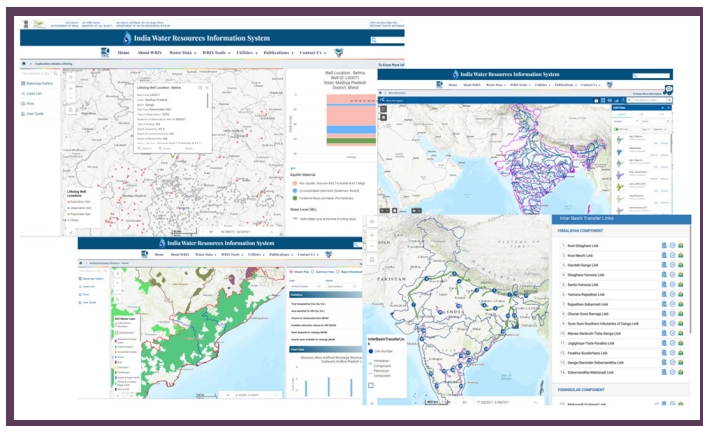
The current version of India-WRIS is in process to be integrated with the Water Information management System (WIMS). With addition of new modules wherein data from automated data acquisition systems established by CWC and CGWB is disseminated along with improvement in the previously existing modules, data through WIMS is fetched in real-time in a handshake mode to disseminate current data in the portal.

India-WRIS provides access to diverse multiyear datasets (5-100 years) along with a large number of attributes and temporal data sets of various inhouse/agency/archive and allows users to Search, Access, Analyze, Visualize, Understand and Analyse comprehensive and contextual water data for the assessment, monitoring, planning and development of water resources for Integrated Water Resources Management (IWRM).

Water Data

India-WRIS provides comprehensive water data including rainfall, snowfall, geo-morphology, climate, geology, surface water, ground water, water quality, ecology, water extraction and use, irrigated area, glaciers, etc., allied themes along with project information, fostering and promoting an integrated approach to Water Resources Management. Extending geospatial infrastructure capabilities for publishing, Jal IITI HAS is an innovative story telling tool powered by ArcGIS for capturing heritage and cultural references of water structures for increasing public awareness.



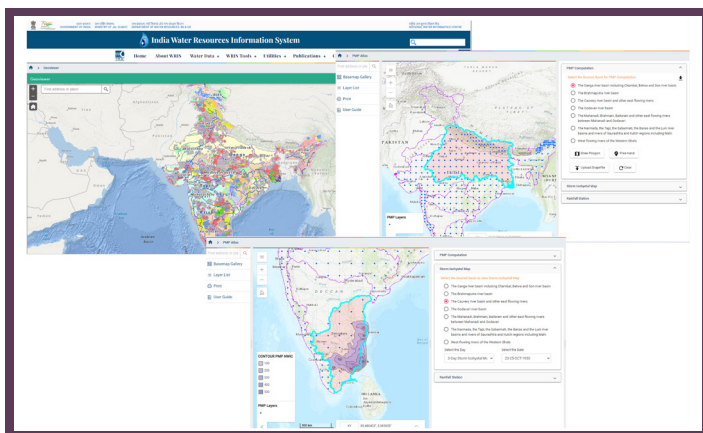


WRIS Tools

Ready to use WRIS tools strengthen collaboration and participatory management of water resources. “Online Feature Editor” enables states to update irrigation projects through secure access to the ArcGIS portal. The “ARS - Editor module” enables states, and central agencies to update and ingest the attribute data related to artificial recharge structures (ARS) under various schemes directly into the India WRIS database while consolidating the nationwide conservation/augmentation efforts made by different agencies at a single location.

Water Utilities

Water Utilities provide users information regarding Data Availability along with dashboards and tools for data/report download, district snapshots and meta data created through ArcCatalog as an XML. Powered by commonly used spatial queries Geo Viewer and PMP Atlas provide intuitive user-friendly visualization of the data sets and analytics.



- Rainfall (mm)
- Reservoir (Level)
- River Points (Level & Discharge)
- Ground Water Level (BGL Meter)
- Water Quality - Groundwater
- Water Quality - Surface water
- Water Audit
- Evapotranspiration (mm)
- Soil Moisture (%)
- Minor Irrigation Tanks
- Coastal Informative System

Dynamic Modules

- Groundwater Resources
- Snow Glacial Lake
- Water Resources Project
- Minor Irrigation Census
- Inland Navigation Waterways
- Inter Basin Transfer Links
- District at a glance
- LULC
- Wasteland
- Wet Land
- Water Tourism

Semi Dynamic Modules

- Data / Report Download (Tabular)
- Data Availability
- Feedback
- GEO Viewer
- Artificial Recharge Structure
- PMP Atlas Data Entry
- WRIS WIKI
- Meta Data
- Mobile App
- Online Editor

Utilities and Tool

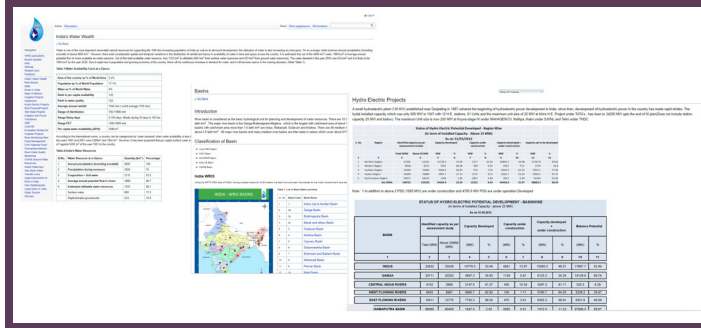
- Litholog
- Aquifer
- Probable Maximum Precipitation Atlas
- Reservoir Sedimentation studies
- Surface Water Bodies
- River Basin System
- Socio Economic Census
- Extreme Events Flood Inundation / Drought Prone Area Program / Earthquake
- Groundwater Prospects
- Region Agro Climatic / Agro Ecological
- Soil
- Land Degradation
- Water Logging & Soil Salinity

Static Modules

Modules of India-WRIS

Collaborative Knowledge Platform

As a Collaborative Knowledge Platform sharing updated information regarding the various aspects of the water resources of the nation, WRS Wiki customized on wiki framework provides access to comprehensive water information and knowledge.



Publications

Publications section brings together all the water related literature and publications including Atlas, Basin Reports, Compendium, Groundwater, Pre-generated Maps, Project Documents, Wasteland Distribution Atlas, Waterlogging and Salinity Assessment, NWMP Data of CPCB (2012-2017). A library of various publications of organisations under Ministry of Jal Shakti is displayed under Research and Development section of Publications.

The screenshot shows the 'Publications' section of the India Water Hub. It lists various publications under different categories like Atlas, River Basin Report Download, and Historical Water Quality Data of Agency CPCB. Each entry includes a title, a brief description, and a download link.

S.No.	Document Name	Download
1.	River Basin Atlas of India	Download
2.	Watershed Atlas of India	Download
3.	Glacial Lake Atlas of Indus River Basin	Download
4.	Glacial Lake Atlas of Ganga River Basin	Download
5.	Historical Water Quality Data of Agency CPCB	Download

Benefits

As a one-stop solution for contextualized water resource information management and decision support, India-WRS provides capabilities for data management, mapping and visualization, analysis, and discovery with automation tools for creating, analysis, managing and sharing of water resource information. India-WRS acts as a force multiplier to strengthen India's water security and resilience by:

- Acting as a single window information source for decision makers, water managers, experts and the public.

- Mapping a common ground for a common understanding and positive action.
- Providing deeper contextualization of all the factors responsible for understanding the relationships and linkages spatially and temporally.
- Bridging the gaps by connecting data and science to the decision-makers.
- Ensuring collective problems solving by fostering participative management and collaboration.
- Creating public awareness about the crucial issues related to water and attract wider participation in water resource management.

Esri India presented National Water Informatics Centre (NWIC) with a comprehensive Water Geo-Hub solution that includes software, application development, training, handholding, and support services. This solution offers users nationwide access to water information through a single window, promoting the free exchange of data among various central and state agencies., while delivering reliable and timely data and insights for comprehensive projections of future water, and facilitating informatics based sustainable development of water resource management along with value added products and services to all stakeholders. Esri India played a crucial role in assisting NWIC in achieving its objectives. Additionally, Esri India facilitated seamless collaboration with national and international research institutes and other agencies. Thanks to the efforts of Esri India, NWIC was able to achieve its objectives and establish a robust water resources information system that would benefit the country's water management efforts.

- Mr. Goutam Bhati, Team Lead (GIS development), NWIC