



INFORMATION BROCHURE



NATIONAL INSTITUTE OF HYDROLOGY

An ISO-9001:2015 Certified Organization

(Department of Water Resources, River Development and Ganga Rejuvenation, Ministry of Jal Shakti, Government of India)



आपो हि ष्ठा मयोभुवः

आपो हि ष्ठा मयोभुवस्था न उर्जे दधातन महे रणाय चक्षसे ॥१॥

ऋग्वेद (Rig Veda)

हे जल! आपकी उपस्थिति से वायुमंडल बहुत तरोताजा है, और यह हमें उत्साह और शक्ति प्रदान करता है।
आपका शुद्ध सार हमें प्रसन्न करता है, इसके लिए हम आपको आदर देते हैं।

**O Water, because of your presence, the atmosphere is so refreshing, and imparts us with vigour and strength.
We revere you who gladdens us by your pure essence.**

THE INSTITUTE

National Institute of Hydrology (NIH) is a premier Research and Development organization under the Ministry of Jal Shakti, Department of Water Resources, River Development and Ganga Rejuvenation, Government of India. It was established as an autonomous Society in 1978 with its headquarters at Roorkee. The Institute has carries out a significant number of demand-driven, user-defined, and strategic studies such as:-

- Basic and applied research
- Sponsored research
- Advisory services to NGT & judiciary
- Software and Web development
- Capacity building and training activities
- Inputs in policy making
- Consultancy studies



OBJECTIVES

- To undertake, aid, promote and coordinate systematic and scientific work in all aspects of hydrology.
- To cooperate and collaborate with other national, foreign and international organization in the field of hydrology.
- To establish and maintain a research and reference library in pursuance of the objectives of the Society and equip the same with books, reviews, magazines and other relevant publications.
- To do all other such things as the Society may consider necessary, incidental or conducive to the attainment of the objectives for which the Institute has been established.



VISION

Providing leadership in hydrologic research through effective R&D solutions for achieving sustainable development and self-reliance of the water sector in India.



MISSION

- Develop methodologies for optimum utilization of water resources and environment.
- Propagate applications of emerging technologies for water resources development and management.
- Find ways to save the society from water- related hazards.
- Develop mass awareness for water conservation and optimum water utilization.



Scientific Divisions

- The Institute has 6 theme-based scientific divisions encompassing all aspects of hydrology and is well-known nationally and internationally for pioneering projects and strategic studies in these field.
- The studies are carried out at the headquarters at Roorkee and the seven regional centers located at Belagavi, Jammu, Kakinada, Bhopal, Guwahati, Jodhpur and Patna.
- The main focus at the headquarters is on applied and user defined research, while the regional centers deal with the field oriented research topics and problems endemic to the hydrological regions in which they are located.



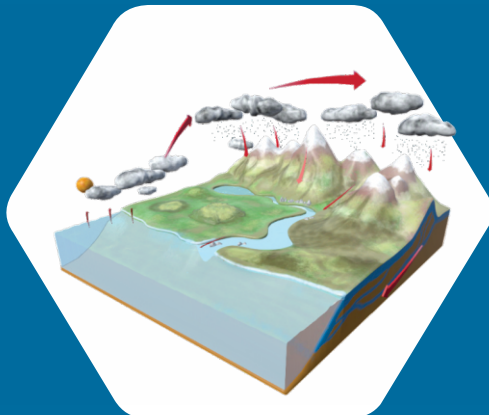
Centre for Cryosphere
and Climate Change Studies



Enviromental Hydrology



Ground Water Hydrology



Hydrological Investigations



Surface Water Hydrology



Water Resources Systems



Laboratories

The Institute has six state of the art laboratories with advanced monitoring and analytical instruments, which provide dynamic and broad-based research environment in different areas of hydrology.

- Hydrological instrumentation laboratory
- Hydro-meteorological observatory
- Nuclear hydrology laboratory
- Remote sensing and GIS Laboratory
- Soil water laboratory
- Water quality laboratory (NABL accredited)



IT Infrastructure

The Computer Centre of Institute is equipped with the latest configuration of computers for conducting complex hydrological analyses and modeling studies. The local area network (LAN) provides inter connectivity amongst the computers in different buildings of the campus. The Centre has implemented 1Gbps internet connectivity in the Institute under National Knowledge Network (NKN) framework. A dedicated web server (www.nihroorkee.gov.in) provides a platform for hosting the Institute information, hydrology related information, research publications, important, announcements, tender notices, jobs, etc. Wi-Fi arrangement in the Institute is also looked after by this Centre.

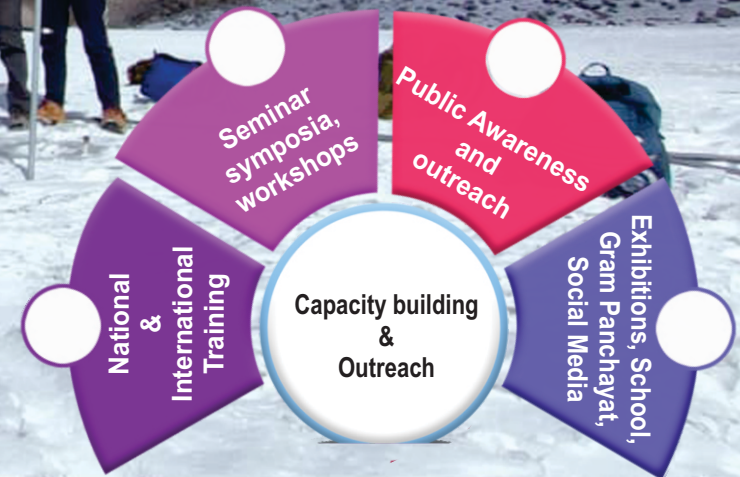
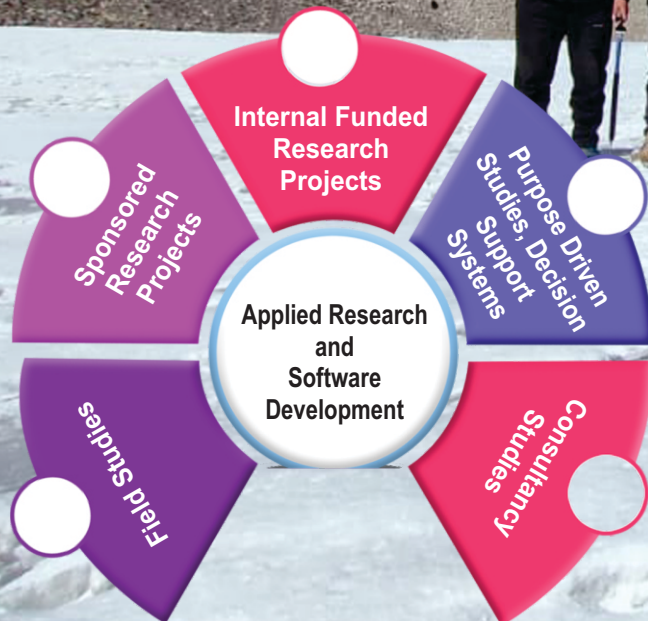
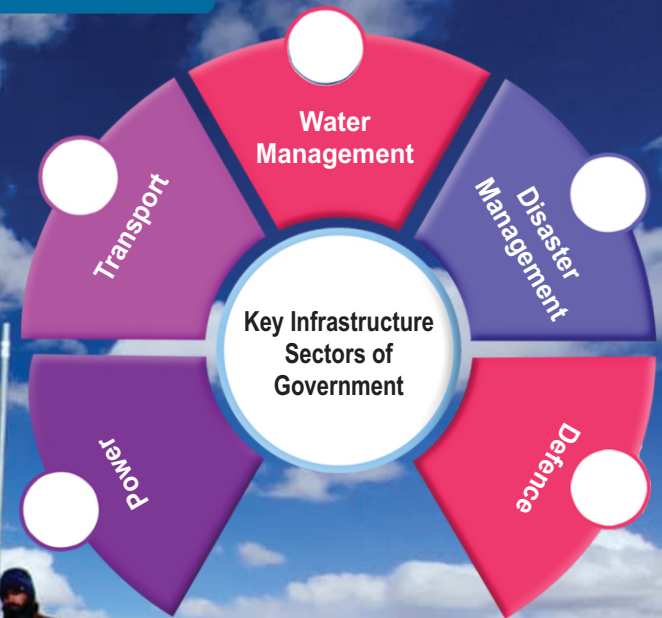
Thrust Areas of Research

The Institute hosts the Secretariat of Indian National Committee on Climate Change (INC-CC), The INC-CC supports funding of R&D projects on climate change and provides sponsorship of seminars, symposia, workshops, etc. The Institute also hosts the secretariat of Indian National Committee of Inter-governmental Hydrological Program. (INC-IHP) of UNESCO.

- Water Resources Planning and Management
- Ground Water Modeling and Management
- Flood and Drought Prediction and Management
- Snow and Glacier Melt Runoff Estimation
- Prediction of Discharge in Ungauged Basins
- Water Quality Assessment
- Hydrology of Arid, Semi-arid Regions
- Hydrology of Coastal & Deltaic Zones
- Reservoir/Lake Sedimentation
- Integrated Water Resource Management (IWRM)
- Springs Hydrology
- Isotope Hydrology
- Hydrology for Arid Region
- Cryosphere Research
- Forest Hydrology & Urban Hydrology
- Climate Change Studies in Hydrology
- Impact of Climate Change on Water Resources
- Modern Techniques to Solve Hydrological Problems
- Hydrology of Reservoir Lakes and Wetlands
- Hydrology of Extremes
- Environmental Hydrology
- Regional Hydrology
- Hydrology for Watershed Management



Contributing to Key Areas in Nation Building



Contributing to Key Infrastructure Sectors

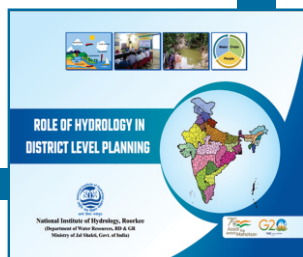
NIH has so far completed more than 230 sponsored research and consultancy projects. The sponsors included Indian Army, PSU's, Industries, Planning Commission, National Productivity Council, State Government Departments, and Central Ministries of Science & Technology, Earth Sciences, Environment & Forests, Agriculture, Rural Development, DST, etc.

Hydropower Sector

- GLOF-design flood
- Cumulative impact assessment
- Environmental flow assessment
- Assessment of power potential

Thermal/Nuclear Power Sector

- Flood safety studies
- Area drainage studies
- Impact on groundwater
- Hydrogeological studies
- Impact of ash disposal
- Rainwater harvesting



Defence Sector

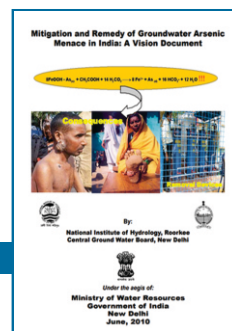
- GLOF/Cloudburst design flood estimate
- Discharge monitoring : Shyok river

Disaster Preparedness

- Dam break studies
- Emergency action plan : Hydro-power

Riverfront Design

- River front development plan



Transport Sector

- Bridges design for flood

Water Management

- Paleochannel mapping
- Aquifer mapping
- Deep groundwater recharge zone identification
- Lake conservation
- Wetland management
- Urban drainage planning
- Pond rejuvenation
- Eco-prudent wastewater solutions

Other Salient contributions to GoI Programs

- Hydraulic modelling for Brahmaputra riverfront development.
- Mapping of nallahs contributing to pollution of river Ganga
- Benchmarking indicators for watersheds.
- Tackling water logging problems in canal commands.
- Monitoring of potential hazards of industrial development in Singrauli area.
- State Specific Action Plan (SSAP) for water Sector under National Water Mission.
- Program on National Mission on Himalayan Studies (NMHS) for MoEF&CC.

Inputs in policy planning

- Vision document on mitigation and remedy of groundwater arsenic menace in India.
- Policy document on problems of salinization of land in coastal areas of India and suitable protection measures.
- Developed a plan on the use of treated wastewater from STP's in Delhi for groundwater recharge (MAR) at identified locations in NCT Delhi.
- Flood plain zoning plans for Haridwar and Uttarkashi (Uttarakhand).
- Contributed in the preparation and review of standards by Bureau of Indian Standards (BIS), NIH has contributed in preparation of an international standard on measurement of liquid flow in open channels-stage discharge relationship (ISO 9123) and contributed in the finalization of a standard on 'guidelines for measurement and control of sediments in natural lakes.
- Role of hydrology in district level planning.
- Guide book on S&T Intervention in pond rejuvenation.



National Collaborations

- Bhabha Atomic Research Centre (BARC)
- Central Water Commission (CWC)
- Central Ground Water Board (CGWB)
- Central Water and Power Research Station (CWPRS)
- Central Pollution Control Board (CPCB)
- Department of Science and Technology (DST)
- Department of Land Resources (DoLR)
- Indian Council of Agricultural Research (ICAR)
- Indian Institute of Remote Sensing (IIRS)
- Indian Institute of Science (IISc)
- Indian Institutes of Technology (IITs)
- India Meteorological Department (IMD)
- Indian Council of Forestry Research (ICFRE)
- Ministry of Environment, Forests and Climate Change (MoEF)
- Ministry of Earth Sciences (MoES)
- Ministry of Agriculture & Farmers Welfare (MoA)
- National Environmental Engineering Research Institute (NEERI)
- National Geophysical Research Institute (NGRI)
- National Institutes of Technology (NITs)
- National Water Academy (NWA)
- National Water Development Agency (NWDA)
- National Remote Sensing Centre (NRSC)
- National Mission for Clean Ganga (NMCG)
- NGOs and PSUs



International Collaborations

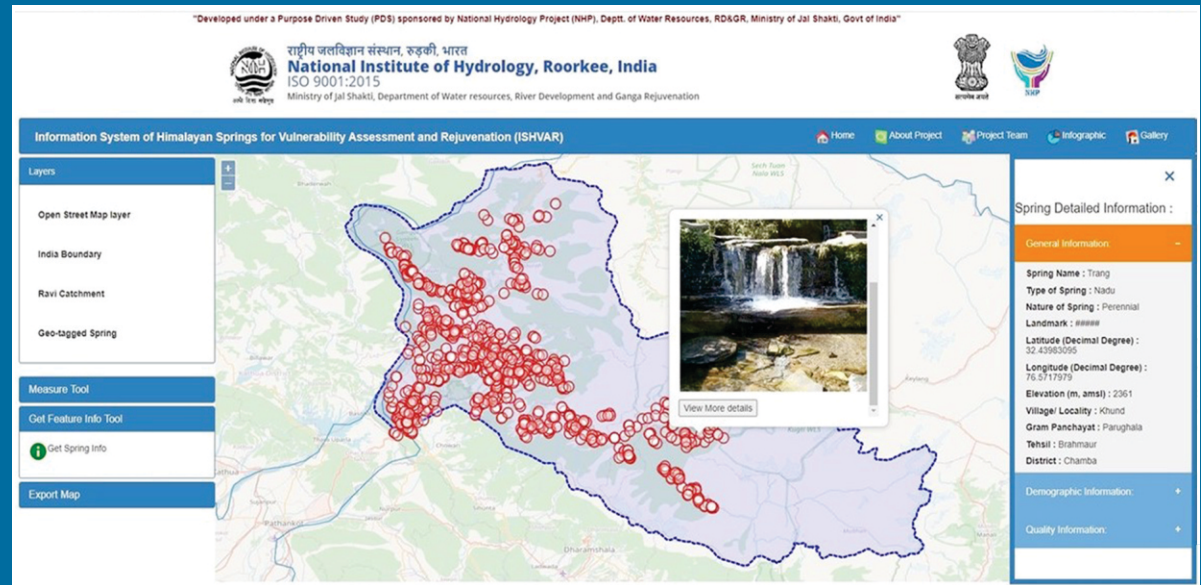
- British Geological Survey (BGS)
- British High Commission, UK
- Carleton University
- Cambridge University
- CentraleSupélec, Université Paris-Saclay, GeePs, France
- Commonwealth Scientific and Industrial Research Organization (CSIRO)
- Centre for Ecology and Hydrology (CEH)
- Dutch Research Council (NWO), Netherlands
- European Union (EU)
- Food and Agriculture Organization (FAO)
- HTW Dresden - University of Applied Sciences, Germany
- International Centre for Integrated Mountain Development (ICIMOD)
- International Atomic Energy Agency (IAEA)
- Indo-US Science & Technology Forum (IUSSTF)
- International Water Management Institute (IWMI)
- International Institute for Hydraulic and Environmental Engineering (IHE)
- International Institute for Applied Systems Analysis (IIASA)
- Natural Environment Research Council (NERC)
- Swedish Meteorological and Hydrological Institute (SMHI)
- The World Bank
- United Nations Development Program (UNDP)
- United Nations Educational, Scientific and Cultural Organization (UNESCO)
- World Meteorological Organisation (WMO)

Software and Web Applications Developed

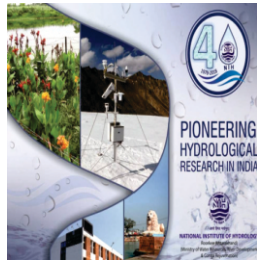
- NIH_ReSyP (NIH_Reservoir Systems Package)
- SNOMOD (Model for Snow-melt Modeling)
- WEGREM-WEB-Enabled Groundwater Recharge Estimation Model
- Web Enabled "Conjunctive Use Management Model using concept of MAR and ASR"
- NIH-ISHVAR • G-MCDA
- NIH-RFROM • FLPACK
- NIH-WISDM • UHPACK

Major R&D Projects

- | | |
|--|--|
| • NMSHE Project 2016-2022 Completed | • USAID Project 1993-1996 |
| • National Hydrology Project 2016 Ongoing | • UNDP Project-II 1991-1996 |
| • Neeranchal National Watershed Project 2016 | • Indo-Dutch Project WAMATRA 1990-1992 |
| • EU Project 'Saph Pani' 2011-2014 | • CEC funded Project 1987-91 |
| • Hydrology Project-II 2006-2014 | • UNDP Project-I 1979-1984 |
| • Hydrology Project-I 1995-2001 | • DST (GoI)-NOW 2019-ONGOING |
| • UNESCO Project 1993-1996 | • IC-ECOWS (DST) 2019-ONGOING |



Library & Documentation Services

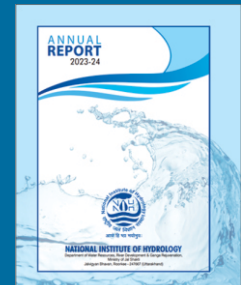
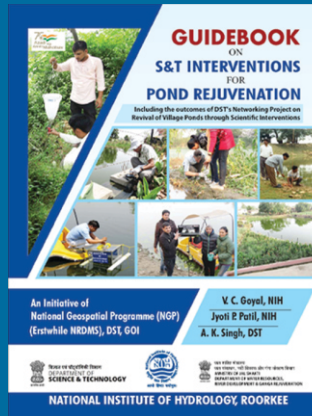
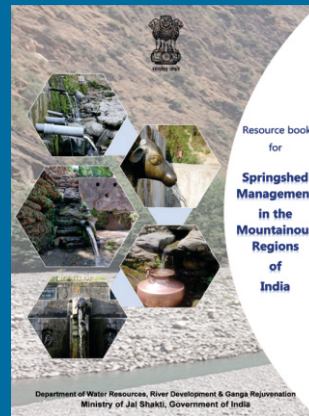
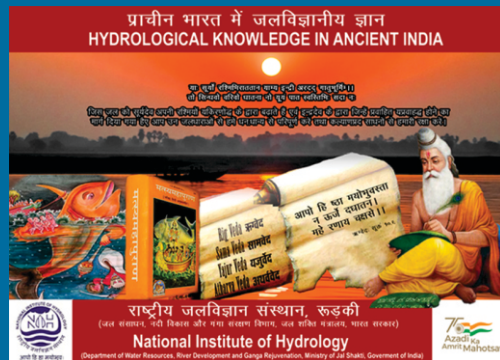


NIH Library maintains one of the world's most comprehensive collection of technical hydrology literature. This consists of published and unpublished documents, in print and electronic formats, by scientists working in many parts of the globe. Also, NIH has a well-rounded collection of materials (print, electronic, or other formats), dealing with other related subjects.

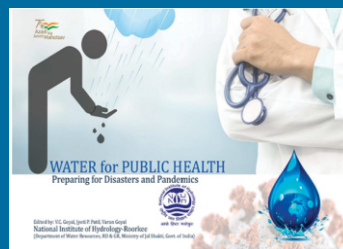
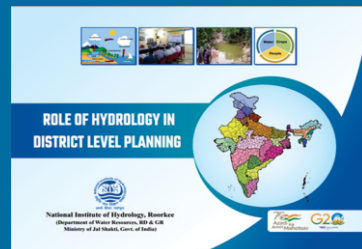
NIH is providing 'Library and Documentation Services' through a process of reproducing any available material and making it available to readers. It includes the periodicals and journals, documents and reprographical service.

An Institutional Digital Repository (IDR) is an online locus for collecting, preserving, and disseminating the intellectual output of an institution in digital form. NIH has recently established an IDR, hosting all NIH publications at one place.

Publications



NIH Publishes its research output in the form of various types of reports, books, chapters in books,



research papers in international and national peer reviewed journals, and in international and national conferences/symposium, seminars, workshops, etc. The institute has an impressive repertoire of published research work. NIH has produced more than 5000 research publications since its inception and the list is further growing.

Major Ongoing/Completed Projects & Studies



- National Hydrology Project (NHP)
- Future Secular Changes and Remediation of Groundwater Arsenic in the Ganga River Basin-FAR GANGA (Indo-UK)
- National Mission for Sustaining Himalayan Ecosystem (NMSHE)
- Neeranchal National Watershed Project (NNWP)
- Impact of Rainwater Harvesting on Groundwater Quality in India with Specific Reference to Fluoride and Micro-pollutants (Indo-UK)
- Innovation Centre for Eco-Prudent Wastewater Solutions (DST)
- Impact of LULC and Catchment Characteristics on Runoff and Groundwater Dynamics of Western Ghats Karnataka

- Hydrological Studies for Inter Linking of Rivers Water Quality
- Exploring and Managing Groundwater
- River Bank Filtration for Drinking Water Supply Glaciers and Permafrost Studies
- Impact of Climate Change on Water Resources Assessment in River Basins Development of Decision Support System (DSS-PM)
- Changing the fate of the Hindon River by evaluating the impact of the agriculture on the water balance developing a template for a cleaner Ganga River (DST-NWO)
- High Performance Advance Septic (HPAS) System for Villagers and Restaurants
- Environmental flow assessment for Chambal, Son, Damoder & Tons Rivers at critical reaches
- First Spring census of India

Large Projects at NIH

National Hydrology Project (NHP) (World bank funded: DoWR, RD & GR, MoJS, GoI)

The World Bank funded Hydrology Projects have been the central government initiatives and entail improving the planning, development and management of water resources, as well as flood forecasting and reservoir operations in real-time. The project completed in two phases (Phase I from 1996 to 2003 and Phase II from 2006 to 2014) has established the backbone of a comprehensive Hydrological Information System (HIS) in India, providing scientifically verified, uniformly accepted and widely accessed hydrological records covering all aspects of the hydrological cycle.

The Hydrology Project Phase-3, now named as National Hydrology Project (NHP) is a follow-on to the earlier Hydrology Project.

Role of NIH in NHP

- Nodal Agency for Demand Driven Research
- Nodal Agency for Training and Capacity building
- Training Courses on hydrological topics
- Training/Meetings and multi-media distance learning
- Centre of Excellence for Hydrological Modeling
- Development of Decision Support System (DSS) software.

Decision Support System (Planning & Management) DSS(PM)

Under the on going National Hydrology Project (NHP), development of the Decision Support System (Planning & Management) - DSS(PM) - is one of the major objective to provide the water management authorities with a structured, user friendly practical water resources management tool which includes the following components:

- Surface water and groundwater planning including conjunctive use, etc.
- Integrated operation of reservoirs
- Flood and drought management
- Water quality management and environmental flows

The DSS(PM) software integrates climatological and hydrological data with water simulation models, cost-benefit analysis, and multi-criteria analysis tools in order to address water resource management issues. The complete system is web-based with connections to some of the widely used software such as HEC-HMS, HEC-RAS, MIKE HYDRO BASIN, MODFLOW, QUAL2K, and NIH-ReSyP is developed at NIH.

National Mission for Sustaining Himalayan Ecosystem (NMSHE) (FUNDED BY MINISTRY OF SCIENCE OF TECHNOLOGY, GoI)

- Development of hydrological database in Upper Ganga basin
- Real-time snow cover information system for Upper Ganga basin
- Glacial Lakes & Glacial Lake Outburst Flood (GLOF) in Western Himalayan region
- Assessment of downstream impact of Gangotri glacier system at Dabrani and future run off variations under climate change scenarios
- Observation and modeling of various hydrological processes in a small watershed in Upper Ganga basin
- Hydrological modeling in Alaknanda basin and assessment of climate change impact
- Hydrological modeling in Bhagirathi basin up to Tehri dam and assessment of climate change impact
- Study of river - aquifer interactions and groundwater potential in the upper Ganga basin up to Dabrani
- Understanding of hydrological processes in study basin by using isotopic techniques
- Environmental assessment of aquatic ecosystem of upper Ganga basin
- Water census and hotspot analysis in selected villages in upper Ganga basin

Capacity Building/Training and Outreach Activities

The Institute vigorously pursues capacity development by way of organising specialized training programs on different aspects of hydrology. NIH has trained field engineers, scientists, researchers, and students, Organised International Seminars / Conferences / Workshops, Organised National Seminars/ Symposia/Workshops, and Organized Interaction Workshop/ Mass Awareness Programs.

Academic Activities

The Institute is recognized by several IIT's, IISc, Universities and other academic organizations for supervising research scholars and Ph.D. degree in hydrology and related subjects. Institute scientists have guided number of research scholars for Ph.D. degree and M.E./M. Tech./M.Sc. thesis. The scientists also provide their inputs to the academic programs through lecturers as guest/visiting faculty and working as examiners of Ph.D. and M.E./M. Tech. thesis and members of various committees as experts.



Future Outlook

Basic Research

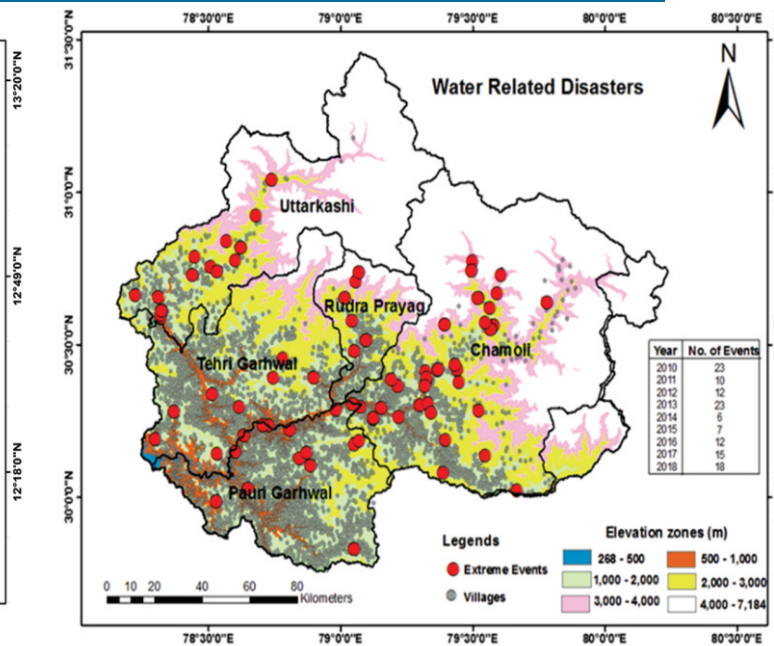
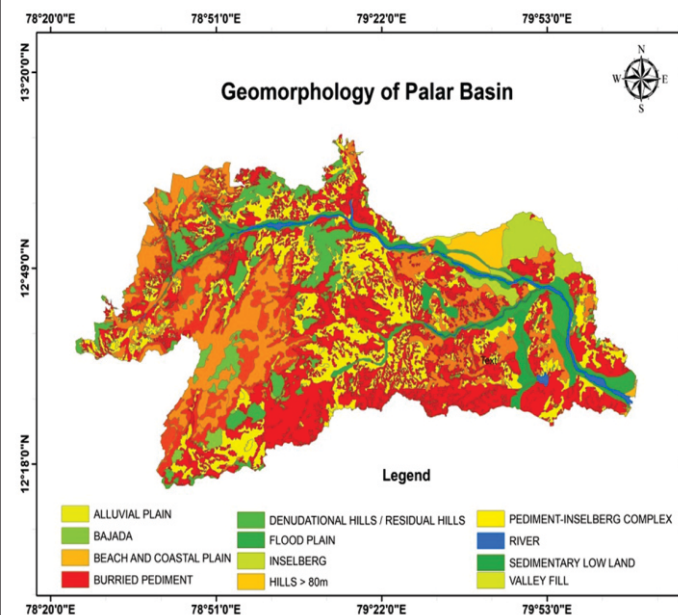
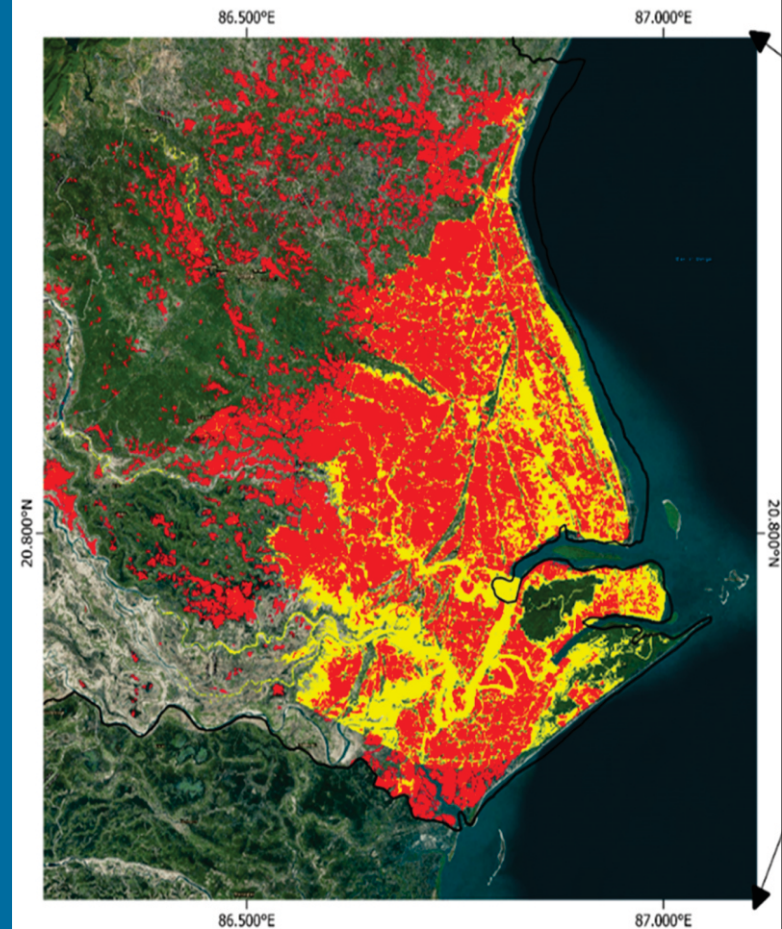
- Coastal groundwater dynamics
- Emerging contaminants, micro-pollutants geogenic contaminants and their impacts on water resources
- Hydrologic extremes
- Integrated assessment of water availability in river basins
- Impact of climate change on water resources.
- Water and food security assessment contribution to SDGs
- Reservoir sedimentation studies.
- Snow-glacier dynamics
- Understanding hydrological processes in the Himalayas
- Urban floods and storm water management
- Vadose zone hydrology

Use of Advanced Techniques and Tools

- Artificial intelligence, virtual water, Internet of Things (IoT).
- Decision Support Systems.
- Hydrologic analysis and design using soft computing.
- Isotopic investigations, use of satellite data for estimation of hydrological variables.
- Use of electronic sensors and data loggers at experimental catchments.
- Web based water resources information system.

Action Research

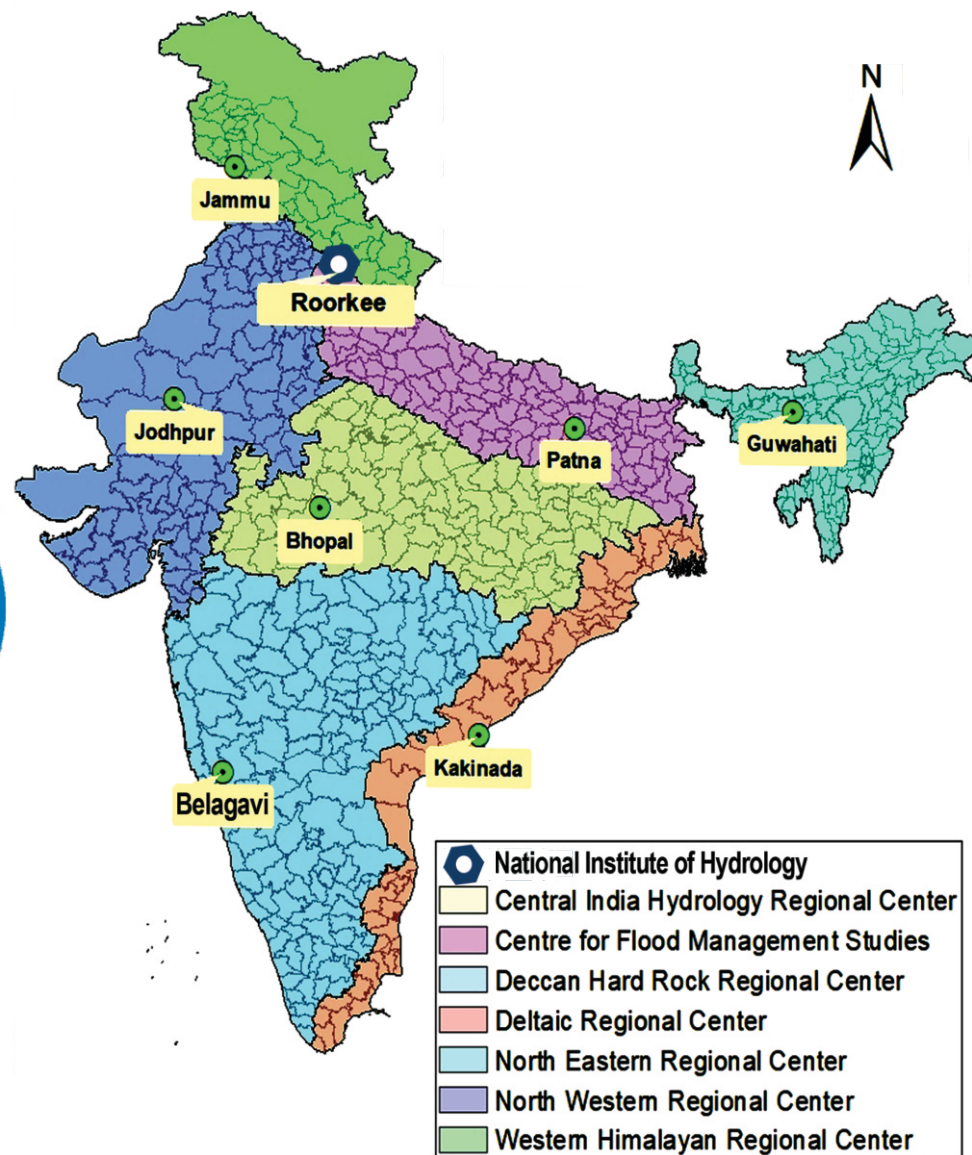
- Flood early warning systems.
- Lake/wetland rejuvenation.
- Managed Aquifer Recharge (MAR).
- Pond rejuvenation.
- River Bank Filtration (RBF).
- Spring rejuvenation.
- IWRM Plan for watersheds.




Regional Centres



To deal with the specific hydrological problems in different regions of the country and to effectively interact with the States.



Regional Centers



Hard Rock Regional Center
National Institute of Hydrology,
Main Road, Irrigation Colony,
Vishvesvaraya Nagar,
Belagavi- 590019 (Karnataka), India
Ph: 0831-2447714
Email: hrrc.nihr@gov.in

Western Himalayan Regional Centre
National Institute of Hydrology,
Irrigation & Flood Control Complex,
Jammu Cantt.-180003 (Jammu & Kashmir), India
Ph: 0191-2432619
Email: whrc.nihr@gov.in

Centre for Flood Managements Studies
National Institute of Hydrology,
Walmi Complex, Khagaul, PO Phulwari
Sharif, Patna-801505 (Bihar), India
Ph: 0612-2452219
Email: cfmsp.nihr@gov.in

Central India Hydrology Regional Centre
National Institute of Hydrology,
WALMI Complex, Near Kaliasot Dam,
Post Ravi Shankar Nagar
Bhopal- 462016 (Madhya Pradesh), India
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Email : cihr.nihr@gov.in

Deltaic Regional Centre
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Email: drc.nihr@gov.in

North Eastern Regional Centre
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