

Information Brochure



आपो हिष्ठा मयोभुवः

NATIONAL INSTITUTE OF HYDROLOGY

An ISO-9001:2015 Certified Organization

(Ministry of Jal Shakti)

Roorkee (Uttarakhand)

NATIONAL INSTITUTE OF HYDROLOGY

(Ministry of Jal Shakti, Govt. of India)

Established as a Government of India Society on 16 December 1978

Recognised as an S&T Institution

ISO 9001:2015 certified organisation

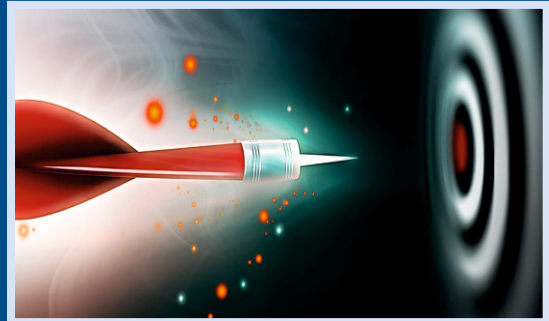


- To undertake, aid, promote and coordinate systematic and scientific work in all aspects of hydrology;
- To cooperate and collaborate with other national, foreign and international organizations in the field of hydrology;
- To establish and maintain a research and reference library in pursuance of the objectives of the Society and equip the same with books, reviews, magazines and other relevant publications; and
- 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



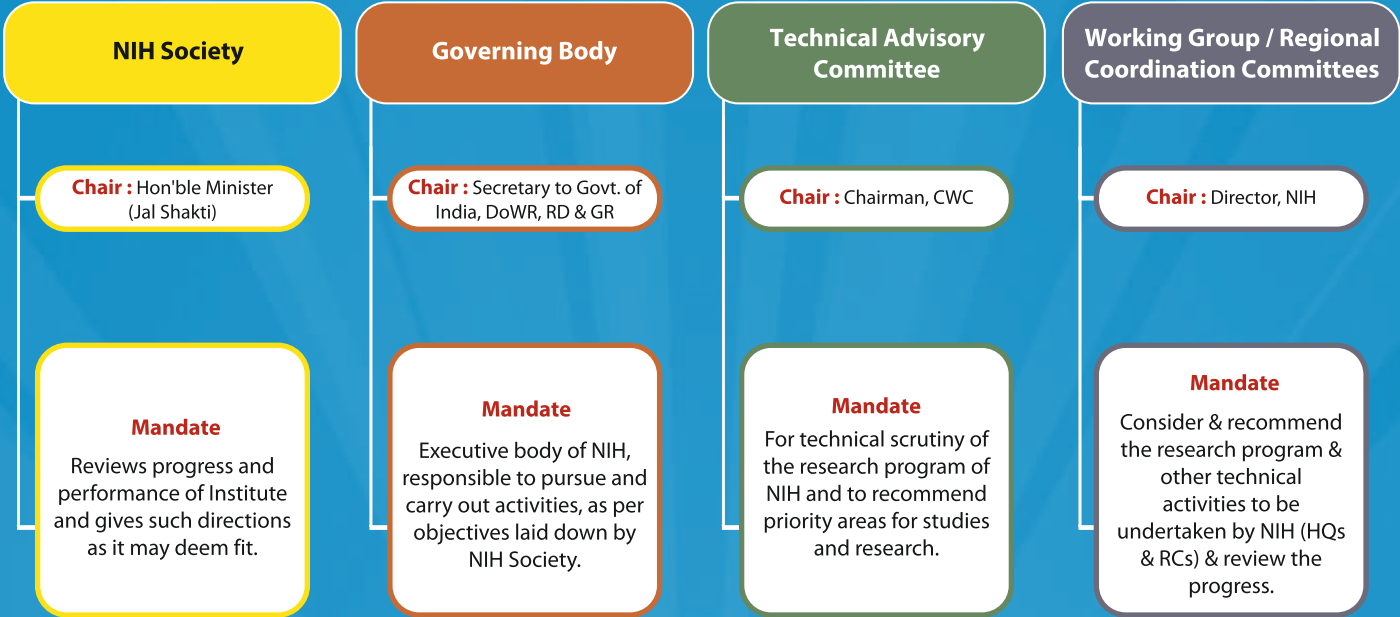
Providing leadership in hydrologic research through effective R&D solutions for achieving sustainable development and self-reliance of the water sector in India.



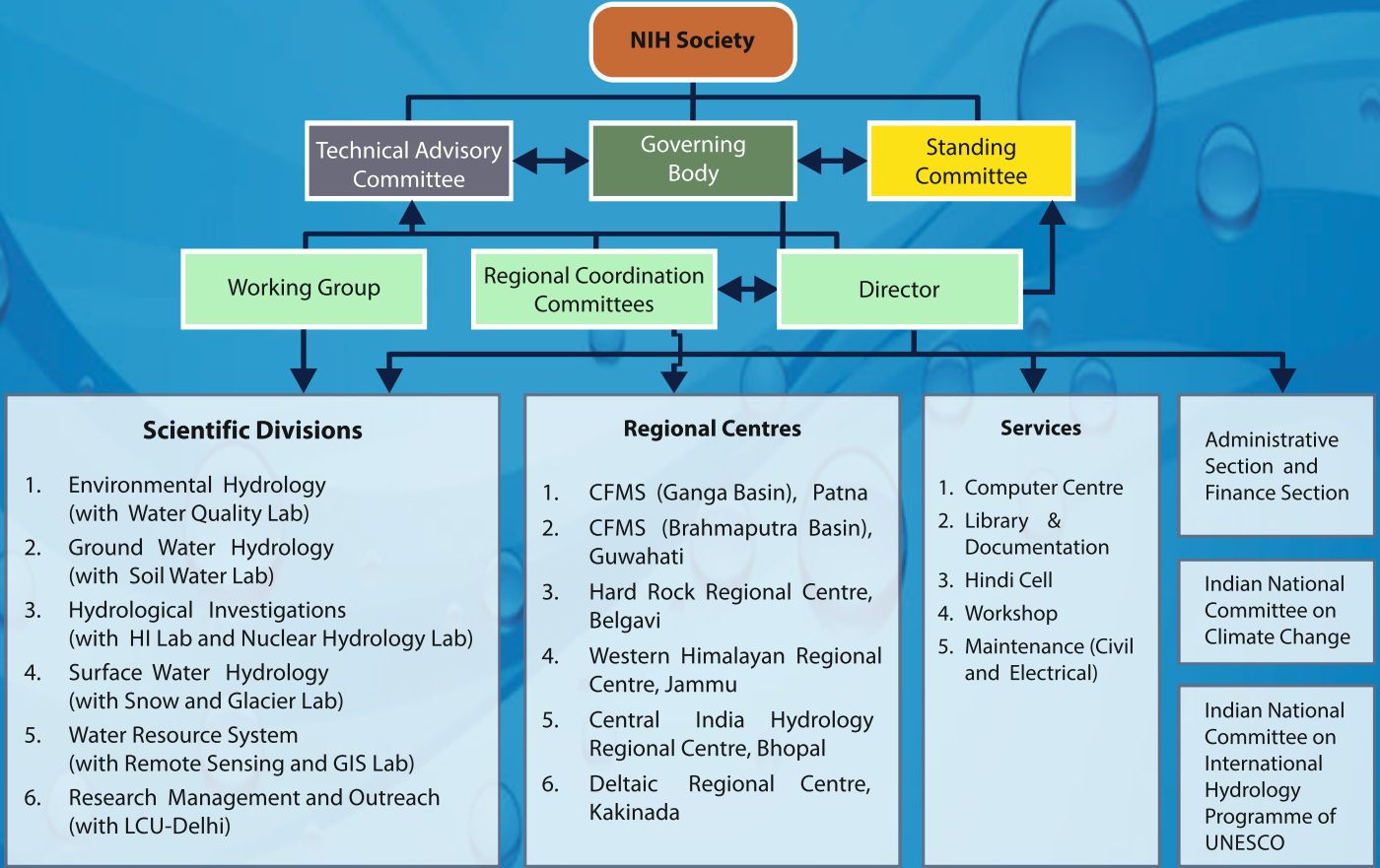
Mission

- 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 utilization

Management Structure



Organogram



Scientific Divisions



The Institute has six theme based divisions encompassing all aspects of hydrology and is known nationally and internationally for pioneering projects and strategic studies in this field.

The studies are carried out at the headquarters at Roorkee and the four Regional Centres at Belagavi, Jammu, Kakinada and Bhopal, and two Centres for Flood Management Studies at Guwahati and Patna.

The main focus of the studies at the headquarters is on applied and user defined research, while the Regional Centres deal with the field oriented research topics and problems endemic to the hydrological regions in which they are located.



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.

The crème de la crème team of scientists, along with the scientific and supporting staff, have conducted experiments at these laboratories over the years, and prolifically brought forth several research studies of national and international importance.

- Hydro-meteorological Observatory
- Hydrological Instrumentation Laboratory
- Nuclear Hydrology Laboratory
- Remote Sensing and GIS Laboratory
- Soil Water Laboratory
- Water Quality Laboratory

Computer Facilities at NIH

Computer Centre of the Institute provides services for the upkeep of computers. The Centre also has 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 also provides support to the NIH administration in the operation and maintenance of recently installed Aadhar-based Biometric Attendance System (BAS). 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.



Institute Workshop

The Institute has a workshop for developing and fabricating experimental set-ups and field instruments. Workshop also undertakes the repair and maintenance work of laboratories, office, and field equipment. It maintains the airconditioning systems, water purifiers, and water coolers of the Institute on a regular basis. It also provides support to the scientific divisions for field activities. The workshop has a lathe machine, power saw machine, drilling machine, cutting cum-punching machine, welding machine and various other smaller machines and tools.



Thrust Areas of Research

- Hydrology of Extremes
- Environmental Hydrology
- Regional Hydrology
- Integrated Water Resources Management (IWRM)
- Hydrology for Watershed Management
- Hydrological Studies for North-East Region
- Hydrological Studies for Himalayan Region
- Capacity Building and Outreach Activities
- Forest Hydrology & Urban Hydrology

What We Do ?

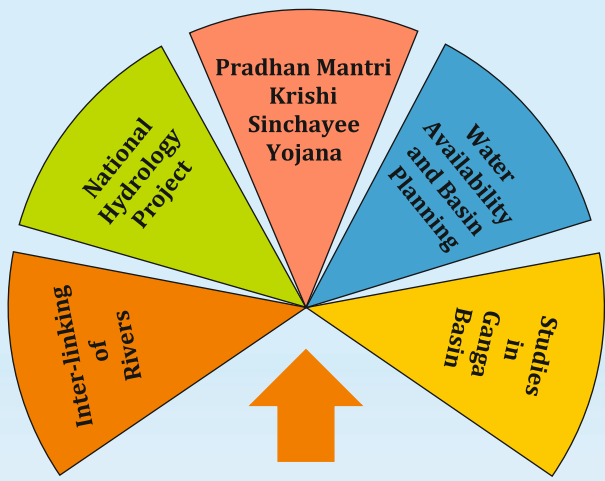
The Institute has come a long way since its inception and is now a centre of excellence for research in hydrology and water resources with emphasis on technology transfer and significant number of demand driven, user defined, and strategic studies to its credit. The Institute is also proactively contributing to knowledge dissemination, mass awareness and capacity building programmes in the water sector.

- **Basic and applied research**
- **Sponsored research**
- **Demand driven research**
- **Software development**
- **Capacity building and training activities**
- **Awareness and outreach activities**
- **Advisory services to NGT & courts**
- **Inputs in policy making**

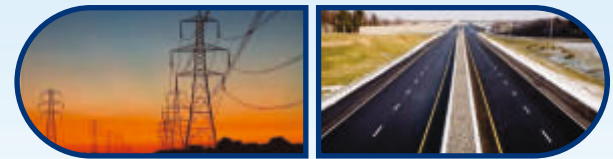
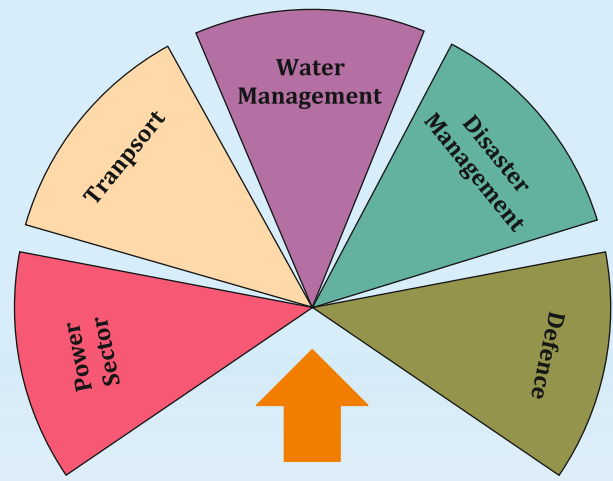
The Institute is hosting the Secretariat of Indian National Committee on Climate Change (INC-CC). INC-CC supports funding of R&D projects and review sessions on climate change and sponsorship of seminars, symposia, workshops, etc. Also, the Institute hosts the Secretariat of Indian National Committee for International Hydrological Program (INC-IHP) of UNESCO.



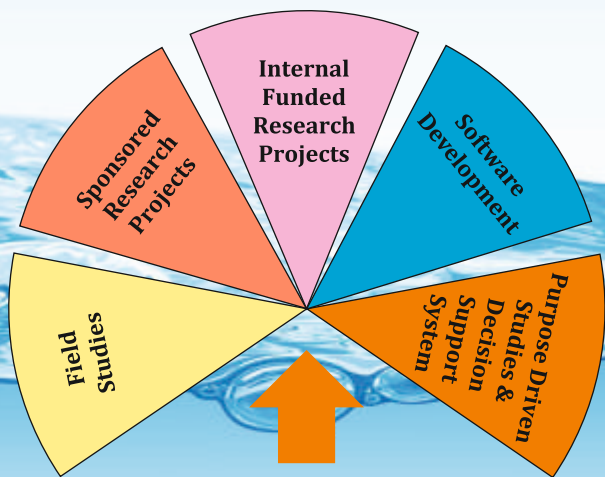
Contributing to Key Areas in Nation Building



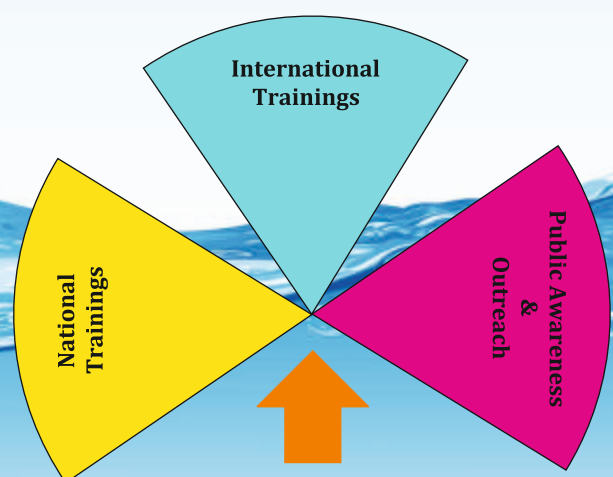
DoWR, RD & GR, Jal Shakti Programs



Key Infrastructure Sectors of the Government



Applied Research & Software Development



Capacity Building & Outreach



Contribution to Key Infrastructure Sectors

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

Hydropower Sector

- Carrying capacity studies
- GLOF - design flood
- Cumulative impact assessment upper Ganga basin
- Environmental flow assessment
- Assessment of power potential

Thermal/Nuclear Power Sector

- Nuclear Plants -
 - * Flood safety studies
- Thermal Plants -
 - * Area drainage studies
 - * Impact on groundwater
 - * Hydrogeological studies
 - * Impact of ash disposal

Defence Sector

- GLOF/Cloudburst design flood estimate, Ladakh, BRO
- Discharge monitoring : Shyok River-BRO

Disaster Preparedness

- Dam break studies (NTPC & NHPC)
- Emergency action plan : Hydro-power

Riverfront Design

- Riverfront development plan (Guwahati & Vadodara cities)

Transport Sector

- Railway bridge/design flood for Chardham connectivity
- Rishikesh-Karnprayag
- Karnaprayag-Chardham

Water Management

- Paleochannel mapping - River Saraswati
- Aquifer mapping
- Deep groundwater recharge zone identification
- Lake conservation - (Nainital, Sukhna)
- Wetland management
- Drainage planning in urban



Inputs in Policy Planning

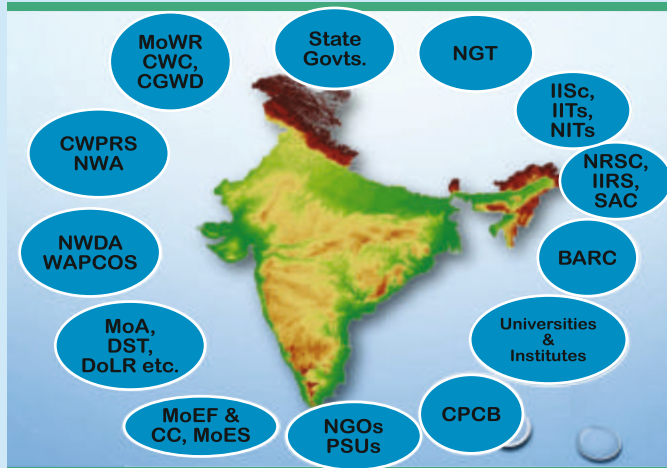
- Vision document on mitigation and remedy of groundwater Arsenic menace in India
- Prepared Policy Document on Salinization of Land in Coastal Areas.
- Developed a plan on the use of treated wastewater from STPs in Delhi for groundwater recharge (MAR) at identified locations in NCT Delhi.
- Flood Plain Zoning plans for Haridwar and Uttarkashi (Uttarakhand)
- Contributed in the preparation and review of standards by Bureau of Indian Standards: NIH has contributed in the preparation of an International standard on 'Measurement of liquid flow in open channels- Stage-Fall-Discharge relationship (ISO 9123)', and contributed in the finalization of a standard on 'Guidelines for measurement and control of sediments in natural lakes'

Other Salient Contributions to GoI Programs

- Hydraulic modelling for Brahmaputra riverfront development
- Mapping of nallahs contributing pollution to river Ganga.
- Benchmarking indicators for watersheds
- Tackling water logging problems in canal commands - Saryu Nahar Pariyojna
- Monitoring of potential hazards of industrial development in Singrauli area
- State specific action plan (SSAP) for water sector, under NWM
- Contributing to the MoEF, CC program on 'National Mission on Himalayan Studies (NMHS)'
- Under a Ministry of Drinking Water and Sanitation initiative, developed a model curriculum for M. Tech. (Water Management)

Teaming up for Greater Synergy

The Institute has forged collaborations at the national and international levels with Governments, departments, and organizations, with which it has synergies of purpose, operations, and capabilities to achieve outcomes that benefit all the participating entities.



National Collaborations

- Bhabha Atomic Research Centre (BARC)
- Central Water Commission (CWC)
- Central Ground Water Board (CGWB)
- Central Water and Power Res. Station (CWPRS)
- Central Pollution Control Board (CPCB)
- Department of Science and Technology (DST)
- Department of Land Resources (DoLR)
- Indian Council of Agri. 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)
- Min. of Env., Forests and Climate Change (MoEF)
- Ministry of Earth Sciences (MoES)
- Ministry of Agriculture & Farmers Welfare (MoA)
- National Env. Engg. Res. 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)
- NGOs and PSUs
- Space Application Centre (SAC)
- WAPCOS Ltd. Northeast Power Corporation Council (NPCC)

International Collaborations

- British Geological Survey (BGS)
- Carleton University, Cambridge University
- Commonwealth Scientific and Industrial Research Organization (CSIRO)
- Centre for Ecology and Hydrology (CEH)
- European Union (EU)
- Food and Agriculture Organisation (FAO)
- International Centre for Integrated Mountain Development (ICIMOD)
- International Atomic Energy Agency (IAEA)
- Indo-US Science & Technology Forum (IUSSTF)
- International Water Management Institute (IWMI)

- Int. Institute for Hydraulic and Environmental Engg. (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 Programme (UNDP)
- United National Scientific, Educational and Cultural Organization (UNESCO)
- World Meteorological Organisation (WMO)



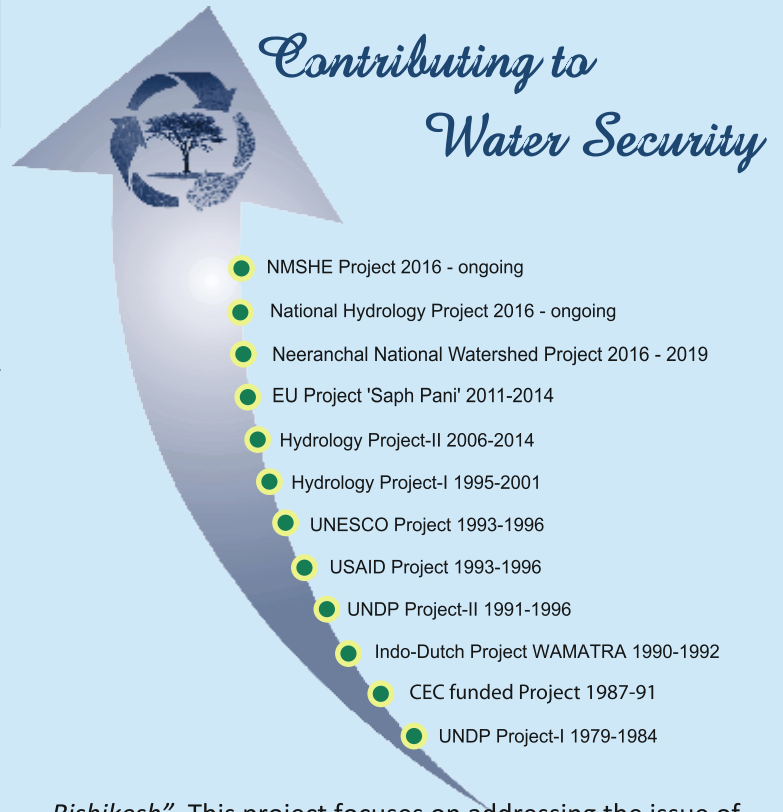
Major R&D Projects

NIH was established as an UNDP assisted project. Over the years, it has received several R&D projects from various funding agencies, both national and international, to carry out the mandated activities.

The Institute has undertaken a number of internationally funded projects, including those from UNDP, USAID, UNSECO, World Bank, The Netherlands, Sweden and European Union.

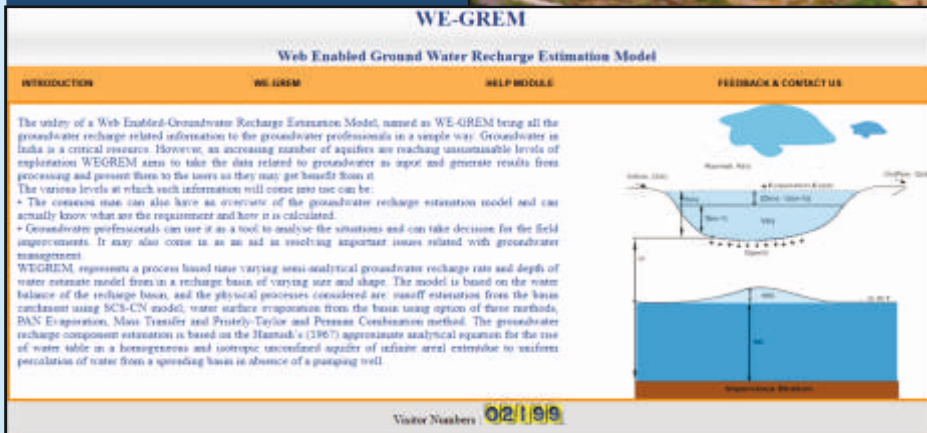
The Institute is now participating in the National Hydrology Project (NHP) and carrying out various Purpose Driven Studies (PDS) besides conducting a number of capacity building programmes.

The Institute is participating in a Ministry of Science & Technology (GoI) funded project entitled "Integrated Hydrological Studies for Upper Ganga Basin up to



Rishikesh". This project focuses on addressing the issue of comprehensive integrated hydrological studies for upper Ganga basin up to Rishikesh.

Software Developed



- NIH_ReSyP (NIH_Reservoir Systems Package)
- SNOMOD (Model for Snow-melt Modeling)
- Web enabled "Conjunctive use management model using concept of MAR and ASR"
- WE-GREM - Web-enabled groundwater recharge estimation model

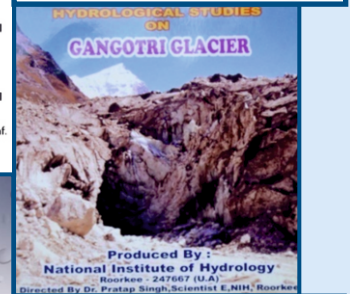
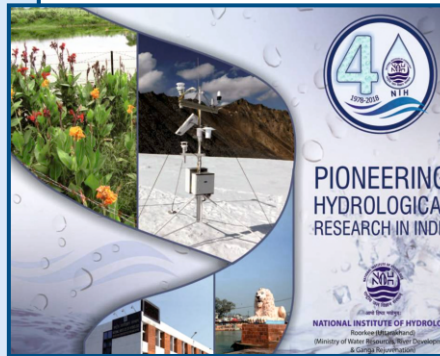
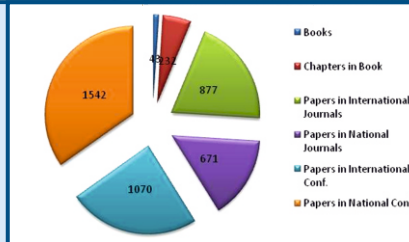
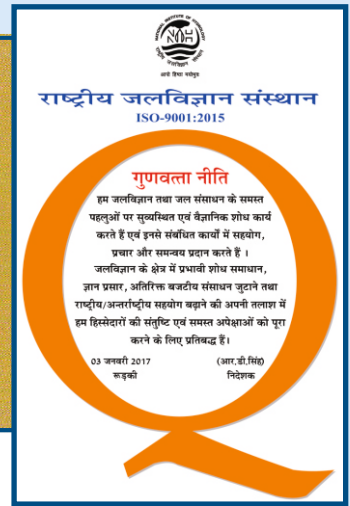


Library & Documentation Services

NIH Library maintains the world's most comprehensive collection of technical hydrology literature, which is linked to the world's scientists. 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

The Scientists of the Institute have been engaged in conducting research in different aspects of Hydrology and have commendable work to their credit in this field. NIH publishes its research output in the form of various type of reports, books, chapters in books, 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 4,400 research publications since its inception and the list is further growing.



Major Ongoing Projects & Studies



- * National Hydrology Project (NHP)
- * National Mission for Sustaining Himalayan Ecosystem (NMSHE)
- * Neeranchal National Watershed Project (NNWP)
- * Managing Hydrological Extremes
- * Hydrology of Lakes
- * Investigation of Village Ponds
- * Hydrology of Springs
- * Hydrology for Watershed Management
- * 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
- * Water Resources Assessment in River Basins
- * Development of Decision Support System (PM)
- * Future Secular Changes and Remediation of Groundwater Arsenic in the Ganga River Basin-FAR GANGA
- * Impact of Rainwater Harvesting on Groundwater Quality in India with Specific Reference to Fluoride and Micro-pollutants
- * High Performance Advance Septic (HPAS) System for Villagers and Restaurants
- * Impact of LU/LC and Catchment Characteristics on Runoff and Groundwater Dynamics of Western Ghats Karnataka



Large Ongoing Projects at NIH

National Hydrology Project (NHP)

(World bank funded; MoWR, RD & GR, Govt. of India)

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 III, now named as National Hydrology Project (NHP) is a follow-on to the earlier Hydrology Projects.

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
- Decision Support System (DSS)

For further information please write to:
Dr. Sanjay Jain <nhp.nih@gmail.com>

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

Under the ongoing 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) tool would have web-based dashboard for display in a basin and inter-sectoral water allocation. The tool will be fully equipped with modeling, scenario building and evaluation including scenarios for extreme climate events, and include key performance indicators, ranking & selection of strategy for implementation, cost benefit analysis. Once developed, the DSS(PM) system will be applied in 10 selected basins under NHP states in coordination with NIH, CWC, CGWB.

For further information please write to:
Dr. A. K. Lohani <lohani.nihr@gov.in>



National Mission for Sustaining Himalayan Ecosystem (NMSHE)

(Funded by Ministry of Science & Technology, GoI)

Themes

- 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

For further information please write to :

Dr. M.K. Goel <mkg.nihr@gov.in>



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 recognised by several IITs, IISc, universities and other academic organisations for supervising research scholars and PG students leading to the award of post-graduate and Ph.D degrees in hydrology and related subjects. Institute scientists have guided number of research scholars for Ph.D degrees and M.E./M. Tech/M.Sc. thesis. The scientists also provide their inputs to the academic programs through lectures 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

Research in emerging areas

- Integrated assessment of water availability in river basins
- Hydrologic extremes
- Coastal groundwater dynamics
- Water and food security assessment contribution to SDGs
- Understanding hydrological processes in the Himalayas
- Emerging contaminants, micro-pollutants, geogenic contaminants and their impacts on water resources
- Impact of climate change on water resources
- Urban floods and stormwater management

Action Research

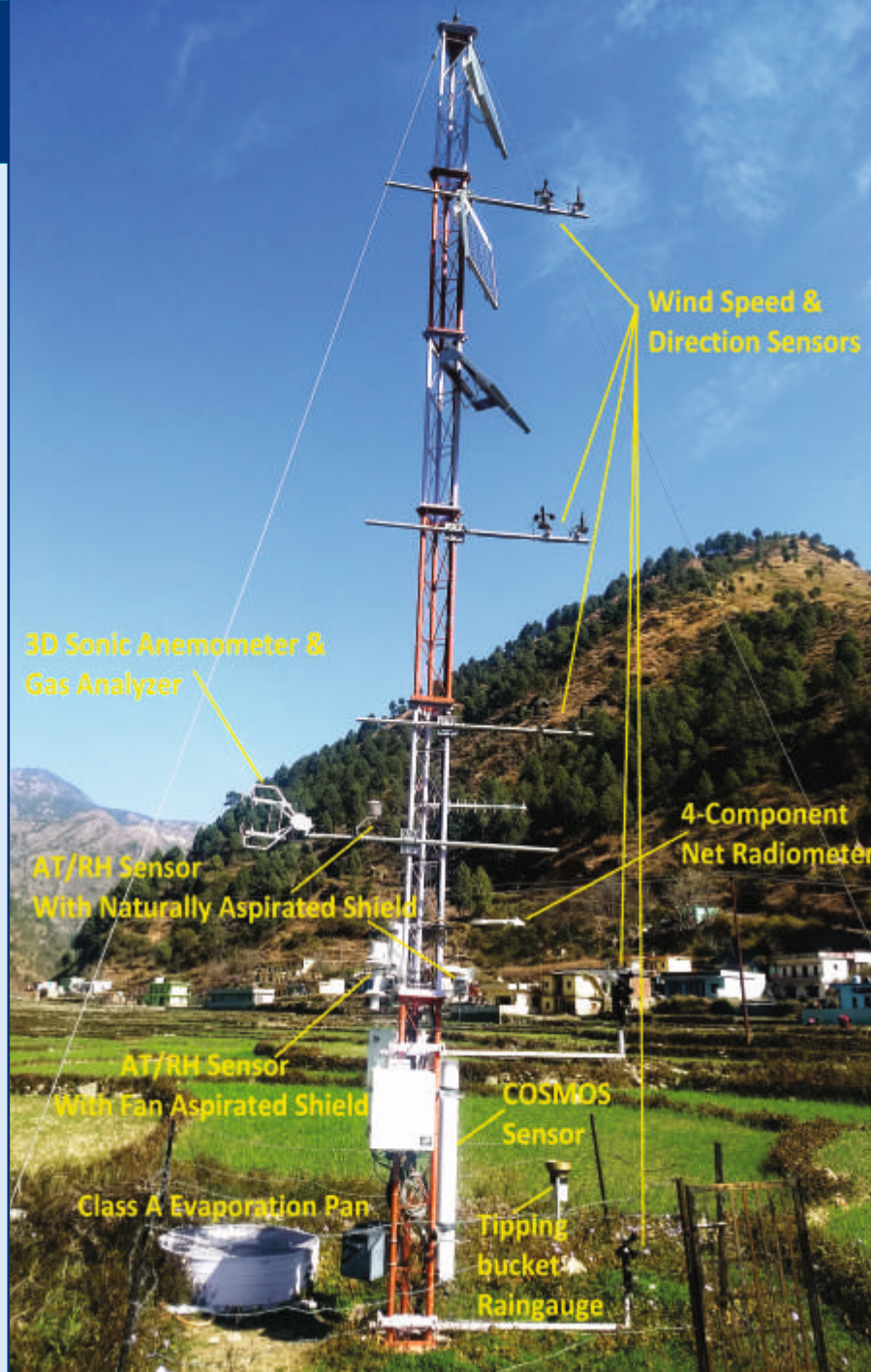
- River Bank Filtration (RBF)
- Managed Aquifer Recharge (MAR)
- Pond rejuvenation
- Lake/wetland rejuvenation
- IWRM Plan for watersheds
- Flood early warning systems
- Spring rejuvenation

Working with Hydrology Models

- Water Accounting +
- HEC models, MIKE Suite, SWAT, WEAP, MODFLOW
- Developing a comprehensive hydrological model under NHP in collaboration with IIT Kharagpur.

Use of advanced techniques and tools

- Hydrologic analysis and design using soft computing, artificial intelligence, virtual water, Internet of Things (IoT)
- Isotopic investigations, use of satellite data for estimation of hydrological variables
- Decision Support Systems



Flux Tower at Herval Experimental Catchment

- Use of electronic sensors and data loggers at experimental catchments
- Web-based water resources information system

Development of new infrastructure

- Centre of Excellence for Hydrological Modelling
- UNESCO Category-II Centre on 'Water & Environment' for South Asia
- Water Innovation Centre for Eco-prudent Wastewater Solutions

Well said about water

Water is the driver of Nature.	Leonardo da Vinci
When the well's dry, we know the worth of water.	Benjamin Franklin
Water is the most critical resource issue of our lifetime and our children's lifetime. The health of our waters is the principal measure of how we live on the land.	Luna Leopold
Water is the mother of the vine, the nurse and fountain of fecundity, the adorer and refresher of the world.	Charles Mackay
Water is the lifeblood of our bodies, our economy, our nation and our well-being.	Stephen Johnson
Pure water is the world's first and foremost medicine.	Slovakian Proverb
Thousands have lived without love, not one without water.	W. H. Auden
Drinking water is like washing out your insides. The water will cleanse the system, fill you up, decrease your caloric load and improve the function of all your tissues.	Kevin R. Stone

जल-स्तुति



बहता छल-छल करता कल-कल,
जीवन स्रोत बना है जल ।
ब्रह्म यही ब्रह्माण्ड यही है, जीवन का है तत्व यही
आदि, मध्य और अन्त यही है, जल का सिद्ध महत्व यही
निर्मल निर्मल पावन छल-छल, सृष्टि स्रोत बना है जल,
जीवन स्रोत बना है जल
बहता छल-छल करता कल-कल ।
नदियां की है धार यही जल, रिमझिम-रिमझिम नभ से बरसे
धरती को देता नव-जीवन, कण कण इससे छूकर हरसे ।
जल की धार यही है शीतल, प्राणों का आधार है जल,
जीवन स्रोत बना है जल
बहता छल-छल करता कल-कल ।
जीवन का संदेश यही है, पुष्प-पुष्प में यही खिले
ब्रह्म समान सर्वव्यापी जल, इससे जग को वृद्धि मिले
गंगा यमुना पावन कल-कल, ब्रह्म समान सर्वव्यापी जल इससे
जग को वृद्धि मिले, ईश्वर का वरदान है जल
जीवन स्रोत बना है जल
बहता छल-छल करता कल-कल ।

आपो हिष्ठा मयोभुवस्था न ऊर्जे दधातन ।
महे रणाथ चक्षसे ॥
स्रोत-ऋग्वेद

हे जल! आपकी उपस्थिति से वायुमंडल बहुत तरोताजा है और 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.

ईशाना वार्याणां क्षयन्तश्चर्षणीनाम् ।
महे रणाथ चक्षसे ॥
स्रोत-ऋग्वेद

हे जल! आपकी दिव्यता कृषि भूमियों में भी संचारित ! हे जल, मेरा आग्रह है कि आप फसलों का समुचित पोषण करें
O Water, may the divinity in Water dwell in the farm lands.
O Water, I implore you to give nutrition (to the crops).

गङ्गे च यमुने चैव गोदावरि सरस्वति ।
नर्मदे सिन्धु कावेरि जलेऽस्मिन् संनिधिं कुरु ॥
स्रोत-ब्रह्मनारदीय पुराण

हे पवित्र नदियों गंगा, यमुना, गोदावरी, सरस्वती, नर्मदा, सिन्धु एवं कावेरी, कृपया इस जल में विद्यमान होकर इसे पवित्र कर दो
O Holy Rivers Ganga and Yamuna, and also Godavari and Saraswati, O Holy Rivers Narmada, Sindhu and Kaveri;
Please be Present in this Water (and make it Holy).



Regional Centres



Hard Rock Regional Centre,
Belagavi



Central India Hydrology
Regional
Centre, Bhopal



Deltaic Regional Centre,
Kakinada



Centre for Flood Management
Studies, Patna

To deal with the specific hydrological problems in different regions of the country and to effectively interact with the States, the Institute has established four Regional Centers and two Centers for Flood Management Studies (CFMS) in different parts of the country.



Western Himalayan Regional
Centre, Jammu



Centre for Flood Management
Studies, Guwahati



आपो हिस्टा मयोभुवः

Contact

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एक कदम स्वच्छता की ओर

रहिमन पानी राखिये, बिन पानी सब सून। पानी गये न ऊबरे, मोती, मानुष, चून।।