

FIELD INSTRUMENTS

- EVRI for Resistivity Survey.
- Infiltrometer
- Tensiometers.
- Soil Moisture Sensors.
- Arsenator
- Groundwater Level Monitoring Instruments.
- Guelph In-situ Permeameter.
- Multi-parameter Analyzer.



CAPABILITIES

- Determining the soil moisture characteristics curve to estimate available moisture, field capacity and wilting point.
- Measuring in-situ saturated hydraulic conductivity, sorptivity and matrix flux potential of soil.
- Analyzing soil particle size distribution using dry and wet sieving methods.
- Using laser diffraction to measure soil particle size distribution (0.1 - 600 μ).
- Classifying soil texture.
- Measuring the coefficient of permeability of undisturbed soil samples.
- Assessing Infiltration rates.
- Evaluating in-situ soil moisture conditions.
- Performing soil sample digestion using MDS (Microwave Digestion System).
- Analyzing carbon, hydrogen, nitrogen and sulphur content using a CHNS Analyzer.
- Measuring trace elements in soil and water samples.
- Conducting in-situ soil moisture measurement using Time Domain Reflectometry (TDR).
- Determining soil moisture content in disturbed samples.
- Measuring particle density, absolute density and percent porosity of soil sample.
- Measuring the pH of soil and water.

OBJECTIVES AND ACTIVITIES

To carry out field and laboratory investigations for determination of various soil hydraulic, physical and chemical properties and provide input to research and applied studies.

Major Activities:

- Determination of various soil properties such as soil hydraulic conductivity, soil moisture, texture, particle size distribution, soil moisture retention, proportions of CHNS in soil, trace metal analysis, soil density, soil salinity and pH.
- In-situ measurement of various soil parameters to support research studies.

UTILITY AND IMPORTANCE OF WORK

Understanding soil-water status and its movement is crucial for agriculture, environment and hydrology. Soil-water movement depends on hydraulic properties, mainly water retention and hydraulic conductivity. The water retention curve shows the relationship between soil-water potential and volumetric water content, varying by soil type. Hydraulic conductivity measures how easily water flows through soil, influenced by pore structure, water content and potential



IMPORTANT STUDIES CARRIED OUT USING LABORATORY FACILITIES

- Integrated Management of Water Resources for Quantity and Quality in Upper Yamuna Basin up to Delhi.
- Enhancing the sustainability of water Resources Through Integrated Assessment and Management Techniques in the LUNI River Basin, Rajasthan.
- Surface water - groundwater Interactions Through Field Techniques and Hydrological Modeling in Yamuna Basin.
- Conjunctive Management of Water Resources in IGNP Command.
- Development of Archive of Soil Hydraulic Characteristics.
- Enhancing Food and Water Security in Arid Region through Improved Understanding of Quantity, Quality and Management of Blue, Green and Grey Water.
- Expansion of the Indo-German Competence Centre for Riverbank Filtration – CCRBF.
- Impact of Rainwater Harvesting on Groundwater Quality in India with Specific Reference to Fluoride and Micro-pollutants.
- Future Secular Changes and Remediation of Groundwater Arsenic in the Ganga River Basin – FAR GANGA.
- Hydro-geochemical Evolution and Arsenic Occurrence in Aquifer of Central Ganges Basin.
- Study of River – Aquifer Interactions and Groundwater Potential at Selected Sites in the Upper Ganga Basin up to Dabrani

LABORATORY DATA PROCESSING SYSTEM
(LABPRO)

LabPro is a web-based system developed at NIH to manage the submission and processing of laboratory analysis requests. It integrates various computational modules to automate the calculation of key soil hydraulic properties, ensuring accuracy and efficiency. Additionally, LabPro standardizes laboratory test reports for consistency and reliability.

Beyond analysis, LabPro serves as a data-hub, facilitating access to NIH's extensive archive of soil hydraulic properties. This enables researchers, engineers, and policymakers to leverage historical data for informed decision-making and further scientific advancements.

WHY CHOOSE US?

- **Precision & Accuracy:** Utilizing advanced technology for reliable and exact results in every analysis.
- **Comprehensive Solutions:** Offering a diverse range of services, from laboratory testing to in-situ experiment.
- **Scientific Expertise:** Our team of specialists ensures consistent, high-quality testing and analysis.



CONTACT US

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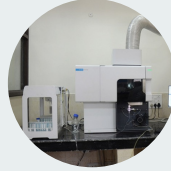
Website: <https://nihroorkee.gov.in/scientific-divisions/groundwater-hydrology/laboratories>



MAJOR LAB INSTRUMENTS



CHNS ANALYZER
Determines Carbon, Hydrogen, Nitrogen and Sulphur percentages in various samples and soil analysis.



ICP-OES
Quantifies trace metals (e.g., Al, As, Cu, Cr, Zn, Pb, Fe) for environmental and research purposes.



PRESSURE PLATE APPARATUS
Measures soil water retention under varying pressure conditions for irrigation and water management.



ICW LAB PERMEAMETER
Measures soil permeability using constant-head or falling-head methods for fluid flow analysis.



MASTER SIZER S3500 (MICROTRAC, USA)
Analyze soil particle size distribution in wet and dry samples.



GEOPYC
Measures soil bulk density using gas/liquid displacement.



MICROWAVE DIGESTION SYSTEM
It efficiently decomposes samples for trace metal analysis using controlled microwave energy.



ELECTRIC-FIELD VECTOR RESISTIVITY IMAGING (EVRI)
A state-of-the-art instrument for 3D subsurface mapping.

SOIL WATER LABORATORY

GROUNDWATER HYDROLOGY DIVISION
NATIONAL INSTITUTE OF HYDROLOGY, ROORKEE



ISO 9001:2015

The Soil Water Laboratory, an integral part of the Groundwater Hydrology Division, is one of the state-of-the-art laboratories of the institute and provides all facilities necessary for conducting field and laboratory investigations/experiments and in-situ determination of soil properties including hydraulic properties of both unsaturated and saturated zones.

