



BROCHURE

Innovante Water Solutions

An IIT Alumni Company...



Business structure: Private Limited

CIN : U74999UR2019PTC010010

Business location: Bahadarpur Saini, Patanjali Yog Peeth,
Roorkee, Haridwar,
Uttarakhand-249405

Date established : 16th July, 2019

Chief Advisor : Dr. Nayan Sharma, Adjunct Professor,
IIT Roorkee & Honorary Professor,
Nottingham University, UK

Vision statement:

To become the world leader at providing state-of-the-art technological services and solutions supporting sustainable water resources development and management.

Mission statement:

To provide customers with the best value in modelling and allied services.

Goals/objectives:

Market leader in customer satisfaction and timely completion of projects.

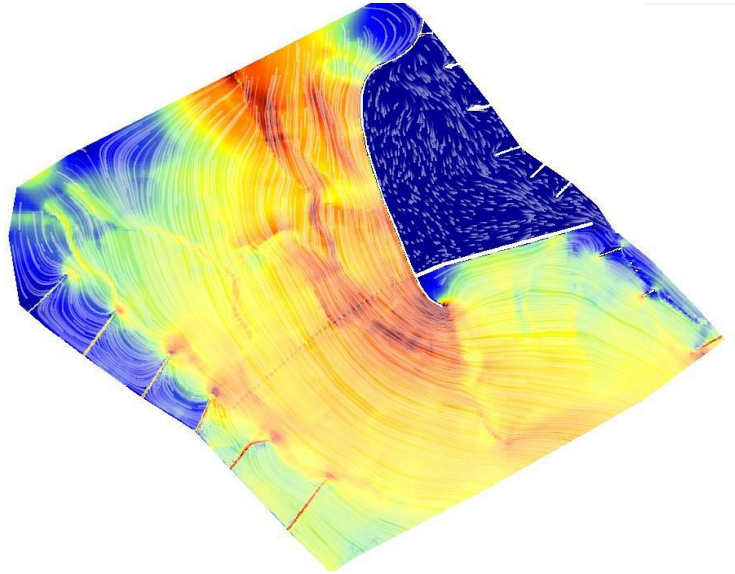


Provided Service

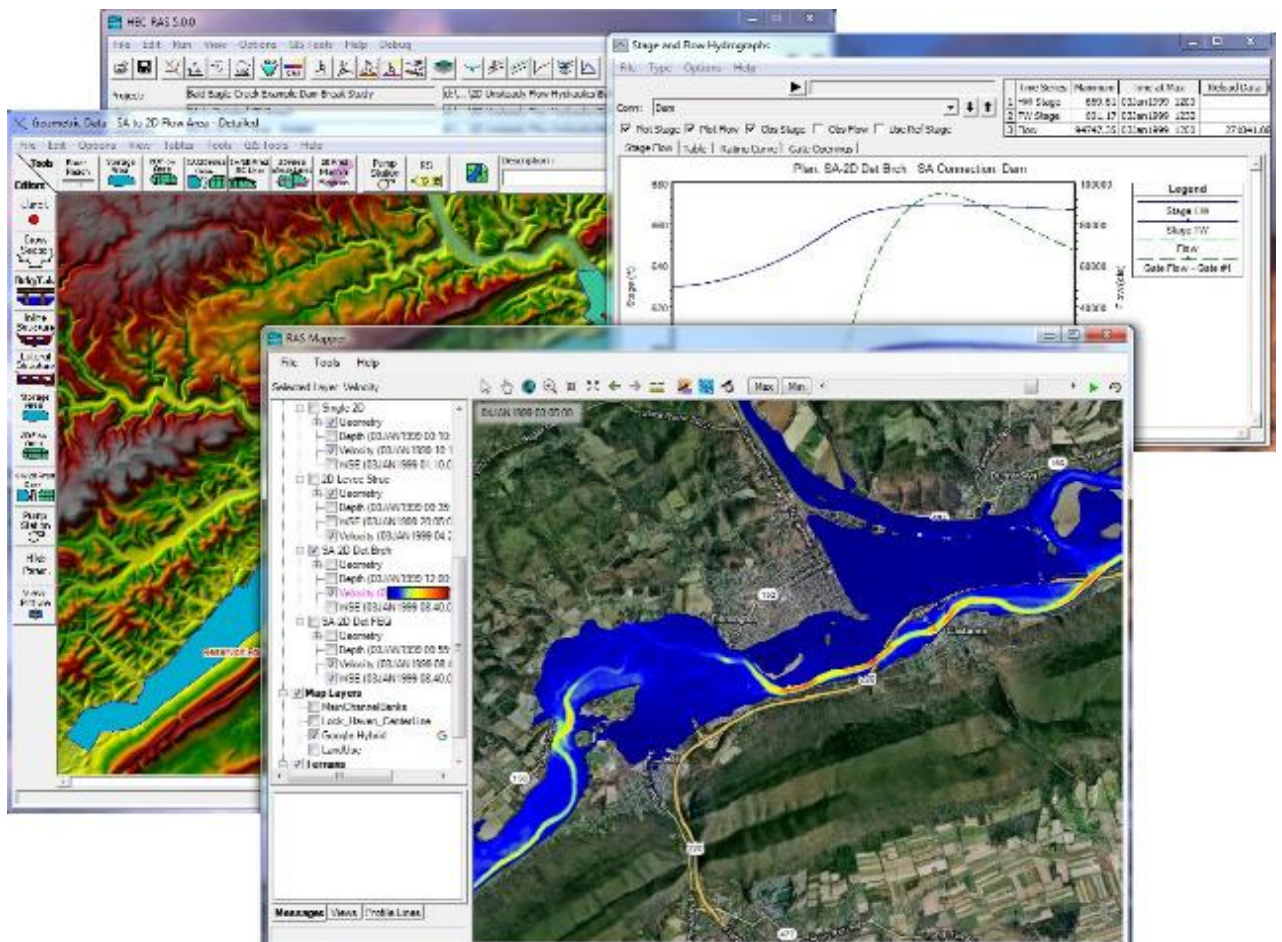
- Mathematical Modelling (1D/2D)
- Physical Modelling (3D)
- Coastal Engineering
- FEM Modelling
- Bridge Modelling
- Hydrological Modelling
- River Training Structure- Analysis and Design
- Climate Change Modelling
- Agricultural Modelling
- Design STP/WTP
- Storm Water Management Model
- Drone Survey
- Pond / Lake Modelling

Mathematical Modelling (1D/2D)

1-D model simulates flow perpendicular to the river cross-section and averages the outputs cross-sectionally, the use of multidimensional models is recommended when modelling complex riverine environments.



2-D models have been shown to predict the general flow pattern in rivers well and computationally lighter when compared with 3-D models.





Physical Modelling (3D)

In recent years, sediment scour near bridge piers and abutment is a serious problem given the highly sensitive issue of flooding due to climate change which cause nationwide concern because it has resulted in more bridge failures than other causes. Fail to present an accurate maximum depth of scour may either lead to an uneconomical design of substructures, or result in scour damage or even bridge failure. As part of this process physical modelling can provide detailed assessment of current and future river work arrangements in a cost effective and timely manner.

Physical modelling of Rivers is principally required to assess the following: -

- Potential flood risk
- Afflux effects on hydraulic structures
- Calibrate and verify mathematical models
- Provide assessment of hydraulic adequacy of structures
- Provide detailed calibration of pertinent hydraulic structures
- Scour*/deposition characteristics
- The effect of trash/debris within a system.



Side View of the model



Divergence of Surface Flow Layers Away from Left Wing Wall Initial Proposal



A View of Layout of Model in Running Condition



General View of Excessive Bed Action near Right Abutment



Running view of P. K. Weir from U/S with under sluice gate closed at 2500 m³/s discharge



Physical Modelling Laboratory (Infrastructure)

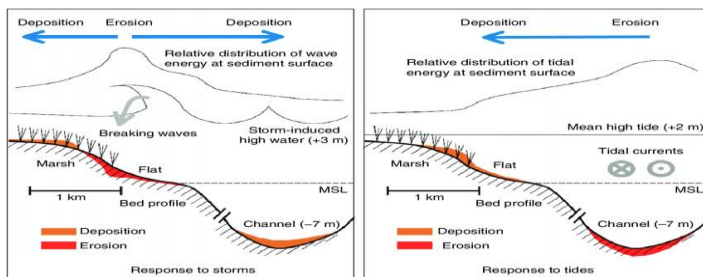
- Flow Pumps –04 NOS @ 75 LPS with VFD
- Model tray 1 – 90 X 120 Feet
- Model tray 2 – 120 X 140 Feet
- Generator Set – 65 KVA
- Re-circulation Storage Tank – 350,000 liters
- Measuring Instruments – Laser distance meter, V-notches of different sizes, Acoustic Doppler Velocimeter (ADV), Current meters, Vernier calipers, Screw Gauges, etc.
- Work Stations for ready calculations and modelling
- Site monitoring system with different viewing angles

Coastal Engineering

Innovante Water Solutions Pvt. Ltd. plays a significant role in the evolution of technology and breakthrough ideas by technical expertise that make a huge difference to the water resources, and port and maritime sector in India. One of the initiatives, customer-oriented approach that helps in the modernization of India's water sectors to ensure that water-led development can be augmented and coastlines can be protected by sustainability and coastal land can be conserved from the coastal erosion.

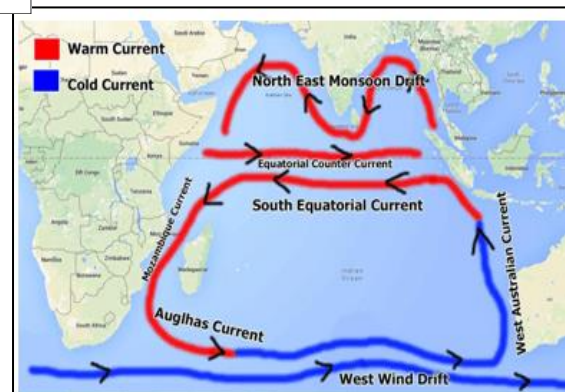


The testing facilities include next generation ports and vessels and Indigenous Technology. Some of the major objectives are; developing state-of-the-art technologies and application products, enabling fast-track innovations and providing appropriate solutions to the port authorities, creating a pool with the latest practical know-how and theoretical knowledge in the areas of physical modeling and numerical modeling.



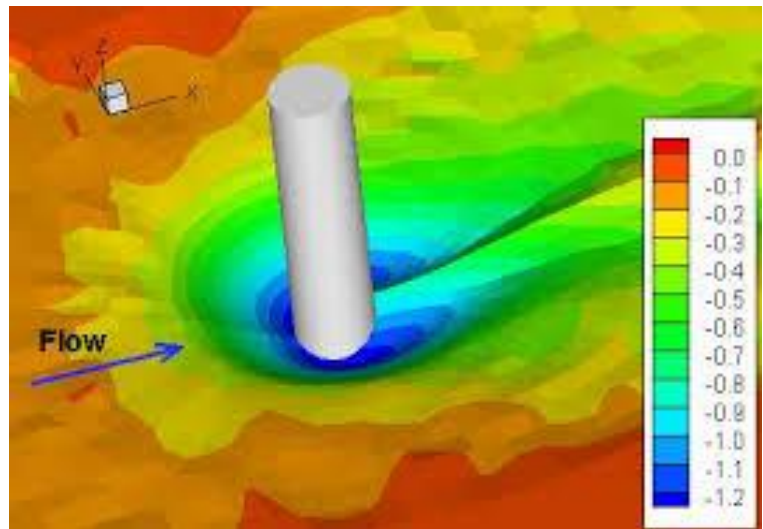
Sediment Transport and Morpho-dynamics Breakwaters

1D, 2D & 3D Modelling of Ocean, Coastal & Estuarine Flows

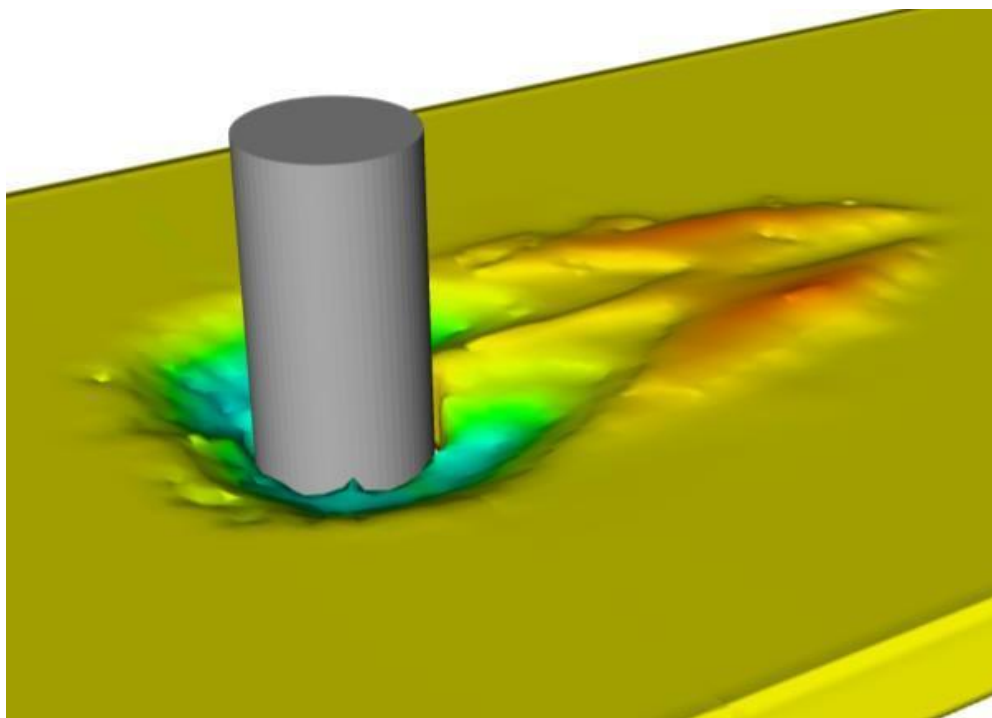


FEM Modelling

The finite element method (FEM) is the most widely used method for solving problems of engineering and mathematical models. Typical problem

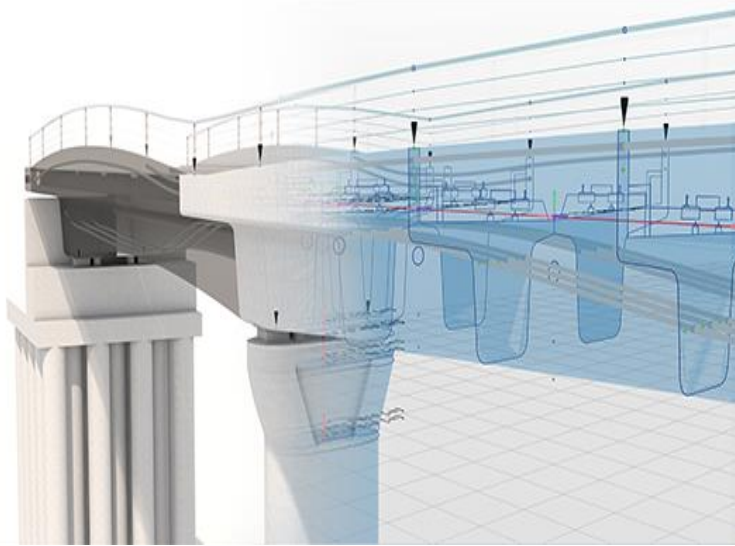


areas of interest include the traditional fields of structures analysis, fluid flow, mass transport, and electromagnetic potential. The FEM is a particular numerical methods for solving partial differential equations in two or three space variables.



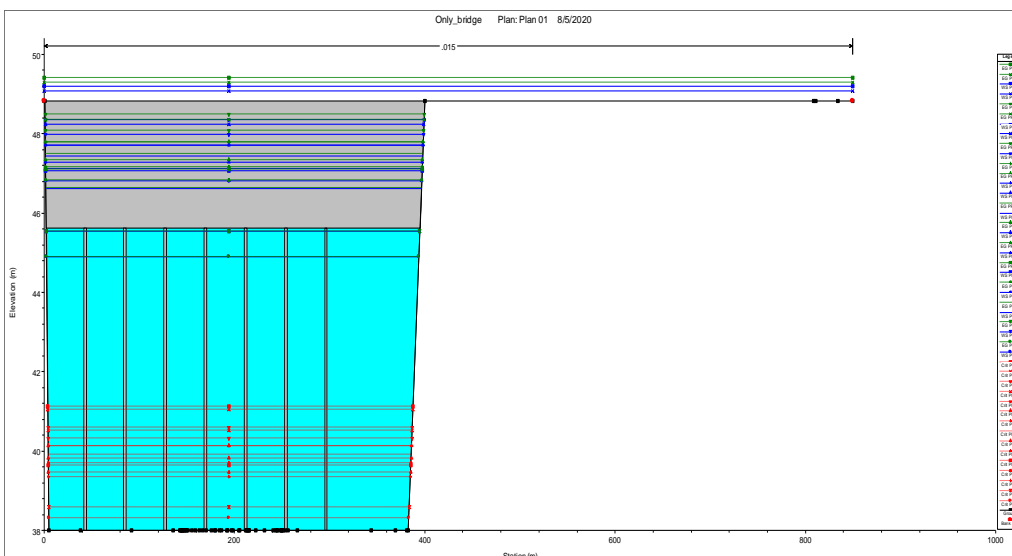
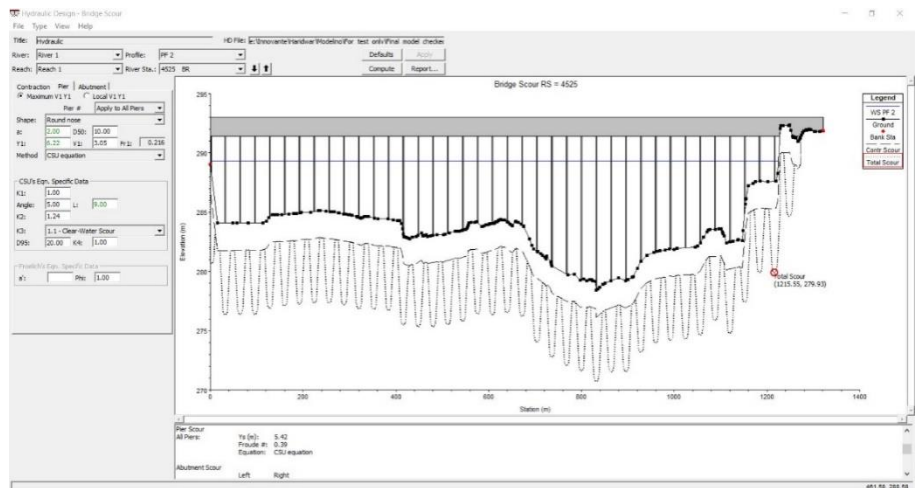


Bridge Modelling



The bridge modelling is one of the most challenging work in construction sector. Our organization is working past couple of years in the field of

bridge modelling, Scour depth estimation, Afflux calculation, bridge & culvert design etc.



Hydrological Modelling

We deals with the various types of watershed modelling for the projects such as calculation of design discharge, Thalweg Study, Stream-Power analysis, Sediment

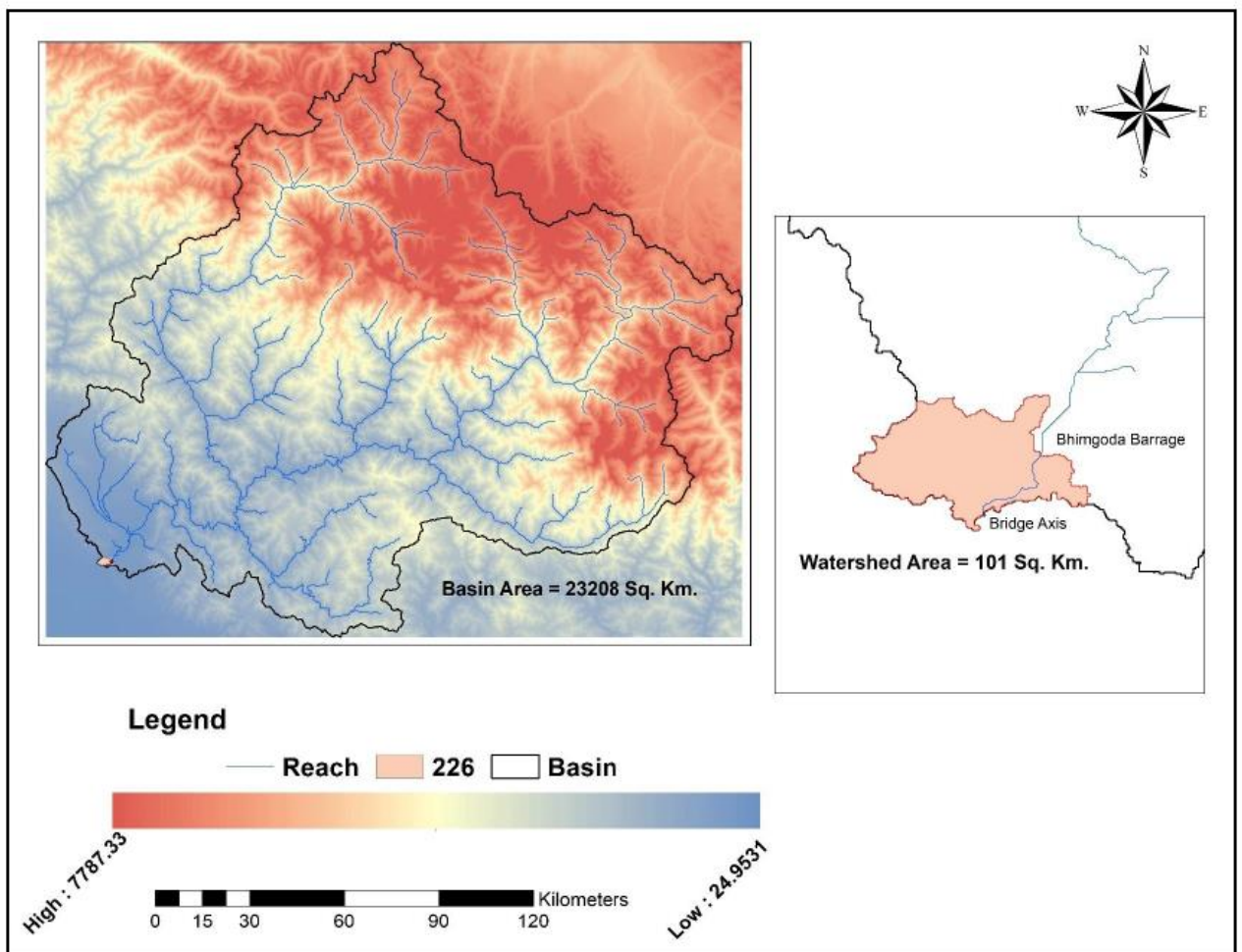


Figure 1 Study Area Map



River Training Structure- Analysis and Design



River training is an age-old practice resulting in incessant development and application of human ingenuity to correct vagaries of the rivers.

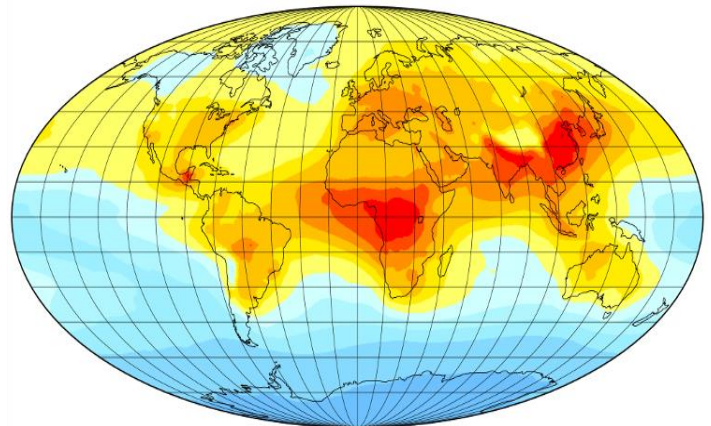
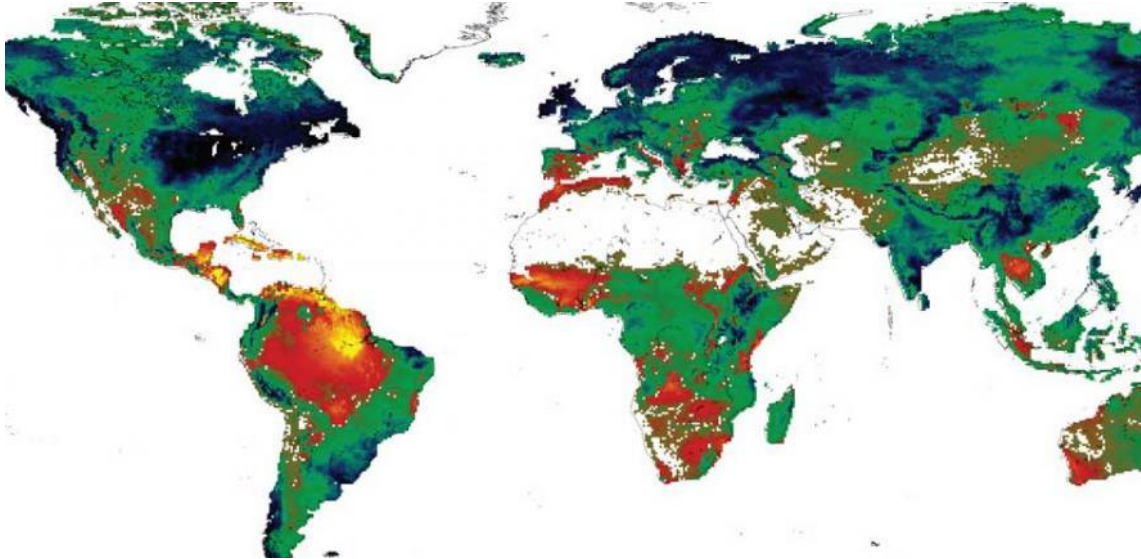


We deal with the following.

- Design of embankment.
- Providing the solution against river bank erosions.
- River canalising
- Embankment safety recommendations
- Hydro dynamic studies for maintenances of thalweg



Climate Change Modelling & Environment Impact Assessment



Climate change modelling deals with the study of various phenomena responsible for the to climate change and its consequences in nature. At present we are working for a hydropower project in which the various changes in water and air quality have to be assessed.





Agricultural Modelling

Crop systems modelling incorporates the capabilities to ensure the overall growth and yields. We deal crop yield forecast, drone survey of a particular field,



providing crop damage reports to the farmers, scientific solutions for organic farming and application of bio fertilizer applications, Benchmarking of Irrigation supply, Canal designs, repair and maintenance, etc.





Design of STP/WTP/ETP



Sewage is the wastewater generated by a community, namely:

a) domestic wastewater, from bathrooms, toilets, kitchens, etc.,



b) raw or treated industrial wastewater discharged in the sewerage system, and sometimes c) rain-water and urban runoff.



Storm Water Management Model



Storm water management is the effort to reduce runoff of rainwater, Sewer water into streets, lawns and other sites and the improvement of



water quality. At present, we are working with couples of government agencies to provide the solution for the use of waste water in the Irrigation after its treatment. We also provide solution for storm water solutions for urban flooding's.

Drone Survey

A drone survey refers to the use of a drone, or unmanned aerial vehicle (UAV), to capture aerial data with downward-facing sensors, such as RGB or multispectral cameras, and LIDAR payloads. We are



capable to do the drone survey for a large area including agriculture, river, urban and rural areas etc.

Products to be Delivered: -

- i) High-Resolution Imageries with horizontal and vertical accuracy of 10cm
- ii) Land use land cover map of the entire area
- iii) Digital Elevation model (Accuracy -10cm)
- iv) Digital Terrain Model (Accuracy -10cm)
- v) Digital Surface Model (Accuracy -10cm)
- vi) Video (if Required)



Pond / Lake Modelling



The pond /Lake modelling is done for the analysis of water in the pond, its quality, making of artificial ponds stress on pond due to population rise, rehabilitation of pond ecosystem, Pond treatment, management of grey water. etc.





Irrigation Benchmarking



Irrigation benchmarking is done for the improve the efficiency of the irrigation system. We provide the complete solution of irrigation system monitoring, estimation of losses, providing recommendation for improving efficiency of irrigation projects.

- 1) Identifying the best management practices
- 2) Assessing and monitoring the irrigation efficiencies
 - a. Conveyance Efficiency (W_c)
 - b. Seepage Losses Efficiency
 - c. Drainage Efficiency
 - d. On Farm Application Efficiency (W_f)
 - e. Overall Project Water Use Efficiency (W_p)
- 3) Calculation of Reference ET(CROPWAT)
- 4) Irrigation Requirement (CROPWAT)
- 5) Crop Water Requirement (CROPWAT)



Specialized Services

- Multi-satellite Based Precipitation Estimation and Extraction
- Satellite Data Analysis and Management
- Floodplain Inundation Mapping
- Sediment Modelling to estimate catchment erosion
- Geomorphological analysis of river
- Hydraulic design of water resources structure
- Erosion Control structure design
- Environmental Flow Modelling
- Lake and storage area hydrodynamics
- Land use Land Cover Change and Prediction
- Reservoir Scheduling
- Hydropower Planning and Management (including Small Hydropower)
- Power Potential studies
- Irrigation canal capacity improvement
- Canal Automation
- Environmental Impact Assessment
- River Health Monitoring
- Decision Support Systems for water resources planning
- Preparation of Detailed Project Report (DPRs)



Experts at Innovante

Prof. Dr. Nayan Sharma (Ph.D.), Executive Director & Chief Advisor



Prof. Dr. Nayan Sharma is Adjunct Professor in IIT Roorkee and Distinguished Professor (Visiting) in Shiv Nadar University. His specialization encompasses all facets of Water Resources Discipline including River Engineering, Dam Engineering & Hydraulic Structures, Irrigation Science. He supervised 174 Master's and 21 Ph.D. theses in IIT Roorkee. He has 217 research publications and has been member of 64 national and international technical committees. He conducted 116 consulting projects, and 12 major national and international research schemes

Dr. Dheeraj Kumar (Ph.D), Managing Director & CEO



Dr. Dheeraj Kumar is the founding member, **Managing Director and CEO** of Innovante Water Solutions Pvt. Ltd. He received his PhD in Water Resource Engineering from Indian Institute of Technology Roorkee in 2016. He has to his credit more than 20 research papers/ book chapters in national and international journals, conferences and Publishers. He has completed more than 50 consultancy projects. His expertise is in water resources planning & management, Hydraulic modelling, Watershed Management, river morphology, hydrology, soil and water conservation, command area development, Catchment Area Treatment, etc.



Er. Parveen Kumar Sanghi – Hydropower expert



Er. Sanghi is a Hydraulic and structural designs expert possesses more than thirty-three years of experience in planning, detailed engineering designs and construction supervision of various Water and hydro-electric projects involving dams (small, medium and high), spillways, Head race tunnels, Surge shafts, Pressure shafts and power houses (both underground and surface) etc. Hydraulic and structural designs (including review) for surface/ underground works comprising Barrage, Dam, Desander Basin, HRT, Surge shaft, pressure shaft/penstock and powerhouse conforming to various international standards and publications (ACI, ANSI/AWS, ASTM, USBR, USACE and BIS etc.)

Er. Kedar Singh (Physical Modelling Expert)



Er. Singh is a Physical Modelling Expert having more than 50-years' experience in 3-Dimensional Hydraulic modelling of Dams, Barrages, Weirs, Intake structures, Spillways, Head-Race-Tunnel (HRT) etc. He worked around 33 years in Irrigation Research Institute, Roorkee and retired as Research Officer (Superintending Engineer). In Irrigation Research Institute he conducted hydraulic model study of more than 17 different projects. He worked for more than 16 years in IIT Roorkee as a Consultant and completed Physical Modelling of more than 26 various projects.



Dr. Shakti Suryavanshi (Ph.D) – Hydrologist



Dr. Suryavanshi is a Hydrologist and Hydrological modelling Expert having experience of more than 13-years in the field of Hydrology and hydrological modelling. He is an Assistant Professor in the department of Civil Engineering, Sam Higginbottom University of Agriculture Technology and Sciences, Allahabad. He has published more than 16 research papers in international journals, 02 book/chapter and presented 08 conference papers. He also contributed himself as Editorial Board Member, Journal of Natural Resources Conservation and Research, USA and reviewer of more than 10 reputed journals.

Dr. Shailendra Kumar Kumre (Ph.D.) – Senior Water Resources Engineer



Dr. Kumre is a Senior Water Resource Engineer at INNOVANTE having expertise in the field of Hydrology and Water Resources. His major domain expertise is on Hydrological and Hydraulic Modelling, Sediment Yield Modelling, River Morphology & Sedimentation, and Environmental Flow Modelling. He received his M.Tech degree in Hydrology and Ph.D. degree in Water Resource Engineering from Indian Institute of Technology Roorkee in year 2013 & 2019. He has more than 10 years' experience in the field of Hydrology, agriculture & water conservation, Survey, Groundwater modelling and other allied areas. He has to his credit more than 13 research papers/ book chapters in national and international journals, conferences and Publishers. He has completed more than 06 consultancy and research projects.



Dr. Muntjeer Ali – Environmental Expert



Dr. Muntjeer Ali has more than 10-year experience in the field of municipal, Industrial wastewater, water and solid waste management. He holds his Ph.D. in environmental engineering from IIT Roorkee, India. During his Ph.D. and post PhD, he has worked in several consultancy projects on adequacy of STPs, CETPs, ETPs and solid waste management. He has done postdoctoral research from Tohoku University, Japan and worked as National Expert in Hydroplan a German based environmental consultancy company for the industrial wastewater and sludge management. He is currently engaged as senior researcher in Indo-EU and Indo UK research projects.

Er. Neeraj Kumar (Water Resource Engineer)



Er. Kumar is a Civil/Water Resource Engineer having expertise on employing various geospatial tools and techniques in the fields of Civil Engineering, Hydrology, Agriculture and other related areas. Mr. Kumar have more than four years of experience in both teaching and research. His area of expertise includes but not limited to Hydrology & Hydraulics, River Engineering, Groundwater Modelling, Highway & Bridge Engineering, Soil Health Monitoring, design of WTP and STP, etc.



**Innovante Hydraulic Engineering Laboratory
(IHEL)**

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