

In Conversation with...

Shri Rajiv Ranjan Mishra,

Director General, National Mission for Clean Ganga (NMCG)

Q. Can you share how the National Mission for Clean Ganga has been progressing?

Namami Gange is a flagship programme of the Government of India for the rejuvenation of Ganga and its tributaries. National Mission for Clean Ganga (NMCG) is the implementing authority of this program. Authority constituted under the provisions of the Environment Protection Act (EPA), 1986, and is a part of the Ministry of Jal Shakti. Vision is to restore the wholesomeness of river Ganga in terms of Aviral Dhara (continuous flow) and Nirmal Dhara (unpolluted flow) along with preserving its ecological and geological identity.

The NMCG, backed by Ganga River Basin Management Plan by a consortium of seven IITs, has a holistic multi-sectoral, multi-agency and multi-level approach in four broad categories: Pollution Abatement (Nirmal Ganga); Improving flow and ecology (Aviral Ganga); Strengthening People, River connect (Jan Ganga) and Research, knowledge management (Gyan Ganga). Unlike previous efforts, it is not limited to cleaning or piecemeal selected city interventions but follows river centric, basin based approach for comprehensive rejuvenation. It is based on learnings from the past and also from some of the global best practices for river rejuvenation. Namami Gange's major components include the creation of sewerage infrastructure, solid waste management, industrial pollution abatement, rural sanitation and water quality monitoring, environmental flow, river front development, afforestation and biodiversity conservation, sustainable agriculture, public participation and policies, research & innovation.



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Q. How has GIS technology intervention helped augment the National Mission for Clean Ganga?

Technology is an integral part of Namami Gange's vision for clean Ganga. Namami Gange programme has high priority for research and evidence based decision making and has a special place for the use of new technology including geospatial technology. NMCG Authority order of Oct' 2016 states that the pollution in River Ganga and its tributaries shall be monitored by use of satellite imagery and other remote sensing technologies. One of the bottlenecks for a comprehensive planning for a river rejuvenation was the lack of scientific data, which requires detailed research studies based on geospatial technology. To overcome these issues, NMCG has sanctioned different GIS based research projects touching different aspects of river rejuvenation to use geospatial data in a wide

variety of areas, including legislative and policy development, the allocation and management of water resources, river system spatial planning, monitoring & basin management. NMCG is also using geospatial technology in outreach programme as online story mapping for students, citizen centric bhuvan ganga mobile app to get information from ground zero, GIS based dashboard to monitor NMCG interventions & water quality, river corridor mapping by LiDAR technology, mapping, biodiversity mapping, fisheries resource mapping, wetland mapping, water bodies mapping by UAV, microbial diversity mapping, cultural mapping, rivulet mapping, urban river mapping, aquifer mapping, high resolution climate scenarios for basin scale and spring rejuvenation mapping, etc. NMCG is leveraging the digital advancements by establishing a strong digital and geospatial data infrastructure like LiDAR data & other geospatial data of river rejuvenation. Significance of GIS framework had brought a paradigm shift in visualization of all crucial spatial and non-spatial information of Ganga basin to adopt accurate & transparent decision. Namami Gange has been recognized as India's leading programme in using geospatial technologies towards river basin management and regulating the proposed protected and regulatory zones along the banks of the river.

Q. Can you brief on the key challenges faced during project implementation and how the GIS technology addressed them?

During the course of River Ganga's journey from the Himalayas to the Bay of Bengal, municipal sewage from urban centres along its banks, effluents from industries, municipal solid wastes and polluting waste from several other non-point sources including agriculture get discharged into the river resulting in its pollution. Large scale abstraction of water from river Ganga for different purposes, most substantial being for agricultural use, leads to depletion of flow in certain stretches. Challenges in the accurate information system is another area where Namami Gange has

been working. We have been trying to build an integrated and composite database of multiple sectors of Namami Gange including sewerage infrastructure, water quality monitoring, etc. But with multiple organisations in play, data validation takes time and resources. NMCG is expecting technology based decision making end solutions tools & technology for river rejuvenation.

Q. Forecasting the relevance of prevention & control of environmental pollution in the river with the fundamentals of next-generation society. How do you vision geospatial infrastructure and technological tools link in this journey?

As the NMCG authority order mandates the use of geospatial information and technology in river rejuvenation, there lies an opportunity for the technology solution providers and decision-makers to tap on to the true potential of geospatial information and technologies. Geospatial infrastructure and technological tools will support river rejuvenation journey. Geospatial infrastructure is enabling a whole new era of maps and language of understanding. Data science and location intelligence are playing an important role in data quality. Data quality will be the differentiator. Remote sensing and IoT will be critical components in integrated decision support systems. It will increase the frequency of acquisition, there will be greater demand for insights from the geospatial data collected for river water quality trend analysis. These systems will be used for hydrological & hydro dynamically modelling and monitoring water resources to better understand riverine ecosystem. Next generation of remote sensing & GIS technology will help to achieve the goal of river rejuvenation. Geospatial sector need to transform from a data-based paradigm to a solutions-based paradigm. Space assets provide vital information and services that will positively contribute this journey.