MGC's Mission

To Build and Secure a Sustainable Future

Dr Girija K Bharat is the Founder-Director of Mu Gamma Consultants Private Limited (MGC). Here, she is in an exclusive conversation with us for *TerraGreen*.

Please let us know about Mu Gamma Consultants' (MGC) commitment in environmental pollution control.

Mu Gamma Consultants Private Limited is a research and consultancy organization aimed at improving the quality of life of communities through environment-friendly solutions, drawing knowledge from global best practices, and applying it to the local context. The overall mission of our work is to create a sustainable society. We also aim to support organizations that are committed to contributing towards the success of the United Nations' Sustainable Development Goals (SDGs) by helping them identify the right tools, strategies, and actions for achieving sustainable development.

Our multi-disciplinary team of professionals has more than 30 years of experience across a range of areas related to water and sanitation, such as:

- Bilateral and multilateral projects and issues such as safe reuse of treated used water, emerging contaminants in water, persistent organic pollutants (POPs), wastewater monitoring for detection of SARS-CoV-2, water quality assessment, WASH (Water, Sanitation & Hygiene), marine litter management, water and sanitation

policies in India, Climate change adaptations in water management, Swachh Survekshan, Swachh Bharat Mission, SMART City projects.

- Supporting the National and state governments with policy advice, technical assistance, and capacity building initiatives in the above-mentioned areas.
- The research and implementation programmes are aimed towards effective delivery of services to support the national agenda and the SDGs at the global level.

Our professionals have authored several publications including research articles in peer-reviewed journals, book chapters, drafted national/ state-level action plans, etc. We have delivered over 50 projects, contributed to more than 100 publications, collaborated with more than 50 partners, and received over 20 national and international awards.

Our studies on emerging contaminants in surface and groundwater in India, endocrine disrupting chemicals in food and drinking water in India, water, wastewater, and sanitation have benefited the development sector practitioners in India. Our research studies are endorsed by the United Nations Environment Programme (UNEP), and the United Nations Industrial Development Organization (UNIDO). Experts in our team have contributed to the development of climate action reports for Conference of the Parties (COP)-15 and COP-26, United Nations Environment Assembly (UNEA)-5.2.

MGC is an expert committee-member of the Stockholm Convention Regional Centre (SCRC) of Asia, supported by the UNEP and hosted by CSIR-NEERI.

The SCRC brings together POPs-related organizations to ensure uniformity and quality of information, for enhanced collaboration on ideas and knowledge.

What motivated you to take up research studies on emerging pollutants in India?

As a Presidential Scholar in George Mason University, USA, I had carried out research on emerging contaminants in the Potomac River. After returning to India, I conducted this research on the Ganges by analysing its water quality from Gangotri to Ganga Sagar. The study was challenging but very insightful.

The research study revealed that during the dry season, water from the melting of glaciers can be an influential secondary source of polychlorinated biphenyls (PCBs) and high-molecular-weight polyaromatic hydrocarbons (PAHs) in the higher ranges of the Ganges. These observations point to the importance of legacy chemicals as contaminants recycled from melting glaciers and emphasize that the source deserves serious consideration when analysing seasonal changes in the ecosystem and in human exposure to POPs in this region. This study also revealed the distribution of perfluoro-alkylsulphonates (PFAS) in groundwater/ drinking water from the Ganges River basin. Out of 21 PFAS, only 14 compounds were frequently detected. The levels and patterns were very similar to those observed in the Ganges River surface water.

The study threw light on the fact that India's approach to the management of harmful chemicals, which mainly involves restrictions and bans, is generally retrospective. The limitations of this approach are clear because it does not anticipate any uncontrolled risk, such as that from new substances entering the market, and relies instead on actions taken only after the impacts of those substances on people or on the environment become evident—which may take several decades, as in the case of POPs. These have been in the environment for a while but concerns over their potential impacts on human health and environment, have been "emerging" recently. It is therefore imperative to expand the scope of managing traditional contaminants to include these emerging issues as well.

How has the Indo-Norwegian research cooperation developed and what are your key learnings from the collaboration?

I have been working with the Norwegian Institute for Water Research (NIVA) from 2011 to 2015 on a project titled: 'Climate-induced mobilization of Persistent Organic Pollutants (POPs) in River Ganga'. This was supported by the Research Council of Norway (RCN). We have also worked on a project on 'Endocrine Disrupting Chemicals (EDCs) in food and water' (2018–2022) and are now working on the 'India-Norway cooperation project on capacity building for reducing plastic and chemical pollution' (INOPOL), with a focus on Gujarat. We have established a strong collaborative platform with NIVA, The Royal Norwegian Embassy in New Delhi, and other key partner organizations in India.

The research and capacity-building projects have been very educative for us and equipped us with the latest knowledge and skills. We are now intensifying the efforts to underpin and support regulatory efforts that align with the SDG principles, and towards a green shift. With the partnership and collaboration with NIVA, we can focus on areas, and processes that require urgent attention, considering fast-paced, scientific and policy developments at the local, regional, and international levels with respect to managing plastic waste and POPs.

How do you incorporate the research findings on emerging contaminants in policy discourses in India?

Our research findings are published in peer-reviewed international journals. We also publish Policy Brief and Discussion Papers based on our study findings. These policy briefs establish clear causal relationships between exposure of emerging contaminants and health, in the context of multiple stressors. Scientists and many environmental and health organizations, including international, governmental, and non-governmental organizations, have advocated for a precautionary approach when dealing with the authorization, and use of certain chemicals. In India, there is an urgent need for more holistic chemical management and pollution control. There is also a scarcity of data on several priority contaminants in India. Our research attempts to bridge these gaps for policy action.

We have made significant contributions to some of the National Policies of India, such as the Plastic Waste Management rules in India, National Water Policy of India, National Policy Framework on Safe Reuse of Treated Used Water in India, and SDG-6 and 14.

What are the health impacts of these emerging contaminants and what measures are you taking towards its reduction?

Our research studies on POPs, EDCs, and emerging contaminants help in understanding knowledge-based recommendations for policies tailored to protect children and women (of fertile age) in India. It also helps compare the regulatory approaches and policies on endocrine disruptors identifying potential transmission value in the European Union (EU) and India.

Our Policy Briefs primarily target policymakers in India and societal actors with a stake in chemical management, food production, and distribution. It helps provide evidence, raise awareness, and inspire the development of policy and innovation in food production, effectively advocating science-based diet with lower levels of EDCs. There are no consolidated regulations dealing with emerging contaminants in India, unlike several other countries. In the absence of a policy strategy, management is characterized by a 'reactive approach' instead of the preferred preventive approach.

The time lag between a new substance entering the market and its identification as a harmful chemical can be decades, leading to persistent, multi-generational exposure in the human population. This is not only an Indian problem, but a general shortfall in most international chemical regulations, including those such as the European Union's Registration, Evaluation, Authorisation, and Restriction of Chemicals (REACH) that is based on risk evaluation and management.

The upcoming new chemical regulation in India—the Chemical Management and Safety Rules (CMSR), expected to enter into force in 2022—represents an ambitious and potentially important step forward. This is based on the principle of risk management, like EU's REACH, and will require any chemical being manufactured, imported, or placed in the Indian market (in quantities above one tonne per annum) to undergo registration and authorization following a detailed evaluation of the risk posed to human health and the environment throughout its entire life cycle.

What are the future plans of MGC towards reducing environmental contaminants?

MGC will continue its research, capacity building, advocacy, and outreach activities for sustainable management of the environment. We would be expanding our geographical area of operation to the Asia-Pacific region by conducting systematic studies on inventorying contaminants in water, sediment, groundwater, soil, and the environment. Our customized capacity-building programmes will address the Environment, Social, and Governance (ESG) Framework.

Currently, we collaborate with partner organizations in Norway, Germany, Switzerland, Australia, and the United States of America. We will expand our collaboration with Canada and Japan, and focus on job creation and skill development, along with increased transformation on the ground for a sustainable environment and healthy society. ■