



Dr. Bidyut Bikash Sharma

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EDUCATION

- **Ph.D., Environmental Science (2015)**
Gauhati University, India
Thesis Title: A Study on the Hydrogeochemistry of Kameng River, Arunachal Pradesh, India
- **M.Sc., Environmental Science (2008)**
Gauhati University, India
Specialization: Natural Hazards of NE India
- **B.Sc., Zoology (2006)**
B. Borooah College, Gauhati University, India

PROFESSIONAL EXPERIENCE

- **Guest Faculty (Jan, 2016 – June, 2020) – M.Sc. Environmental Science program; Department of Environmental Science, Gauhati University**
Courses Taught – *Environmental Pollution, Ecosystem Dynamics, Ecohydrology, Biogeochemistry, Natural Hazards, Disaster Risk Reduction, Environmental Impact Assessment*
- **Laboratory Staff (June 2013 – till date) – Environmental Monitoring & Analysis Lab; Department of Environmental Science, Gauhati University**

RESEARCH STATEMENT

My overarching research interests is within the domain of Limnology and my research focuses on environmental hydrogeochemistry, *trace element toxicology, conservation and sustainable management of freshwater ecosystems* of the Eastern Himalaya biodiversity hotspot region located within North-East India.

I am interested in identifying the sources, transport pathways and determining the fate of trace elements within the different compartments of rivers, wetlands and groundwater aquifers. A particular interest is also on the uptake, transformation and bioaccumulation of the different forms of the toxic trace element by aquatic organisms (invertebrates and fishes). My academic training in the subjects of zoology and environmental science has helped me in developing an interdisciplinary approach to address the complex socio-environmental problems related to freshwater ecosystems which includes

issues pertaining to pollution, habitat fragmentation, resource over-exploitation and water related conflicts.

Another area of research that intrigues my mind is evaluating the impact of climate change on freshwater ecosystems and understanding the adaptive strategies adopted by the marginalized indigenous communities dependent on aquatic resources for sustenance and livelihood. The whole objective of doing research on the above issues is to contribute towards the conservation and sustainable management of freshwater ecosystems and achieving the Sustainable Development Goals.

CURRENT RESEARCH

Pollution of Natural Water Resources in an Urban Landscape – Guwahati City

Currently, I am investigating the sources and pathways of trace element contamination of both surface and groundwater resources within the changing urban landscape of Guwahati city in the state of Assam, India. Within the broader framework of this project, three specific problems are being investigated:

- i. Excess Fluoride concentration in the groundwater of Guwahati metropolitan area
- ii. Pollution of the Bharalu river due to point and nonpoint sources
- iii. Contamination of the Deepor Beel Ramsar site due to leachate from municipal solid wastes dumping site
- iv. Contamination of drinking water and consequent occurrence of gastro-intestinal diseases

Urban Wetlands: Assessment of hydro-geomorphic changes, ecosystem services and conservation strategies for wetlands in Guwahati City

Within this project, multiple issues surrounding urban wetlands are addressed and the study takes into consideration the following three wetlands of Guwahati-

- Deepor Beel (RAMSAR site)
- Silsako Beel
- Sola Beel

These wetlands have been subjected to a lot of anthropogenic pressure since past few decades and to evaluate their current condition and the present study has been designed with specific objectives.

The main objectives of this project are to assess –

- i. The threats to the existing wetlands owing to loss of hydrological connectivity with watercourses and the impacts of increasing urban development
- ii. The potential of the wetlands to contribute towards the city's adaptation strategies against the impacts of climate change
- iii. The socio-economic aspects of the wetlands with special focus on identifying and quantifying wetland values.

The outcome of the projects shall help to develop a strategy to integrate the wise use of wetlands into city development projects which is currently lacking.

PAST RESEARCH

Study on the Hydrogeochemistry of Kameng River, Arunachal Pradesh

This study was focused on studying the environmental hydrogeochemistry of a high altitude river in the eastern Himalayas. My research specifically addressed the following issues in the Kameng river of Arunachal Pradesh in India:

- Spatial and temporal variations of major ions and the toxic trace metals in the river water and sediments
- Identification of sources of heavy metals in the river and determining the physical erosion rates through geochemical investigations
- Environmental implications of toxic trace elements in the bed sediments of Kameng river
- Bioavailability and mobility of toxic metals in the bed sediments of the river

Study on Arbuscular Mycorrhiza and Dark Septate Fungal Associations in Medicinal and Aromatic Plants of Guwahati city

This study was carried out with the aim of generating baseline data on the association of Arbuscular Mycorrhiza (AM) and Dark Septate Endophytes (DSE) in medicinal and aromatic plants of Guwahati city. During the study a total number of 20 species of medicinal and aromatic plants were studied. Physico-chemical parameters of the rhizosphere soil samples were also analyzed statistically and tested for its correlation and variation against percentage of AM and DSE root colonization and also mycorrhizal spore count.

Documentation of the Faunal Diversity of Amchang Wildlife Sanctuary with Special Reference to the Lesser-Known Forms

Amchang Wildlife Sanctuary was declared, as a sanctuary in 2004. The total area of the sanctuary is 78.64 sq. km. However there was no proper data available regarding the flora and fauna of the sanctuary. The study was carried out from 2006 to 2007 to prepare a checklist of faunal diversity in the sanctuary with special reference to and to find the distribution of each species inside the sanctuary.

FUTURE RESEARCH

Apart from my current research work, my future interest lies also in addressing key eco-hydrological issues with regards to the freshwater ecosystems in the Eastern Himalayan region. The complex linkages and feedback that exists among the vast range of physical, chemical and biological processes within the freshwater ecosystems are now subjected to the impacts of anthropogenic pressure. Therefore, it becomes imperative to understand not only the complex process governing the rivers and wetlands, but also the human impact on these processes and their consequences. Therefore, my future research on freshwater ecosystems shall be designed with the goal of contributing towards understanding of the - ***coupled hydro-geomorphic ecosystem response to natural and anthropogenic change.***

The key questions which I wish to address are:

- i. How do freshwater ecosystems (wetlands and rivers) respond to natural hazards (floods, landslides and earthquakes) vis-à-vis climate change scenario?
- ii. How do human induced hydro-geomorphic changes affect the cycling of biologically regulated elements (C, N & P) and toxic trace elements (Cd, Pb, Ni, As, etc.)?
- iii. How do aquatic organisms (fishes & invertebrates) respond to changes in fluvial regime due to flow regulation and habitat fragmentation?

PROFESSIONAL AFFILIATIONS

Indian Science Congress Association (L24005)

Indian Association of Hydrologists (LM-1809)

Aaranyak (A Society for Conservation of Biodiversity & SIRO) (L-055)