

Regional Development Planning Specialty Group Newsletter

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A Specialty Group of the Association of American Geographers
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Member Profile: Dr. Kumkum Bhattacharya

1. Tell us something about your educational background? What motivated you to study Geography?

From my childhood, I had a natural instinct and inquisitive mind towards knowing and understanding earth places, society, people, and environment. It would not be out of place to highlight the fact that from my early primary school class room windows the flowing River Ganga was visible. During my study, my attention towards my teacher's lecture used to get diverted towards River Ganga, and I used to look at it with my full concentration. My inquisitive mind used to raise several questions towards its origin, flow paths, etc. To begin with, Geography was first introduced as part of regular curriculum in school for our study/course at age nine, and while pursuing my school education, I found the joy of learning which satisfied my natural instinct to understand earth, environment and people through study and project works in Geography. .



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This curiosity was followed by professional training as an academician, and to continuously engage in research, teaching and discovery.

I obtained my PhD degree in Geography (2000) from The University of Burdwan, India; followed by Post-Doctoral research at the University of California Berkeley (2002-2003). I have always enjoyed maps and processes of understanding geographical phenomenon. I was really excited when I first discovered Geographic Information Systems (GIS) in 1994 while working with engineers from the Indian Institute of Technology, Kharagpur. Since then I took several courses on GIS, Remote Sensing and other courses on Microsoft technology.

I taught Geography at a college in Washington State, and so since 2004, and most of the years since then, I have been teaching and doing research. My academic pursuits reflect my interests in several global issues with particular emphasis on water use, management, regulation, conservation, sustainable development and human-environment interactions in altering fluvial landscapes including issues of the “Human Ecology of Water”. At present, I am teaching GIS/Geography courses at the University of Central Arkansas.

As an AAG Member since 2008, the first conference I attended was at Las Vegas, Nevada.

2. Tell us something about your academic research and accomplishments?

My aim is to become an accomplished teacher and scholar. As a graduate student, I worked on ‘Watershed management in flood prone watershed region of micro-order’ and delved how indigenous technological innovations help in water resource management. My PhD research addresses the impacts of control structures in the flow regime of the Damodar River as well as the way in which people, ranging from refugees to local settlers, driven by diverse cultural, economic and political forces, have transformed the fluvial landscape into hybrid landscape. Anthropogenic processes of the kind within riverbed sandbars locally known as *Char* lands/*Mana* in South Asia have not been adequately studied by geographers. My PhD dissertation has been highly appreciated by M. Gordon Wolman (Reds Wolman, Late Professor of The Johns Hopkins University, Maryland, USA). I have presented papers on environmental issues in several conferences. The research theme and my style of presentation have always drawn attention of Applied/Environmental Geomorphologists. I participated in field work in several countries and got an exposure to network with people coming from different parts of the world.

In my post-doc I worked on sediment management in aging reservoirs and reviewed status of reservoir sedimentation in California/India and tried to provide measures that can be taken for the effective management of sediment to prolong the operational life of reservoir. I have taught both Geography and GIS at Eastern Michigan University, Saginaw Valley State University in Michigan State, and at Highline Community College in Washington State.

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My book "The Lower Damodar River, India: understanding the human role in changing fluvial environment" was recently released (2011) by Springer. I am also involved in several studies exploring river flooding cycles and their relationship to both ecological and social systems with Dr. Michael J Wiley, University of Michigan. I am constantly exploring the role and place of human beings in changing natural landscape into hybrid landscape. At present, I am teaching GIS/Geography courses at the University of Central Arkansas as a Visiting Assistant Professor.

3. Who has influenced you most in your academic pursuit? What question/s, research inquiry or theoretical framework in geography were you most influenced with?

I firmly believe that my natural instinct towards Geography is a prime motivating factor in my academic pursuit as Geographer towards integrated study of the earth places, societies, people, and environments. Combined with my prime natural instinct towards Geography, the education facilities, my parents, teachers, and so many direct and indirect facilitators have facilitated me to consider Geography as the perfect platform to meaningfully consolidate all my knowledge and pursue that into an academic context.

As a motivating factor and in accelerating my process of learning Geography and becoming a Geographer, it is prudent to mention specially the name of M. Basu (Ex. Reader, The University of Burdwan), who was instrumental in sparking my interest in the way people interacted with their fluvial environment and responded as a community at both micro and macro levels. Her enthusiasm for my topic and tremendous expertise is very much appreciated. I was introduced with late Professor M.G. Wolman in 1995, while presenting paper in Singapore. He ultimately examined my PhD dissertation. In the Memorandum, dated 24 April, 2000, sent to Dr. M.K. Chatterjee, Registrar, The University of Burdwan, Professor Wolman said "If cum laude can be awarded for a dissertation, I would so vote---I would hope that the dissertation could be published as a monograph---I believe the University would be well advised to seek its publication at its cost---". He had given me the hope and encouragement to publish my PhD research as a book form. I would like to mention the names of Dr. G.M. Kondolf (University of California, Berkeley, CA), Dr. R. Stallard (USGS) and Dr. K.A. Howard (USGS) for their inputs into the development of my PhD research into a book. Presently, I am very blessed to have the support and guidance of Professors M. J. Wiley (University of Michigan), A.K. Dutt (The University of Akron), and B.K. Paul (Kansas State University). Thank you Professors! Your dedication and generosity with your time in helping me is greatly appreciated.

4. What are some research partnerships you have nurtured over the years?

I have worked at Washington State Department of Ecology prioritizing environmental cleanup activities; contributed to the development of the 'Oregon Explorer Wetland Portal'

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and helping to develop a statewide GIS database of wetlands for Oregon; and I am also involved in several studies exploring river flooding cycles and their relationship to both ecological and social systems with Dr. Michael J Wiley, University of Michigan. I am constantly exploring the role and place of humans in changing natural landscape into hybrid landscape.

5. What geography books, projects, and research papers are your favorites?

The current era is termed as the “Anthropocene” era. In different parts of the world the earth system components are now more controlled by anthropogenic processes than by natural processes. I am interested in reading books/research papers related to human-environmental interactions and changing fluvial regime and how to develop a holistic and sustainable water management system.

6. What are the leading spatial/geographical problems in the nation and the state of Arkansas?

The climate is changing and providing profound threats to our hydrological cycle and on fluvial systems. It poses danger to biodiversity and ecosystem services. There are seasonal shifts in stream flow and precipitation pattern, changes in temperature and will have a significant negative impact on ecosystem. The state of Arkansas is susceptible to air pollution impacts. Climate change will deteriorate smog and causes plants to produce more pollen pollution and will increase respiratory health threats.

7. What are the future of Physical Geography and the role of technology in understanding physical processes?

The future of Physical geography currently is very promising. In fact, it seems to be healthier than ever before. There are important emergent trends in physical geography and it will grow continuously moving forward in the twenty-first century. There is continuous development of integrated physical geography in order to understand the human-induced environmental problems and provide potential solutions. Due to flourishing technology and continuous advancement in the methods and approaches we are now familiar in using remote sensing technology to monitor the earth’s resources and human-modified environment. We are using geographic information systems (GIS), global positioning systems, and several other tools for the management of earth’s resources and in understanding physical processes.

8. You have recently published a book from Springer. Can you describe the salient features of the book?

The book published by me covers and collated the work associated with my PhD research on “Applied Geomorphological study in a controlled tropical river- The case of the Damodar between Panchet Reservoir and Falta” and the salient features covered under the same are summarized below:

1. Review and report state and community level initiatives in flood and water resources management.
2. Assess and report the impacts of river control measures on selected hydro-geomorphological parameters of a tropical alluvial river in its low gradient sector.
3. Review and report the socio-economic significance of such control measures and consequent anthropogenic changes in the fluvial environment.
4. Assessment of short-term risks and long-term benefits of release of water from the reservoirs, as well as decisions on specific land use are made on the basis of personal experience.

The river that has been selected for this work is the Lower Damodar situated in eastern part of India, a subsystem of the mighty Ganga system which was once notorious for the flood havoc. Embankments were the first control structures to tame this river. Post-independence, the Damodar Valley Corporation (DVC) followed the Tennessee Valley Authority (TVA) model and constructed four multipurpose dams to facilitate regional development and reduce flood hazards.

9. Has the Tennessee Valley Authority (TVA) model of regional development been of help in regional planning in developing countries such as India?

The Tennessee Valley Authority (TVA) model of regional development was partially implemented and has been of partial help in regional planning in developing countries, such as India. TVA Engineer, Mr. Voorduin's project provided for the full control of a “design” flood of 28,321 m³/s resulting from a rainstorm of 50.8 cm in the upper catchment, and for the controlled flood to be limited to the assumed channel capacity of 7,080 m³/s at Rhondia for which purpose it was required to construct all the proposed 7 multipurpose dams to facilitate together a total flood reserve of 3,595.6 million m³. However, due to financial and other constraints, the participating governments of West Bengal, Bihar (present Jharkhand), and the Central Government approved the construction of only 4 multipurpose dams, i.e., the Tilaiya, the Maithon, the Panchet and the Konar, which provide total flood reserves of 1,292 million m³. Land acquisition for the Maithon and the Panchet reservoirs up to the top of the gates is yet to be completed. When this is done the flood reserve will be 1,863 million m³, slightly more than half of what is required for the control of the “design” flood. With this in mind, moderation of a 28,321 m³/s design flood, or even known floods with a peak of 18,406 m³/s to the bankfull capacity of 7,080 m³/s, is not possible at present.

As per B.K. Banerjee (Ex. Hydraulic Engineer, DVC), planners and executors of DVC make a mockery of the grand plan. Although DVC dams have altered the flow regime and the sediment supply of the river, some sediment is trapped in the reservoirs. In the Panchet Hill reservoir, 55.5% of the dead storage space is filled with sediment. At the same time, 36.1% of the live storage space and 2.6% of the flood storage has also been lost in the 39 years up to 1995. In the Maithon reservoir, 55% dead storage space and 27.3% live storage space had been lost as of 2001. The sedimentation rate at the Panchet reservoir has fallen after the construction of the upstream reservoir at Tenughat. However, silting of the Panchet and Maithon reservoirs still has significant consequences below the reservoirs. Moreover, a million tons of sediment nevertheless pours into the river from the uncontrolled stretch. The capacity of the river to transport this sediment has been reduced due to the reduction of flood peaks. A chain of sandbars or *char* lands has emerged within the riverbed below the control structures. The channel deposits in the sandbars support agriculture and most of the channel bars have been settled and are now used as a resource base. Though DVC Dams provide many benefits by reducing flood flows, providing irrigation water, and securing the life of people in downstream sectors by generating electricity, yet the river is now under anthropogenic degradation. When DVC was implemented, stream corridors and floodplain were not legally encroached. Now we need a separate plan for rational and constructive maintenance and use of our water resources. We need to launch a holistic integrated catchment management initiative.

The River Basin Development and Management (RBDPM) initiatives in the People's Republic of China, apparently quite successful, are based on a different approach to that adopted in the developing countries (Sun, P., ed. 1994). In China, it is founded on local involvement, self-reliance and mutual cooperation rather than central government intervention and funding. By backing local practices rather than large-scale activities, RBDPM might achieve more positive regional development and sustainable development results (Faniran, 1981, p. 13). It is suggested and recommended that DVC and Government of India should learn from Chinese experience and visible results, and may explore the possibility of benefiting from adopting and executing under the proven guidelines based on the Chinese experience, while implementing the original plan based on the TVA model.

10. What advice will you give to young and future geographers? What should they focus upon physical versus human geography or qualitative versus quantitative approaches?

Geography is a vibrant and pertinent subject for all young and future geographers. Geographers hold the key to the world's problems, a statement not to be under rated in a world continuously shaken by environmental, political or social acts. It is a subject that inspires students to acquire global citizenship and at the same time helps to reveal the world's people, places, and environment, while also giving a hand in shaping world's future. The subject Geography is primarily and fundamentally categorized in two disciplines: Physical and Human geography. The two disciplines have to go together to find the mutual understanding, which bond the subject. The two disciplines compliment and supplement each other.