

Curriculum Vitae

Name **Rajesh Bhakar**

Date of Birth **29-11-1970**

Designation: **Post Doctoral Fellow,
Center for Studies in Science Policy,
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Career Summary

I have an M.A. in Geography from Jawaharlal Nehru University (JNU) (1993) and an M.Phil. on Geopolitics of Biodiversity Conservation from JNU (1995). I also have an M.Sc. in GeoInformation Science (2006), with specialization in Natural Hazards and Risk Analysis, jointly offered by the ITC (Netherlands) and Indian Institute of Remote Sensing (Dehradun, India). I obtained my Ph.D. in Geography from the University of Rajasthan, Jaipur (2008). I have worked as Lecturer in the Department of Geography, Govt. Dungar College, Bikaner from July, 1996 to May, 2005 and from June 2005 – July, 2009. Currently, I am affiliated with the Centre for Studies in Science Policy (CSSP), School of Social Sciences, Jawaharlal Nehru University (JNU), New Delhi as Post Doctoral Fellow.

Research Interest

My training in Geography (an interdisciplinary science concerned with understanding and explaining the physical and human environment from a spatial

perspective) oriented me towards exploration of ‘sustainability’ of specific socio-ecological processes – e.g. agricultural expansion, pasture or forest use, rural livelihoods, or developmental schemes like large irrigation project – against specific geographic, temporal and socio-ecological contexts. I use multi-temporal Remote Sensing images for data collection, GIS for spatial analysis and numerical models for simulation of environmental processes. During the course of my PhD research (2008) entitled, “Dynamics of Land-use Change in the Indira Gandhi Canal Project (IGNP) Area,” I investigated the land-cover transformation - from a rain-fed agricultural/pastoral landscape to an irrigation supported settled agricultural landscape - in the command area using integration of quantitative inputs from high resolution satellite imagery and ground survey derived socio-economic drivers of land-use/land-cover change.

I also explored of the vulnerability of the farmers in the Charanwal area of IGNP Stage-II to the erratic irrigation supply regime by extracting and comparing the actual cropped area from multi-temporal satellite imageries acquired during years when the irrigation supply is ‘normal’ and when it is ‘below normal.’ I simulated the surface-water and groundwater interaction for my M.Sc. research, using a physically based distributed model to assess the risk of waterlogging in the flow areas of IGNP Stage II. Some aspects of my research have already been published or have been accepted for publication while others are under the review process (Please refer to the publication section for details).

I am engaged with two PhD projects. The first involves simulation of the flash-flood event that struck the Kwas area of Barmer, Rajasthan in September 2006. This research involves mapping the pre and post flood landscape, creation of Digital Elevation Models of the surface topography and sub-surface impermeable layers area, and creation of rainfall-runoff model in the PCRaster environmental modelling environment. This work is being carried out using freely available remote sensing data sets viz Landsat images, Google Earth imagery and SRTM DEM. Currently, the model calibration runs are going on.

The second project proposes detailed mapping of the agricultural and pastoral resources of areas served by Anupgarh branch and Lunkaransar lift of IGNP Stage-I and Sagarmal Gopa branch of IGNP Stage-II. This research seeks to understand the impact of recurrent droughts (a manifestation of climatic variability in form of erratic

irrigation supply and precipitation regime) by quantification of the vulnerability of the irrigated agriculture to the climatic variability; inventorying the pastoral resource base; and an assessment of the actual contribution of the pastoral alternative in the overall viability of project.

Post Doctoral Research

At present I have received Post Doctoral Research award from the University Grants Commission for working on Climate Change on the Water Resources of Sutlej Basin. I am affiliated with the Center for Studies in Science Polity, School of Social Sciences, Jawaharlal Nehru University for this research. The overall objectives of this research is to assess the likely impacts of climate change on the water resources availability in the catchment of Sutlej River in the mid and late 21st century and indicate the implications for policy formulation. This research involves simulation of Sutlej rivers hydrological regime using SNOWMOD model and statistical downscaling of available Global Climate Models.

Research Publications

Published papers

- (1) Rajesh Bhakar, “Recent Advances in Geo-informatics Based Assessment of Waterlogging and Salinization Hazards: a Review of Studies of the Irrigated Tracts in Desert Environments. *Oikoassay*, Volume 24, 2011.
- (2) Rajesh Bhakar, “Extraction of Irrigation Network Details from Medium Resolution Satellite Imagery: a Comparative Assessment of LISS-III and ASTER Data Products”. *International Journal of Engineering and Earth Sciences*, Volume 3 (6), 2010.
- (3) Rajesh Bhakar, S.K. Srivastav, and Milap Punia, “Assessment of the Relative Accuracy of ASTER and SRTM Digital Elevation Models along Irrigation Channel Banks of Indira Gandhi Canal Project Area, Rajasthan”, *Journal of Water & Land-use Management*. Volume 10 (1-2), 2010.
- (4) Kamleh Punia, Milap Punia and Rajesh Bhakar, “Road Accessibility and its Role in Rural Development: A Case Study of Rajasthan”. *Annals of the Rajasthan Geographical Association*. Volume 26, 2009

- (5) Rajesh Bhakar, "Geographic Thought: A Praxis Perspective George", book review of Henderson and Marvin Waterstone (editors): *Geographic Thought: A Praxis Perspective. Annals of the Rajasthan Geographical Association*. Volume 26, 2009.
- (6) Rajesh Bhakar, Victor Jetten and S.K. Srivstav, "Delineating Spatio-temporal Distribution of Groundwater Recharge Zones Using Remote Sensing in Irrigated Landscape of Thar Desert, India". *Transactions* Volume 30(2), 2008.
- (7) Rajesh Bhakar and Vinod Singh, "Waste Disposal Sites Mapping Using Satellite Imagery and Global Positioning System in Bikaner Municipality. *Annals of the Rajasthan Geographical Association*. Volume 25, 2008.
- (8) Rajesh Bhakar, Victor Jetten and S.K. Srivstav, "Integrating Geospatial Technologies with Conventional Methods for Estimating Depth to Hydrologic Barrier in an Irrigated Arid Landscape." *Annals of the Rajasthan Geographical Association*, Volume XXIV, 2007.
- (9) Rajesh Bhakar "Re-evaluating the Sustainability of Irrigated Agriculture in Arid Zones: a Case Study of Indira Gandhi Nahar Pariyojna." *Indian Cartographer*, Volume 24, 2004, 132-141.

Papers under review

1. Rajesh Bhakar, Victor Jetten and S.K. Srivastav, "Integrating Geospatial Technologies with Conventional Methods for Identifying Areas with Potential for Groundwater Development in an Irrigated Landscape Underlain by Shallow Hydrologic Barrier", *Irrigation: Types, Sources and Problems*, InTech - Open Access Publisher, <http://www.intechweb.org/> (extended abstract submitted to reviewing editor, March 2011)
2. Rajesh Bhakar, S.K. Srivstav, Victor Jetten and R.D. Garg, Upscaling Soil-Hydrologic Parameters for Distributed Hydrological Modelling in Sandy Desert Environment. *Asian Journal of Geoinformatics*, (First revision submitted after review, February, 2011).
3. Rajesh Bhakar and Vinod Singh, "Linking Archival, Survey and Remote Sensing data for Identification of Rain-water Harvesting Sites in Bikaner City", *Journal of Water & Land-use Management*. (Manuscript submitted to the reviewing editor, February 2011)

Books (published thesis)

Rajesh Bhakar, Analysis of Hydrological System and Land Cover for Assessment of Risks to Irrigated. Agriculture in Thar Desert: Charanwala System of the Indira Gandhi Canal Project. Thesis (M.Sc.) International Institute for Geoinformation Science, Enschede, Netherlands, 2007.
www.itc.nl/library/papers_2007/msc/iirs/bhakar.pdf

Educational Qualifications

Examination Passed	Year of passing	Name of the University or other examining body	Subject
Secondary	1986	CBSE	All
Higher Secondary	1988	CBSE	Geography, Economics English History
B.A.	1990	University of Ajmer, Ajmer, Rajasthan	Geography Economic, Public-Administration
M.A.	1993	Jawaharlal Nehru University (JNU), New Delhi	Geography
M.Phil.	1995	Jawaharlal Nehru University (JNU), New Delhi	Political Geography
M.Sc. *	2006	ITC, The Netherlands	Geo-information Science & Earth Observation
Ph.D.	2008	University of Rajasthan, Jaipur	Dynamics of Land Use Change in Indira Gandhi Nahar Project Command Area 1981-2001

* M.Sc. Degree is integrated with the Ph.D. and was obtained as part of the PhD data collection and analysis carried out at the Indian Institute of Remote Sensing (IIRS), Dehradun and International Institute of Earth Observation and Geoinformation Science (ITC), Netherlands, courtesy the joint IIRS-ITC 'Geohazards and Risk Analysis' educational and training programme.

Scholarships and fellowships

- National Merit Scholarship, 1990, for obtaining First position in the college in B.A. examination.
- UGC, Junior Research Fellowship, 1993.
- UGC, Senior Research Fellowship, 1995.
- UGC Teacher Research Fellowship, 2005
- Nuffic Foundation Fellowship, 2006 (provided by the Netherlands Government for studying in Netherlands)
- UGC Post Doctoral Fellow, 2009.

Computer Skills

Software: **ArcGIS 9.3**
 ERDAS 8.7
 ENVI 4.3
 SkyPro
 Leica 500 Differential GPS
 HP GPS (PDA)

Programming Language: **PC Raster Environmental Modelling Language**