

Curriculum Vitae

Name	Sapna Bisht
Role	Research and Development
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PROFESSIONAL PROFILE	
Brief Profile	<ul style="list-style-type: none"> ✓ <i>Consultant (Uttarakhand State)</i> at NABARD Consultancy Services in Watershed Development Fund Programme. ✓ <i>Experience as Deputy Manager</i> in NRM division, Green Initiatives Certification & Inspection Agency (GICIA) IPL, Noida, India. Research and development in the “Scientific Assessment and Study on availability of Agarwood Spp. and Bamboo Spp. in non- forest areas of Assam” funded by The Forest Department, Government of Assam. ✓ <i>Assistant Environmental Expert</i> in Highways & Structures, Transportation project, AECOM, Gurgaon, India. ✓ Experience in MOEFCC’s autonomous research institute as <i>Researcher</i> in house project “Energy Use Pattern in Rural Domestic Sector of Uttarakhand State- Issues, Options and Challenges” and the Earth watch funded project “Assessment and quantification of forest ecosystem services with special emphasis on pollination in the Indian Himalayan agro-ecosystems”, GB Pant National Institute of Himalayan Environment and Sustainable Development (GBPNIHESD), Kosi-Katarmal, Almora (Uttarakhand), India. ✓ <i>Content Manager</i> in World Bank funded project “e-class”, S. Chand Technologies Pvt. Ltd. (SCTPL). ✓ <i>Teaching and guiding dissertation students</i> in Environmental Science and Geography in University, College and Schools. ✓ <i>Worked in projects</i> for dissertation during graduation and post-graduation in topics “Watershed Management” at ICAR-Indian Institute of soil & water conservation, Dehradun, India and “Drinking water quality monitoring of Dehra Doon city” at People's Science Institute, Dehradun (Uttarakhand), India. ✓ Good experience in statistics using Excel and SPSS tool. ✓ Continuously participate in poster and paper presentations in different national and international conferences.
Total Experience	11 years
Education	<ul style="list-style-type: none"> • PhD in Environmental Sciences • MSc in Ecology and Environment • Master’s in Geo-informatics
Tools	<ul style="list-style-type: none"> • ERDAS imagine 9.1, ARC GIS 9.3 , SPSS, MS Office, MS Excel, Python programming

TALKS/ POSTERS/ PAPERS

1) TALKS/POSTERS

- Poster presentation at International Workshop on “Mountain Biodiversity & Impact of Climate Change with special reference to Himalayan Biodiversity Hotspot” held at GBPNIHESD, Almora, India from 6-8 Dec, 2010.
- Oral presentation at 7th UCOST on “Eco-friendly cooking energy in rural Uttarakhand: adoption and constraints” held at Dehradun, India, 21-23 Nov, 2012.
- Oral presentation at National Conference on “Climate Change: Socio-economic & environmental issues-problems & challenges” on the topic - Issues of alternative energy use: case of rural landscape in Uttarakhand held at Meerut, India, 21-22 April, 2013.
- Bisht, S. & Chaudhry, S. (2017). Sustainability of small scale hydro power in Gagas river watershed, Almora district of Uttarakhand state. Paper selected under ISCA Best Poster Award Programme for 2016-2017 in the 104th Indian Science Congress Association (ISCA) held at Tirupati, Andhra Pradesh, India, 2-7 January, 2017.
- Bisht, S. (2018). Sustainability of energy resources in a western Himalayan mountainous watershed. **Won Best poster award** (Environmental Sciences) under ISCA Best Poster Award Programme for 2017-2018 in the 105th Indian Science Congress Association (ISCA) held at Imphal, Manipur, India, 16-20 March, 2018.

2) PAPERS

- Sharma, S. & Bisht, S. (2013). Conservation Areas, *The Himalayan Biodiversity: Richness, Representativeness, Uniqueness and Life-Support Values GBPIHED*, pp. 6972. ISBN No.: 81-927373-1-7.
- Bisht, S., Sharma, S., Chaudhry, S. (2016). Flash Flood Risk Susceptibility in Gagas River Watershed - Kumaun Lesser Himalaya. *International Journal of Advanced Remote Sensing and GIS*, Vol 5 (4), ISSN: 2320-0243. (IF: 1.69).
- Bisht, S. & Chaudhry, S. (2016). Bibliometric Indicators of Biodiversity Monitoring Using RS/GIS in Western Himalaya. *ENVIS Bulletin Himalayan Ecology*, Vol 4, ISSN: 0971-7447 (P) ISSN: 2455-6815 (O) (Global Impact and Quality Factor: 0.543).
- Bisht, S., & Sharma, S. (2018). Carbon Footprints of Liquefied Petroleum Gas Transportation in the Indian Himalaya. *Journal of Cleaner Production*. Vol 196, 1065 - 1072 (IF: 6.352).
- Bisht, S., Chaudhry, S., Sharma, S., & Soni, S. (2018). Assessment of flash flood vulnerability zonation through Geospatial technique in high altitude Himalayan watershed, Himachal Pradesh India. *Remote Sensing Applications: Society and Environment Vol 12*, 35 – 47 (SNIP IF: 1.097).

WORKSHOPS/TRAININGS:

- Training Programme on “Soil Analysis and Data Interpretation”, GBPNIHESD (UK), India.
- Workshop on “Assessing vulnerability to Climate Change: A PRA Toolkit for documenting community perceptions, responses & capacities”, GBPNIHESD (UK), India.
- Training on “Hydrologic modeling using RS/GIS with special reference to climate change”, National Institute of Hydrology, Roorkee (UK), India.
- Training on “Research Methodology and Quantitative Analysis through SPSS” held at Department of Humanities and Social Sciences, Motilal Nehru National Institute of Technology, Allahabad (UP), India.
- Training cum Exposure Programme on Watershed Management and Climate Change Adaptation conducted at WOTR, Darewadi Training Centre, Ahmednagar, Maharashtra from 23rd to 27th July, 2018
- ISO 9001:2015 Quality Management Systems Auditor/Lead Auditor Training Course.

References

Name	Designation
Prof. Smita Chaudhry	Director, Institute of Environmental Studies, Kurukshetra University, Kurukshetra, Haryana, India. smitachaudhry11@gmail.com
Dr. Subrat Sharma	Scientist D, Head (Climate Change Division), GBPNIHESD, Almora, Uttarakhand, India. subrats@rediffmail.com
Dr. Jeet Ram	Head of Forestry Department, DSB Campus, Nainital, Uttarakhand, India. jeetram2001@yahoo.com
Dr. S S Samant	Scientist and Unit Incharge, GBPNIHESD, Kullu, Himachal Pradesh, India. samantss2@rediffmail.com

Educational Qualification

Degree	Institution / University	Percentage	Year
PhD	Institute of Environmental Studies, Kurukshetra University	-----	2017
Master in Ecology and Environment	Sikkim Manipal University of Health, Medical & Technological Sciences	63.2	2006
Master in Geo informatics	Uttarakhand Open University	82	2014
Diploma in Web Centric Computing	NIIT	80	2005

Personal Details	
Date of Birth	April 20th, 1981
Sex	Female
Nationality	Indian
Languages Known	Hindi, English.

Declaration
<p>The above furnished information is true and best of my knowledge.</p> <p style="text-align: right;">Sincerely, (Sapna Bisht)</p>

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Assessment of flash flood vulnerability zonation through Geospatial technique in high altitude Himalayan watershed, Himachal Pradesh India

Article · September 2018

DOI: 10.1016/j.rsase.2018.09.001

CITATION

1

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Smita Chaudhry

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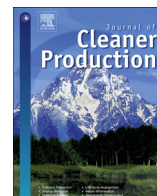
Some of the authors of this publication are also working on these related projects:



National Mission for Sustaining the Himalayan Ecosystem (NMSHE) TF 3 'Forest Resources and Plant Biodiversity' [View project](#)



The Precambrian geology of western Ethiopia [View project](#)



Carbon footprints of Liquefied Petroleum Gas transportation in the Indian Himalaya

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ABSTRACT

In developing countries such as India, supply of modern kitchen fuels such as Liquefied Petroleum Gas (LPG) involves a chain of carriers contributing directly or indirectly in emission of Greenhouse Gases (GHGs) mainly Carbon dioxide (CO₂). In view of the above, the present case study was carried out in the Himalayan region to estimate the carbon miles (CO₂ emitted per km of travel) of LPG transportations. The methodology included relevant variables in the LPG supply chain viz., the vehicular types and loads, fuel types and vehicular performance, distances travelled, and supply routes in the mountainous and the plain regions. These were collated by intensive monitoring, primary data collection, and using records obtained from line departments. In the analysis, it is estimated that on an average 60 g of carbon is emitted by transporting a cylinder of 14.2 kg per km of distance thus defining the carbon miles of LPG transportations. The vehicular types and distances travelled were the most determining factors influencing the carbon miles. It is recommended that considering LPG's ever increasing consumer growth, the cumulative and the multiplying effect, there is a need to review efforts in environmentally efficient transportations of such fuels especially in growing economies such as India.

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1. Introduction

There is an excessive volume of human-generated Greenhouse Gases (GHGs) in the atmospheric system majorly the Carbon dioxide (CO₂) which accounts for an estimated 77% of GHGs (Rahman et al., 2017). Globally, several steps are being taken up for the mitigation of carbon emissions for an e.g., the mensuration of GHGs intensiveness of different products, bodies, and processes, is one such vital mitigation strategy (Wiedmann and Minx, 2007). Due to its large quantity present in the atmosphere and also because of its human induced nature, more focus on CO₂ emissions have been given and thus it is sometimes also referred to as carbon emissions as in carbon footprint (Seyfang, 2008). Since the year 2000, the increased CO₂ emissions are driven by enhanced economic growth and increased carbon intensity (Le Quéré et al., 2016). In all the Intergovernmental Panel on Climate Change (IPCC) scenarios of fossil fuel, an increase in CO₂ emissions over the next few decades with a large spread in emissions estimated up to the year 2100 is depicted (Myhre et al., 2009).

India that constitutes 17.31% of the world's population is still in dilemma and often following the developmental markers set and tested in different socio-techno-economical spheres of the developed countries. Modern kitchen fuels such as Liquefied Petroleum Gas (LPG) are considered a better environmentally suitable alternative of primitive cooking energy i.e., those obtained from biomass (fuelwood, crop residue, etc.). The current and future scenarios become more crucial since after the countries such as China and USA, India at present is the third largest consumer of LPG in the domestic sector. In the country, nearly 3 million LPG cylinders are being delivered, daily (MOPNG, 2017). The total consumption is ever growing with an annual increase of 8% due to coupling of rapid growth of population and rising paying capacity.

In one of the studies on GHG emissions, Johnson, E. 2009 on the basis of comparison of carbon emissions analysed that cooking with LPG rather than charcoal combats global warming and deforestation. The author studied the carbon footprint of LPG distribution and assessed it to be 42 kg CO₂e/t LPG. Singh et al., 2014 evaluated and compared environmental performances of 10 fuel sources used in Indian households using life cycle assessment methodology. In the study LPG was considered a preferred fuel for urban areas based on its lower environmental impact as compared to others. Ramachandra et al., 2017 analysed household activities

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Flash Flood Risk Susceptibility in Gagas River Watershed - Kumaun Lesser Himalaya

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Abstract Himalayan region is highly susceptible to natural hazards particularly those that are triggered by the action of water. Due to the vast topographical diversity, events of 'peak runoff' pose various risks to small villages located at the watershed's foot area. In this study, for the purpose to estimate flash flood risk along the Gagas River in Kumaun lesser Himalaya, high-resolution Digital Elevation Model (DEM) coupled with Geographical Information Systems (GIS) were utilised. The region experiences frequent storm events especially in the monsoon season. The river basin is also an evolving HELP basin endorsed by UNESCO as part of its global efforts for restoration of languishing river systems. Variability in the climatic conditions has imposed undue pressure on the livelihoods for survival. Relevant morphometric, topographic parameters and maximum runoff of the sub-watersheds of Gagas river watershed were computed in the GIS environment and were analysed to understand the drainage basins susceptibility to the flash flood hazards. These measurements allowed prioritising the sub watersheds in the presence of a series of rainstorms that generate unusual runoff volumes. Map representing hazard zones of sub-watersheds were identified and classified into four susceptibility groups (very high, high, moderate and low). The knowledge of flash flood susceptibility is important in mitigating the losses incurred to agriculture, irrigation systems, watermills, and recreational activities; and in the proper management of water resources.

Keywords *Morphometry; Flash Floods; Himalaya; Prioritisation*

1. Introduction

In complex mountainous environment such as Himalayas, due to their high susceptibility to natural hazards such as debris flows, debris floods, and flash floods, hydric analysis is very important, so that appropriate risk management could be initiated. The unprecedented rate of Climate Change causing increase in high intensity rainfall and decrease in low and medium intensity events renders the situation more vulnerable to the after effects (Goswami et al., 2006; ICIMOD, 2007).

Flows hastened by intense rainfalls are often referred to as "flash floods", these, according to IAHS-UNESCO WMO (1974) are defined as sudden floods with high peak discharges, produced by severe



Conserving cold Desert habitats- Hemis National Park © Subrat Sharma

Conservation Areas

Promoting Conservation in the Himalayan Region

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The new vision of CBD (Convention on Biological Diversity) – “*Living in Harmony with Nature*” envisages that “By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people”. This calls for attention from diverse stakeholders. In this context, India is committed to protect, conserve and sustainably use the country’s biological resources through its constitution and wide-ranging policies, programmes and projects. These include the various acts (Forest Conservation, Wildlife Protection, Biological Diversity etc.), action plans (National Biodiversity, Wildlife 2002–2016, River, Lakes etc.), policies (Forest, Environment etc.), programmes (MAB India), and bodies (Indian Board of Wildlife, apex advisory body headed by the Prime Minister, which oversees and guides the implementation of various schemes for wildlife conservation; National Biodiversity Authority, State Biodiversity Boards etc.). Among others the Indian Himalayan Region (IHR) is one of the priority areas for ecosystem conservation in the country.

Richness & Representativeness

Three bio-geographic zones (Trans-Himalaya, Himalaya, and North-east India) represent the administrative spread of the IHR, and nearly 8% of the total landscape is under legal protection through National Parks and Sanctuaries. In numbers and area coverage of PAs, the IHR shares considerably large part of PA network in India: Total PAs 22.0% (133 of 672 in India), PAs coverage 29.1% (45,774 km² of total 1,57,572 km² in India). Representation and richness of PAs in different Biogeographic Zones of IHR is given (Table 16.1). The initial conservation efforts (1935) in the country took off from the IHR only with the establishment of the Corbett National Park (second in the country for hosting more than hundred tiger population). The physiographic diversity of IHR ranges

from ~250 m to >7,000 m asl encompassing elements of subtropical to tundra type biomes. Major habitat types are forests, high altitude wetlands, and cold deserts. More than one third (9) of the declared internationally important wetlands of India (25) are located in the IHR. The foothills of IHR are habitats for three major terrestrial flagship species (tiger, elephant, and rhino) while high altitudes for snow leopard, Tibetan antelope, wild yak, and Himalayan tahr. Three Tiger Reserves, located in this region, cover 0.7% of total geographical area. Besides the tiger conservation programme, some of the designated Elephant Reserves are also located in the region, viz., Kameng in Arunachal Pradesh, Garo Hills in Meghalaya, and the Shivalik in Uttarakhand. Among others, the region is well represented in Biosphere Reserve (BR) network of India. Of the existing 18 BRs, 5 are exclusively Himalayan Biosphere and Tiger Reserves in the Indian Himalaya are shown (Table 16.1).

Uniqueness

Most of the Himalayan landscape is part of the either Himalayan biodiversity hotspot or Indo-Burma biodiversity hotspot. The vertebrate faunal elements in the Himalaya provide a high degree of diversity and endemism at species level. High endemism in fish species occurs in the Himalayan region as compared to the country (25.7% vs. 8.7%, respectively). Many of the plants are endemic to these mountain ranges (~40% of the flora) particularly in the high altitudes, and alpine/sub alpine areas. In total Himalayan flora represents 71 endemic genera. Five families are endemic to the region (*i.e.*, Tetracentraceae, Hamamelidaceae, Circaeasteraceae, Butomaceae, and Stachyuraceae), while over 90% of the species in Berberidaceae and Saxifragaceae are reported as endemic to the Himalaya. High endemism makes the Himalaya a highly significant area from the conservation and protection point of view.



BIBLIOMETRIC INDICATORS OF BIODIVERSITY MONITORING USING RS/GIS IN WESTERN HIMALAYA

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ABSTRACT

A bibliometric analysis of published biodiversity monitoring studies using remote sensing and geographic information system was carried out to quantitatively evaluate scientific research on various categories in a long span of 19 years between 1996–2015 in the western Himalayan states of India. The common remote sensing platform sensors and scientific production of RS/GIS papers in any journal of all subject categories were studied. Studies related to geospatial modeling, invasive species, land use dynamics, phenology, forest fire and fragmentation, biodiversity assessment and mitigation as main subject categories in biodiversity research were analyzed. In the western Himalayan region, land use dynamics was the most important subject category followed by geospatial modelling. Medium to high spatial resolution sensors (e.g., Landsat, IRS, SPOT, ASTER) were used in studying all the subject categories. The published output analysis showed that RS/GIS research concerning biodiversity steadily increased over the past 19 years and the paper production in 2011–2015 was about 21 times 1996–2000 production outputs. The growth of article outputs has increased tremendously since 2011. Journal of the Indian Society of Remote Sensing and Current Science were most active journals in this field. Uttarakhand was the largest contributor in the region's biodiversity studies followed by Himachal Pradesh. The study revealed use of different sensors, and pattern in scientific outputs and subject categories highlighting the topics for further research advancements.

Keywords: Bibliometry, Western Himalaya, RS/GIS, Biodiversity.

INTRODUCTION

Biodiversity monitoring, by evaluating spatial (e.g. range), temporal (e.g. phenology) and self (e.g. physiology) trends is valuable to infer causes of biodiversity changes. Observational data and model simulations by the use of highly advanced computer software, multimedia and virtual reality technologies as well as global positioning systems, multi-source spatio-temporal data (weather stations, seismometers, gauges etc. and society) has literally opened up whole new areas of ecological research and analysis. Global coverage by data from Satellite Remote Sensing (SRS) such as, geostationary and

polar orbiting satellites at a variety of resolutions enable decision makers to use these technologies for developing prevention, mitigation and adaptation measures to solve the questions relevant to environmental issues (Fischer-Kowalski; Haberl 2007). Mountains are particularly rich in biodiversity, providing various ecosystem services, but are being highly vulnerable to degradation, due to increased socio-economic progression and high sensitivity to climate within short distances (Shrestha 2007). Western Himalayan region of India covers three states of India viz. Jammu and Kashmir, Himachal Pradesh