

APPLICATIONS OF SATELLITE DATA FOR ASSESSING NATURAL DISASTERS RISKS IN THE HIMALAYAS

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The total population of the Himalayas is about 55 million out of which more than 75 per cent live in rural areas and largely depend on subsistence cultivation of crops mixed with animal husbandry. Several parts of the Himalayas in India and Nepal experienced flood disasters during June 2013. India reported more than 5700 people killed due to these floods in the Uttarakhand State whereas hundreds of tourists in the down-stream areas could not be counted. The death toll in Nepal was about 1000 people. The damage of property and infrastructure was huge. These floods were caused by the unprecedented and erratic pattern of pre-monsoon rains. The societies living in the Himalayas face a range of natural disasters every year. It is not only these cause lot damage to people, resources and property but pose big questions about the future development processes. It is evident that these societies are highly vulnerable to the observed natural disasters although there are variations in their magnitude as well as their spatial and temporal patterns.

Overall objective

The broader objective of this project is to enhance the presence of Austrian institutions of excellence in South Asia as well as strengthen academic and scientific collaboration with the institutions of higher education in India, Nepal and Bhutan. The strengthening of collaboration requires understanding of the potentials and development of capable human resources across various disciplines and professions thus this project addresses academic and scientific requirements expressed by the partner institutions in South Asia.

Specific objective

organize a short intensive Faculty-Development Workshop and an Expert level Seminar at the host institution for disseminating the outcomes of the workshop. The reason for organizing a short intensive multi-partner GIScience Capacity Building Workshop and Dissemination Seminar is to share the 'know-how' regarding the methods of identifying crucial factors like natural, social indicators of environmental and socio-economic changes in mountain environments, and to generate higher multiplier effect within a short period (1 week) and initiate a network for future cooperation.

Scientific intervention

An extensive understanding of the natural and social patterns across the Himalayas and an intensive analysis of natural disasters require identification of various determining and influencing factors as well as interdisciplinary methodologies and sophisticated technologies for analyzing their spatial and temporal interrelationships. GIScience has developed the methods for capturing, processing and analyzing various types of spatial information and have the tools for re-presenting the present, reconstructing the past and projecting the future scenarios. The applications of Geoinformatics for analyzing the permutation and combinations of various spatial and temporal indicators of rural development as well as natural resources, sustainable planning and decision making, development policy framing etc. have been well established during the recent decades.

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However, the capabilities to perform sophisticated analysis based on Geospatial techniques are not sufficiently developed everywhere and a 'transfer of know-how' from expert institutions to other collaborating institutions ensures contribution to the institutional capacity building process. The main role of the experts from Commission for GIScience of the Austrian Academy of Sciences and the partner institution is to deliver the faculty development workshop and train the faculty members and post-graduate students from the participant institutions in apply "Geoinformatics for Planning Sustainable Rural Development in the Himalayas" in specific and in mountain environments on a broader scale. The mission of the Commission for GIScience of the Austrian Academy of Sciences is to play a leading scientific role in promoting Geoinformatics in society, economy and academic institutions in Austria and internationally. This is achieved through an advisory role for stakeholders, publications and organization of conferences and workshops as well as the development of position papers on critical issues. The above mentioned mission is achieved through several specific streams of research and applications expertise. 3 major streams relevant to this project are following:

1. Learning to Think Spatially

Successful communication of spatial knowledge is required across all segments of society. Starting from cognitive aspects, facets of situated learning and interaction with visual stimuli lead to research questions important for a (Geo-) Information Society.

2. Spatial Analysis and Modeling

The spatial research questions address GIS-based information extraction from remotely sensed imagery, multidimensional geostatistics and the modeling of dynamic processes. Various methods are used for flexible regionalization to identify the expected problem regions.

3. Time & Space

Conventionally, these meta-dimensions have not been treated from integrated perspectives. Temporal enabling of data models and analytical strategies is indispensable for spatial monitoring, analysis of rapidly changing dynamics in natural and social indicators over space.

This project has been designed in consonance with the mission of Eurasia Pacific Uninet. It promotes multilateral scientific cooperation by organizing a joint workshop and conference to establish contacts and scientific partnerships by sharing the 'know-how' between Austrian Institutions of excellence in GIScience and relevant member institutions of Eurasia Pacific Uninet in South Asia. The major role of the participant institutions from Bhutan, India and Nepal is to benefit from the expertise achieved by the experts at the Austrian institutions through a process of 'know-how sharing' promoting contribution to the institutional capacity building process.

Project activities

- seminars covering conceptual understanding of physiographic climatic and economic characteristics of the Himalayas, fundamentals of Geospatial Technologies, identification of various indicators to analyze spatial patterns rural economy and alternative socio-economic activities.
- 'hands-on-training' of GIS and Remote Sensing technologies, and exploring practical applications of various indicators for generating various scenarios for assessing socio-economic vulnerability of the agrarian population in South Asia.

GIScience is an applied science based on the intensive use of computers and it requires understanding of both theoretical and practical parts of the discipline.