



**Eesti Maaülikool**  
Estonian University of Life Sciences



ИРГОСЫЙ ФЕДЕРАЛЬНЫЙ УНИВЕРСИТЕТ  
SIBERIAN FEDERAL UNIVERSITY



**UNIVERSITÄT**  
SALZBURG



**Altai-Sayan**  
Mountain PARTNERSHIP

## Sustainable Natural Resource Use in Arctic and High Mountainous Areas



Co-funded by the  
Erasmus+ Programme  
of the European Union



Department of Geography, Kumaun University, Nainital 263002, Uttarakhand



## Partner and Collaborating Institutions



Country	Institution	City
Austria	University of Salzburg (PLUS)	Salzburg
Bhutan	Royal University of Bhutan (RUB)	Thimphu
Estonia	Estonian University of Life Sciences (EULS)	Tartu
Germany	University of Bremen (UniHB)	Bremen
India	Lawaharlal Nehru University (JNU)	New Delhi
	Kumaun University (KU)	Nainital
	Central Himalayan Environment Association	Nainital
Russia	Altai-Sayan Mountain Partnership (ASMP)	Gorno-Altai
	Gorno-Altai State University (GASU)	Gorno-Altai
	Russian State Hydro-meteorological Siberian Federal University (SibFU)	St.-Petersburg Krasnojarsk

The Department of Geography is one of the Lead Partner institutions of the multi-institutional collaborative Educational and Research Capacity Building Project on 'Sustainable Natural Resource Use in Arctic and High Mountain Areas' [SUNRAISE] along-with nine Universities of excellence in Europe, funded by the European Union [EU]. The Department has modernized its Post Graduate Curriculum with experiences gained from the SUNRAISE Partner and Collaborative Institutions and a range of other stakeholders, and made the Post Graduate Academic Programmes more mountain and community oriented

### **SUNRAISE Main Objectives and Expected Outcomes**

#### **■ New Curriculum Contents:**

Development of new and revision of existing BSc/BA; MSc/MA and PhD Courses; and Research Training Guidelines

#### **■ E-learning Suite:**

SUNRAISER – Learning management system, e-modules and Massive Open Online Course [MOOCs]

#### **■ Stakeholder Engagement:**

Sectoral Collaborative Platforms [SCPs]

#### **■ Capacity Development and Sustainability:**

Training in subject areas; teaching and curriculum development methodology; application of ICT; and stakeholder engagement

#### **■ Dissemination:**

SUNRAISE Web and social media; corporate and mass media; conferences and workshops; newsletters and news updates; open-call training events; educational

publications, open access e-learning materials

### **Kumaun University is Moving Ahead With Project Activities**

#### **Development of New Curriculum and Revision of Existing Courses**

**The following new courses have been introduced:**

#### **[1] Climate Change Impacts and Adaptation in Himalaya**

This one full semester course provides the M.A./M.Sc. Semester-III students of Geography basic understanding of climate change and its fundamental concepts; and knowledge about the trends of Climate Change in Himalaya. Besides, it will also introduce students to climate change induced natural disasters, climate change vulnerability assessment; and methods, techniques and approaches of climate change adaptation in Himalaya. The course includes individual assignments. This course has been designed with a view to help students in developing a comprehensive understanding and knowledge of the impacts of climate change in Himalaya and the need of evolving and implementing effective adaptation strategies. The main objectives of the course are: (i) to help students in understanding the increasing impacts of climate change on natural and socio-economic systems in Himalaya; (ii) to provide students with the state-of-art recent knowledge about the climate change induced natural disasters in Himalaya; and (iii) to appraise students about the need of developing effective climate change adaptation strategies and

mainstreaming climate change adaptation in development planning.

## **[2] Integrated Mountain Development with Special Reference to the Indian Himalayan Region**

This one full semester course provides the M.A./M.Sc. Semester-I students of Geography the basic understanding of the environmental significance of the mountain regions and the need of their sustainable development. It will present a comprehensive socio-ecological overview of the world's mountains and the impacts of the process of global environmental changes including climate change on high mountain regions, specifically Himalaya. Besides, it will also introduce students to mountain natural resources and role of local institutions mountain environmental governance; and need, approaches and strategies for sustainable mountain development. The course includes individual assignments. This course has been designed with a view to help students in developing a comprehensive understanding and knowledge of the critical environmental and developmental issues of important mountain regions of the world and need of their sustainable development in context of the Indian Himalayan Region. The main objectives of the proposed course are: (i) to help students in understanding the environmental and socio-cultural significance of mountain regions; (ii) to equip the students with the state-of-art recent knowledge about process, drivers and impacts of the environmental changes in the high mountains; (iii) to educate students about the role and significance of mountain institutions in environmental governance and sustainability; and (iv) to make students to realize to need of

sustainable development of mountain regions and their people.

**The following existing courses have been revised:**

### **[1] Natural Resource Management**

This one full semester course provides the M.A./M.Sc. Semester-I students of Geography the basic understanding of the significance and relevance Integrated Watershed Management in the management of natural resources in the mountain regions. It will present a comprehensive overview of the relevance and significance of Integrated Watershed Management approach for sustainable development of high mountain ecosystem in the era of global environmental changes, particularly climate change and environmental degradation with specific reference to Himalaya. It will also highlight the importance of watershed management in mainstreaming climate change adaptation and disaster risk reduction in mountain regions, particularly in developing countries. The course includes individual assignments. This course has been designed with a view to help students in developing a comprehensive understanding and knowledge of the Integrated Watershed Management approach and its significance and rationale for sustainable mountain development in context of the Indian Himalayan Region. This course will help in developing a complete understanding of concept of and process of natural resource development, and their conservation and management using application of Remote Sensing (RS) and Geographic Information System (GIS) with special reference to high mountains and Himalaya. To help students in understanding the concepts of natural

resources, learning methods of resource analysis and mapping, and developing natural resources information system using geo-spatial techniques. The main objectives of the course are: (i) to understand the process of natural resource development in varying natural and socio-economic, and legal environment; (ii) to demonstrate the application of state-of-art Remote Sensing (RS) and Geographic Information System (GIS) with special reference to high mountains specifically Himalaya; (iii) to help students in learning concepts and approaches of natural resources management and understanding its inter-linkages with sustainable mountain development in context of Himalaya

## [2] Integrated Watershed Management

This one full semester course provides the M.A./M.Sc. Semester-IV students of Geography the basic understanding of the fundamental concept of natural resources and of the process of resource development. The students would learn the applications of remote sensing and Geographic Information System in natural resources analysis and mapping in the mountain regions. It will present a comprehensive overview of the carrying capacity and productivity of natural resources in high mountains with specific reference to Himalaya. It will also impart education to the students about the various approaches of natural resource management in high mountains in context of Himalaya. The course includes individual assignments. This course has been designed with a view to help students in developing a comprehensive understanding and knowledge of the Integrated Watershed Management approach and its significance and rationale

for sustainable mountain development in context of the Indian Himalayan Region. The main objectives of the revised course are: (i) to help students in understanding the significance of watershed approach in sustainable mountain development; (ii) to provide students with the state-of-art recent knowledge about the relevance of watershed approach in climate change adaptation and Disaster Risk Reduction mountains; (iii) to educate students about the rationale and importance of Trans-boundary Watershed Management in Himalaya; and (iv) to make students to understand upstream and downstream linkages in river-basin system

A comprehensive assessment of both the new and revised courses have been carried out by different stakeholders, students and teachers. Besides, the quality assessment of course framework has also been done by the external expert appointed by EU.

In order to help the students to prepare the new and revised courses Kumaun University Faculty has prepared comprehensive Lecture Notes

### Lecture Notes

## Climate Change Impact and Adaptation in Agriculture

[With Special Reference to Himalaya]

Prakash C. Tiwari  
Professor  
Department of Geography



Kumaun University, Nainital  
Uttarakhand, India  
Email: pctiwari@yahoo.com

### Lecture Notes

## Natural Resource Management

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Department of Geography



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**Lecture Notes**

**Mountains:**  
Definition, Classification, Significance, Marginality, Vulnerability, Environmental Changes and Sustainable Development



**Authors:**  
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**Lecture Notes**

**Integrated Watershed Management:  
Meaning, Concept, Significance and Approaches**



**Authors:**  
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Nainital-263 002, Uttarakhand, India  
*and*  
Dr. Bhagwati Joshi  
Department of Geography  
Government Post Graduate College [Kumaun University]  
Rudrapur 263153 Uttarakhand, India

## Participation in SUNRAISE Meetings, Workshops, Conferences and Summer Schools

### Kumaun University Faculty Actively Participated in SUNRAISE Kick-off Meeting, Bremen 2018



Kumaun University Faculty participated in the SUNRAISE Kick-off Meeting at University of Bremen, Bremen, Germany. The participant interacted personally with other partners of the project during the meeting, and developed comprehensive understanding of their academic and scientific programmes and capacities in the context of high mountains, based on the presentation made by the partner institutions. The participant also made a detailed presentation on the mountain specific academic and research programmes of Kumaun University; and interacted with other participants on the scope and possibilities of collaboration for the effective implementation the project. The participant learned about the

objectives, contents, time schedule and partners' responsibilities related with the implementation of the project. The participant participated in the discussion on various important project management issues including financial and administrative procedure and reporting; different work packages and roles and responsibilities of project-partners, development of e-services; organizational arrangements of the project; curricula and learning contents; quality control and monitoring; dissemination and utilisation of results; development of project website; project management platform; and planning the activities of the project for Period-II.

**Organized Stakeholders' Workshop at Kumaun University in Nainital on 21 May 2018**

The Department of Geography, Kumaun University, Nainital organized one-day Stakeholders' Workshop in Nainital on 21 May 2018. The main objective of the Workshop was to obtain the feedback and suggestions from a wide range of stakeholders including academic institutions, government organizations, training institutes, research and development organizations, Non-Governmental Organizations and private sectors; and incorporate the highly relevant proposals in the mountain specific multi-disciplinary curriculum development process in higher education system of the Himalayan Universities. More than 40 participants from Kumaun University and its affiliated colleges, Jawaharlal Nehru University, New Delhi, University of Salzburg, Austria; Uttarakhand Academy of Administration, Nainital; Central Himalayan Environment Association, Nainital

participated in the workshop and interacted with the resource persons. The workshop panellists included Professor Juergen Breuste, University of Salzburg, Austria; Professor P. K. Joshi, School of Environmental Sciences, Jawaherlal Nehru University, New Delhi and Dr. Pankaj Tewari, Executive Director, Central Himalayan Environment Association, Nainital. The recommendations of the Workshop are as follows:



**विश्वविद्यालय के पाठ्यक्रम में शामिल किया जाए पहाड़ का परंपरागत ज्ञान**

जामश संसददात, नैनीताल : पहाड़ के पारंपरिक ज्ञान को अब वैज्ञानिक माध्यम से गिनना शुरू है। यूनिवर्सिटी ऑफ़ नैनीताल के सहयोग से नैनीताल में आयोजित कार्यक्रम में एक कक्ष में पहाड़ से जुड़े लोगों के ज्ञान को वैज्ञानिक रूप से मापने का प्रयास किया जा रहा है।

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**कार्यशाला**

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- The process of urban growth is not only rapid but also unplanned and unsystematic in the Himalayan Region, and this has not only emerged as one of the major drivers of land use change and depletion of natural resources. In view of this, Sustainable Mountain Urban Development should be included in the higher education curriculum across the Himalayan Universities.
- It was suggested by almost all the participants that in order to conserve natural resources and ensure the well-being of local communities the knowledge on 'Integrated Mountain Development' should be created and incorporated in Master's Programme in Geography, Environmental Sciences and Social Sciences in the higher education institutions in the Himalayan Region.
- It was deliberated and agreed upon that improvement of rural livelihood is now being considered as basis of rural development in the mountain region where due to constraints of terrain and climate subsistence farming constitutes the main source of rural livelihood. Hence, the livelihood opportunities in non-traditional sectors, specifically ecological tourism, value addition and marketing need to be explored through their induction in higher education curriculum.
- It was recommended that climate change adaptation and disaster risk reduction programme should be integrated into the overall process of development planning at watershed level in the Himalayan mountains, and this should find important place in the higher education system.
- Most of the stakeholders strongly recommended that documentation and preservation of mountain traditional knowledge need to be included in higher education programmes as this is being urgently required not only for the sustainable natural resources governance; but also for evolving effective strategies for climate change adaptation and disaster risk reduction in mountain regions.
- Forest, Water and Biodiversity Conservation emerged as one of the important components for higher education system in Himalaya.
- Besides, both panellists and participants observed that specific training modules should be developed on key identified mountain specific issues such as, sustainable mountain urban development; climate change adaptation, improving rural livelihood; disaster risk reduction, documentation and preservation of traditional knowledge; and incorporated in training programmes organized for university faculty and policy planners in different Training Institutes located in the Himalayan Region.

**Kumaun University Participated in  
SUNRAISE Workshop in JNU, New Delhi  
in May 2018**

Professor P. C. Tiwari and Dr. Bhagwati Joshi participated in the Stakeholder Workshop organized by JNU on 17 May

2018 Professor P. C. Tiwari made presentation on 'Integrating Local Developmental Needs with Global Priorities: Mainstreaming Higher Education for Sustainability of Himalayan Ecosystem' and incorporated suggestions and feedbacks provided by workshop participants. Professor Tiwari and Dr. Joshi have had comprehensive discussion with the invited experts, academicians and students on development of new mountain curriculum and modifications in the existing ones at KU



**Participation in Erasmus+ Capacity Building in Higher Education- (CBHE) Cluster and Bilateral Meetings**

Professor P. C. Tiwari and Dr. Bhagwati Joshi represented SUNRAISE [India] in the Cluster Meeting and made comprehensive presentation on the objective, scope, expected outcomes, deliverables and on the overall progress of the SUNRAISE. Professor Tiwari participated in the bilateral meeting with EACEA Officials and have had fruitful discussion on the various aspects related with the implementation of the project. Professor Tiwari have had productive discussion with the EACEA Officials and representatives of other institutions.

**Kumaun University Faculty Participated in SUNRAISE Meeting in JNU, in April 2019**





During the meetings detailed discussion held with Professor Igor Novopashenny and Professor P. K. Joshi on the possibility of organizing proposed SUNRAISE Conference in Nainital in 2020, potential participants, logistics and the structure of the event. Comprehensive discussion with Professor Igor Novopashenny on the implementation of the new and revised M.A./M.Sc. courses and evolving mechanism for ensuring efficient overall and local coordination of the project activities. Discussion held with Professor Igor Novopashenny on resolving the practical constraints related with staff-cost, VAT/GST and the procurement of equipment under the project. Prospects and challenges related with incorporating recommendations of the workshops held in JNU and Nainital were discussed and resolved.

**Kumaun University faculty participated in International Workshop on ICT Tools and Methods for Curriculum Development Estonian University of Life Sciences, Tartu, Estonia, 19-24 May 2019**

Participated in E-Learning courses workshop and interaction with partner institutions working on the development of

E-learning programmes. Discussion held with partner institutions on the development and implementation of E-Learning courses at KU. Participated in group discussions on the scope and possibilities on implementation of E-learning programmes. Developed the structure and framework of MOOCs on the 'Understanding of Marginality and Vulnerability of High Mountain Ecosystems' with Russian Partners. Participated in the workshops on joint work on interactive and/or audiovisual features of e-courses. Participated in Hands on Training on e-learning modules in computer lab of the institute.. Participated the field-course on good practices of wetland ecosystem management.

**Participation in SUNRAISE –SURE Summer School URBAN + MOUNTAINS 07-14 July 2019, Salzburg, Austria**

Two faculty members and two Ph.D. Students participated in summer. Professpr Prakash C. Tiwari delivered talk at the summer school on High Mountain Urbanization. Faculty and students Interacted with the resource persons and participants of the workshop on the various issues related with sustainable resource use and urban development planning in high mountains. Faculty members of Kumaun University participated in the Project Management Meeting. Detailed discussion held with the coordinating institutions and on the possibility of organizing proposed SUNRAISE Conference in Nainital in 2020, potential participants, logistics and the structure of the event. Detailed discussion held with project partner institutions and coordinating institutions on the successful

implementation of SUNRAISE. Faculty members and students of Kumaun University also participated in the field-course on sustainable landscape management in high mountain areas.

## Participation in SUNRAISE Pilot Testing Workshop held from August 12 to August 18, 2019



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Royal University of Bhutan  
College of Natural Resources  
Lobesa: Punakha.

### SUNRAISE Piloting Workshop, 12-18 August 2019

Professor Prakash C. Tiwari and Dr. Bhagwati Joshi of Kumaun University participated in SUNRAISE Piloting Workshop as a Resource Persons organized by the College of Natural Resources, Royal University of Bhutan, Lobesa, Punakha. on 12-18 August 2019. Professor Prakash C. Tiwari delivered talks to the student of Piloting Programme. Dr. Bhagwati Joshi organized practical exercises on the vulnerability assessment of urbanization in Bhutan Himalaya. Interacted with the resource persons and participants of the workshop on the various issues related with sustainable resource use and urban development planning in high mountains. Detailed discussion held with participating institutions on the successful implementation of SUNRAISE





**Participation in Project Meeting, Workshop, Seminar and Conference in Russia 22-30 November 2019**  
**Faculty members of Kumaun University participated in different scientific, educational and academic activities organized by the Russian Partner Institutions from 22 to 30 November 2019**

- Kumaun University faculty members participated and made presentation on 'Urbanization in Himalaya: Understanding the Process and Option for Sustainable Development', in the International Workshop at Pskov State University, Pskov, Russia, 21-23 November 2019
- Participated and made presentations on 'Climate Change and Rural Out-migration in Himalaya', in the International Science Education Seminar on 'Global and Regional Environmental Changes in High Mountains', at Russian State Hydro-

meteorological University, St. Petersburg, Russia, 24-25 November 2019

- Delivered online Plenary Lecture on 'Trans-boundary River Basin Management in Himalaya for Sustainable Development and Peace and Security in South Asia under Climate Change, in the International Conference on 'Trans-boundary Regions under Global Change: Current Challenges and Development Trajectories' at Gorno-Altai State University, Gorno-Altai, Russia, 26-28 November 2019
- Meeting held with Prof. Igor Novopashenny and Indian, Bhutanese and Russian Partners on Development of MOOCs
- Meeting held with Prof Igor Novopashenny about procurement of equipment and financial management of the Project
- Discussion also held with Prof. Igor Novopashenny and Indian, Bhutanese and Russian Partners on the smooth implementation of the Project and organization of SUNRAISE Conference in Nainital in March 2020



## Kumaun University Jointly Organized Webinar with JNU, New Delhi on COVID 19: Himalayan Environment in May 2020



**12<sup>th</sup> Webinar**  
**COVID19 – Himalayan Environment**

**Panelists**

**Prof. B D Joshi**  
*is Emeritus Professor Fellow with Gurukula Kangri University, Haridwar with decades of immense contribution in Environmental Sciences.*

**Prof. P C Tiwari**  
*is Head Department of Geography, Kumaon University, Nainital and works on mountain environment and sustainable development.*

**Prof. P C Joshi**  
*is Dean Green Audit, Gurukula Kangri University, Haridwar with research focus in Western Himalayan Ecoregion.*

**Dr Anand Sharma**  
*is Deputy Director General (Head) Regional Meteorological Centre, New Delhi with research interest in Mountain Meteorology, and Disaster Management.*

**Connect to ZOOM**  
<https://us02web.zoom.us/j/89101432939?pwd=YSYlYkZ3hraEhENLS0d2UkVlQkxk2cW93QT09>

Meeting ID : 891 0143 2939  
Password : 951160

Date **10 May 2020 (Sunday)**  
Time **0700 – 0800 pm**

**Coordinator**  
**Prof. P K Joshi**  
*is Chairperson, Special Centre for Disaster Research, JNU. His interest lies in geospatial modeling for landscape analysis, ecosystem and climate change studies.*

**Organizer**  
Special Center for Disaster Research (SCDR)  
Jawaharlal Nehru University (JNU), New Delhi

with  
Climate Resilient Observing-Systems Promotion Council (CROPC)

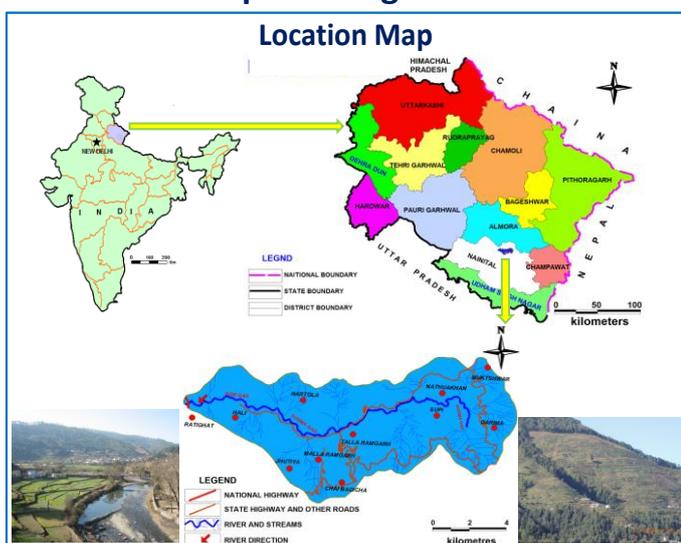
## Kumaun University Procured and Installed Equipment [Desk Top Computers, Laptop and Printer] for the Use of Post Graduate Students and Ph.D. Students



## Community based Weather Equipment Installed in the Rural Areas of District Nainital in Collaboration with Newcastle University, UK. Kumaun University Students helping rural community in taking observations and monitoring the information

In order to build the capacity of rural communities, particularly for improving women [who are the primary resource developers in the Himalayan mountains] direct access to climate information we have installed low cost automated and manual weather equipment in the Ramgad Watershed located in the Middle Himalayan Ranges of District, Nainital, Uttarakhand

### Location Map of Ramgad Watershed



- The automated weather station are located at two villages, and manual equipment have been installed in 7 villages of the Ramgad Watershed. The women have been trained in the collection and analysis of weather information

- The information is collected after every 24 hours, the climatic trends of month, agricultural season and of the year are presented and discussed in the village meeting every month.
- The students and faculty of the network member institutions of the project are most welcome to visit the weather equipment sites, interact with the community and observe the monitoring process







**Students are Training Rural Communities in Participatory Natural Resource Appraisal and Mapping in Rural Areas**



**Natural Resource Management Students Working in the Field under Supervision of Dr. Bhagwati Joshi**



**Kumaun University Organized a Series of Workshops, Stakeholders' Meetings**

**and Community Outreach Programmes in which the SUNRAISE Activities have been discussed and communicated to wider range of stakeholders**



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**Kumaun University, Nainital**

