## Equipment Utilisation

Spatial Analysis and Informatics Lab (SAIL) of the School of Environmental Sciences (SES), Jawaharlal Nehru University (JNU), New Delhi India installed and is maintaining five computer workstations and one Liquid Crystal Display (LCD) projector. The computer workstations are for accessibility of students, researchers and trainees using remote sensing data processing, geospatial analysis (including GIS/GPS) and other spatial modelling related work. However, the LCD projector is used for displaying video, images and computer data on a flat screen while carrying out training programs, discussions related to the research and as computer peripheral for teaching. The generated knowledge through the research work (MPhil/PhD) is adding to the existing knowledge, and will be extensively utilised as case studies and practical course work for MSc/MA/MPhil teaching and other training program. Maintenance of the workstations will be undertaken timely in coordination with University Computer Maintenance Cell (UCMC) working under the Communication and Information Services (CIS) of JNU, New Delhi.

Picture 1: View of the Laboratory showing the five workstations (purchased under the project)

1. **Masters (MSc/MA) Degree Program**

**Programs**

(a) Environmental Sciences (School of Environmental Sciences)
(b) Disaster Studies (Special Center for Disaster Research)

**Course work(s)**

(1) Ecosystem Dynamics
(2) Risk, Vulnerability and Resilience: Concepts and Understanding
(3) Ecosystem Approach for Disaster Risk Reduction
(4) Remote Sensing and GIS for Emergency Management
(5) Practical(s) on Remote Sensing & GIS

Around 20 plus students register for the MSc Environmental Sciences and another 20 students MA Disaster Studies. Students opting for the above courses undergo classroom teaching and laboratory work with emphasis on importance of spatial data (remote sensing) and spatial data analysis and modelling (GIS/GPS enabled). Such laboratory work ensures exposure to such dataset specific to Mountain (Himalayan) context. Students are promoted to undertake research activities under the larger domain of SUNRAISE and benefit from the developed computational facility.

Based on the exposure during the coursework, especially exposure to wide range of geospatial datasets using the developed equipment facility, some of the students take up masters dissertation (MSc thesis) work focussed to the domain of SUNRAISE project and issues in Himalayan landscape. The facility generated and maintained herewith facilitate such students opting for dissertation and research work.

## 2. Masters/Pre-PhD (MPhil) Program

**Course work(s)**

(1) Ecosystem Professes
(2) Analytical Techniques (Hands-on course work)
(3) Man & Tropical Forest Ecosystem Function
(4) Himalayan Ecology (*proposed*)

**Students' research work**

(1) Ecosystem Services vis-à-vis climate change
(2) Biomass/Carbon estimation in foothills of Himalaya

As a part of MPhil and pre-PhD course work students attend the above courses. The taught courses have a component of hands-on training cum exposure to develop better understanding on the spatial data. However, course like Analytical Techniques is much focussed on the laboratory exercises and attempts to understand the techniques in much details. Students would be utilising the developed infrastructure for effective and efficient learning in the respective domains.

Students pursuing MPhil course work work for one year project as a MPhil dissertation. Two of the students working the in the SAIL are given the research problems related to Himalayas which are tandem to the larger perspective of the SUNRAISE project. This would serve as one of the outcome of the SUNRAISE project. The developed facility is of immense value to these students to carry out the MPhil research work. In future also much of the similar students will be utilising these resources for their research and dissertation work.

### 3. Doctoral (PhD) Research Program

**Broad areas of research**

1. Characterizing urban ecosystems in Western Himalaya
2. Climate change (vulnerability & adaptation) in socio-ecological systems of Himalaya
3. Road ecology in Central Himalaya
4. Understanding eastern Himalayan Cryosphere
5. Ecosystem Services vis-à-vis climate change (*tentatively proposed*)

The above research problems are identified for the doctoral (PhD) thesis of some of the students. These are outcomes of the SUNRAISE project proposal, and focussed to overarching goal of the project. The doctoral research students are working on Himalayan ecosystems, and are utilising remote sensing inputs (Landsat, ASTER, Sentinel, MODIS among other), geospatial database (village, district, and state level) and spatial analysis and modelling (integrating wide range of field, primary and secondary data) as the primary tool. As of now, the facilities are not able to cater such specific and high data processing facility. Such processing would need high-end workstation/computer systems. Thus, the procured equipment (Computer Workstation with Intel Xeon 4116 Processor-Tyrone) and developed facility within SUNRAISE project would extensively support such research work. The developed research documents and knowledge through this would be utilised in the MSc/MA/MPhil course work.

### 4. Capacity building

(training program for stakeholders and agencies focussing on Himalayas)

The SAIL/SES/JNU is actively participating in capacity building program for stakeholders and agencies working in Natural Resource Management (with specific interest in Geo-database generation and utilization). The SCDR/JNU has a specific interest in workshops/seminars and training programs for knowledge and experience sharing while working with the National Disaster Management Authority (NDMA) and the National Institute of Disaster Management (NIDM) (the national institutes under Ministry of Homes Affairs, Government of India) in the area of communicating disaster research and studies. In totality both the centers are interested in environmental issues, climate change, disaster research and impact analysis, wherein remote sensing, GIS/GPS data along with climate and environmental data analysis is the prime. Specific modules including use and demonstration of RS & GIS/GPS are developed utilizing the equipment procured.

Two manual are developed for explicit utilisation of these equipment; namely (a) Basics of GIS Analysis and (b) Basics of Satellite Data Processing. We carried out two workshops using these manuals, which were attended by around 15 participants in each.


Picture 2: Group photograph of the participants attending

The cluster of equipment procured is supporting doctoral students working in SES/JNU for data processing. Most of these research activities are adding value to the ongoing activities within the scope of SUNRAISE project. We have more plans for optimal utilization of the equipment for capability building.

The other equipment facility available tiwh the SAIL, SES/JNU is:


Picture 3: Handheld GPS

Picture 4: Fisheye Lens (8-15mm F/42)


Picture 5: Willey Mills (3SS Sieves)

Picture 6: Hot Air Oven

Picture 7: Kjeldahl Analytical set-up