**Applications of Remote Sensing & GIS for Assessment of Impact and Vulnerability of Forest Ecosystems to Climate Change: A Case study of Himachal Pradesh**

*Sujata Upgupta, Jagmohan Sharma and N H Ravindranath*

***Proposed presenter:*** *Sujata Upgupta* **-** (**Prefer oral presentation)**

***Mailing Addresses:***

***Author 1***

Sujata Upgupta, Senior Research Fellow (Remote Sensing & GIS)

Center for Sustainable Technologies

Indian Institute of Science

Bangalore 560 012

Karnataka, India

Phone: 7259478416

*Email*: [sujata.upgupta1@gmail.com](mailto:sujata.upgupta1@gmail.com)

***Author 2***

Jagmohan Sharma IFS

Chief Conservator of Forests

Coorg Circle, Madikeri 571201 (India)

Ph: 9449863506

*E-mail*: jagmohan\_gaur@yahoo.com

***Author 3***

Prof. N H Ravindranath  
Centre for Sustainable Technologies (CST)  
Indian Institute of Science  
Bangalore - 560 012, INDIA                 
Phone:  91 - 80 - 2334 1838   
Fax:      91- 80- 2360 1428  
*Email*: [ravi@ces.iisc.ernet.in](mailto:ravi@ces.iisc.ernet.in)

***Abstract***

Climate change is projected to impact the forest ecosystems, in particular, biodiversity and ecosystem services. Studies based on climate projections and vegetation models project a significant impact of climate change on the Himalayan Region. The forests of Himachal Pradesh, which are part of the Western Himalayas and account to 26% of its total geographical area are shown to be impacted by climate change. This study demonstrates the applications of Remote Sensing and Geographical Information System to identify the geophysical locations of forest types that will be impacted by climate change. Further the study also estimates vulnerability of forest ecosystems to climate change based on forest disturbances, biological richness, ground slope and crown density. The study showed that the climate change will impact the Himalayan Moist Temperate forests, Sub-tropical Pine and Tropical Dry Deciduous forests of Himachal Pradesh. Vulnerability of forests under ‘current’ climate scenario is assessed by adopting indicator-based approach, while the ‘future’ vulnerability is assessed using climate and vegetation models. Based on the vulnerability index, which incorporates the projected climate change impacts and the current vulnerability, five districts - Chamba, Kullu, Shimla, Mandi and Kangra are identified as the most vulnerable districts by 2030s under the likely RCP 8.5 scenario. Identifying vulnerable forests will help policy makers and forest managers to prioritise management to restore health and productivity of forests and to build long-term resilience to climate change.

***Keywords:*** Forests, climate change, vulnerability, climate models.