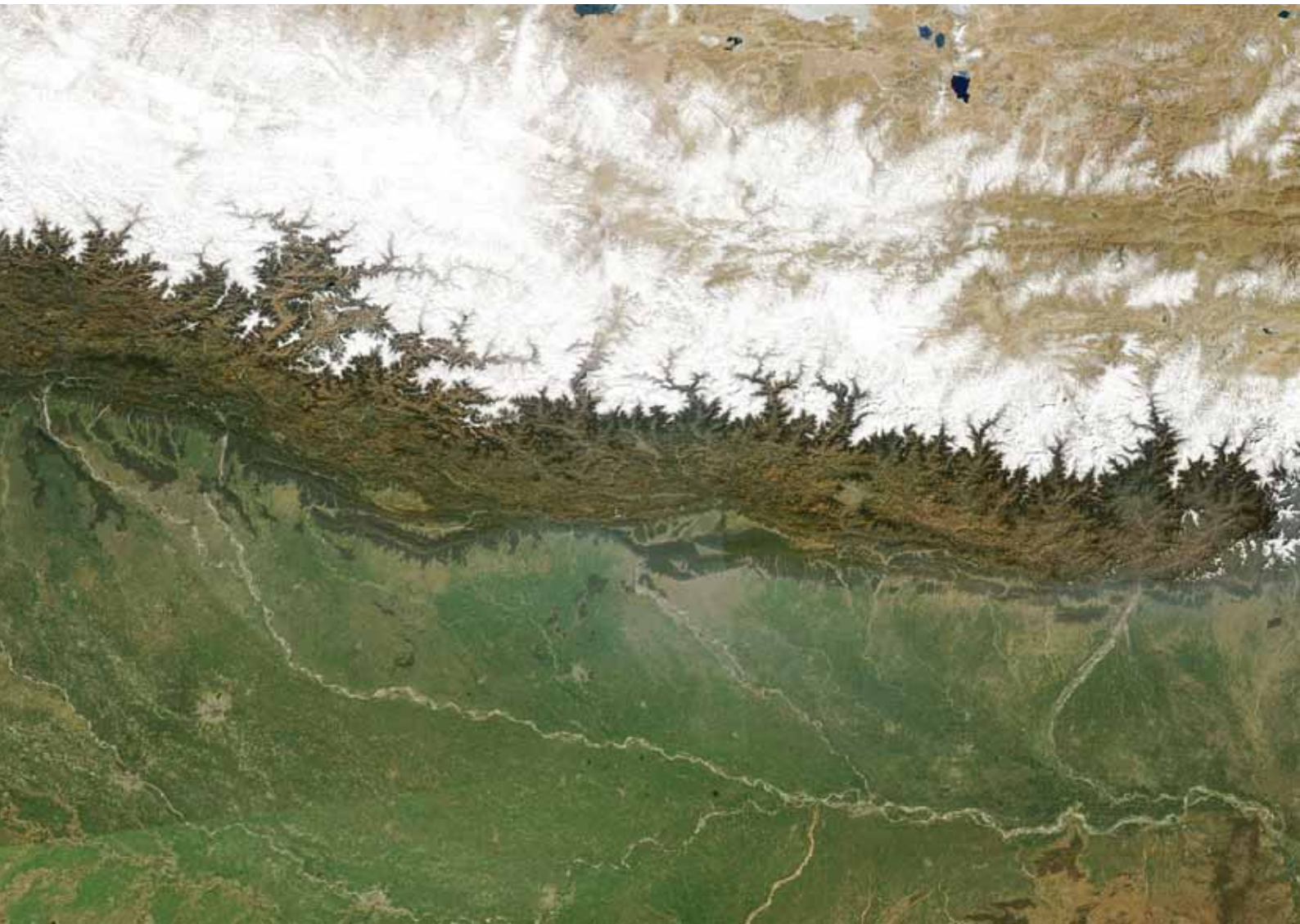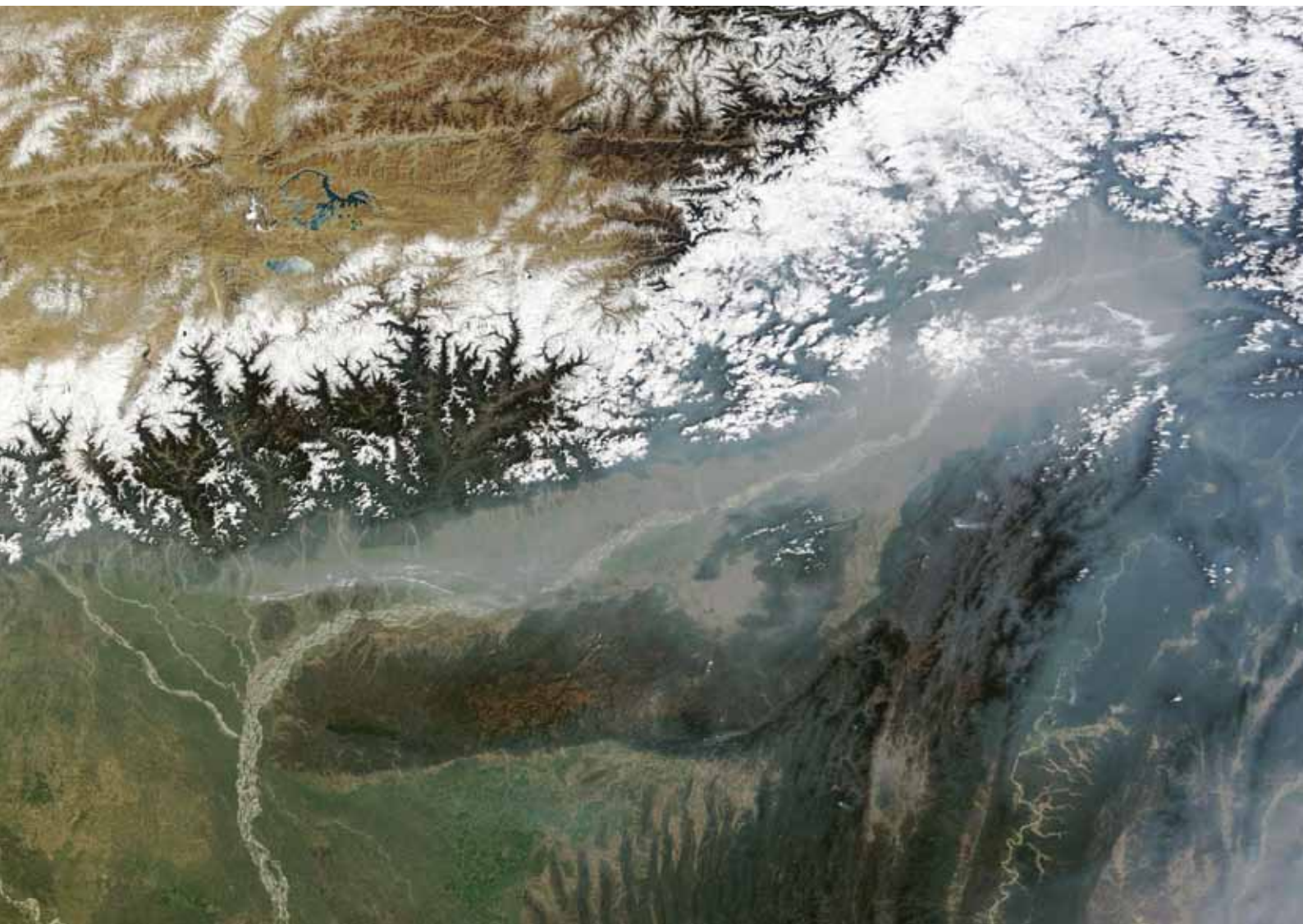# Mountain Environment Regional Information System

In 2012, strategic partnerships augmented ICIMOD's capacity as a regional resource centre for geoinformation and earth observation in the Hindu Kush Himalayan region. It strengthened partnerships with USAID and NASA through the SERVIR-Himalaya Initiative to promote the use of earth observation and geospatial technologies for timely decision making on pressing environmental challenges in the Hindu Kush Himalayan region.

The Mountain GeoPortal, ICIMOD's integrated data platform, has enhanced interactive mapping and database components in the region. The number of visitors increased by over 50% compared to previous years and downloads of GIS datasets increased to over 2,500 annually. Since 2008, over 600,000 knowledge explorers, researchers, and professionals in disaster risk reduction have visited ICIMOD's Disaster Risk Reduction website.

Satellite image captured by MODIS receiver

Within ICIMOD's initiatives, geospatial tools and the resources of the Mountain Environment Regional Information System are being increasingly applied. Remote sensing instruments were used to estimate carbon REDD+ pilot sites in three watersheds of Nepal, with the aim of upscaling remote sensing-based approaches and methodologies in other parts of the region. National land cover databases for Bangladesh, Bhutan, Nepal, and Pakistan have also been prepared.

Under SERVIR-Himalaya, 15 training courses on the application of geoinformatics have been conducted for more than 300 participants, including representatives from all regional member countries. ICIMOD has promoted an exchange programme with national partners and offered internships and opportunities for young professionals. Capacity building in rapid response mapping for disasters was done with the Japan Aerospace Exploration Agency through regional training workshops.

Real-Time Direct Access to Space Images

For direct access to real-time data, a MODIS (Moderate Resolution Imaging Spectroradiometer) receiver and acquisition system was installed on the rooftop of ICIMOD Headquarters. It links to a processing facility in the Centre's central server room and a visualization system housed in the Centre.

With this receiver, ICIMOD has direct access to real-time MODIS data from two NASA scientific research satellites. Each day, two snapshots of the earth's surface are delivered to the Centre with a spatial resolution (250 m, 500 m and 1 km) appropriate for national and regional studies. Previously, the global servers took 2-3 days to relay data; now the data transfer takes 15 minutes. MODIS imageries and derivative environmental products made available with this new addition are used by ICIMOD and its national partners in almost all ICIMOD programmes and initiatives.

Forest Fire Detection and Monitoring System in Nepal

"This system is extremely useful for the members of Community Forest User Groups and District Forest Officers to protect our forests by knowing when and where a fire has started. We are able to take action to stop the fires because everyone knows very quickly."

– **Sabina Rai**, FECOFUN Chairperson
Bhojpur District

To contribute to mitigating the many adverse ecological and economic effects of forest fires, ICIMOD, in close collaboration with the Department of Forests of Nepal, developed and piloted a national forest fire detection and monitoring system. The system assimilates active fire data generated by ICIMOD's MODIS receiving station and adopts NASA's fire detection algorithm, which has been extensively used in detecting and monitoring forest fires across the globe.

After the system automatically adds important information to fire data, including the district and VDC in which the fire was detected, emails and

SMS notifications are sent to over 220 subscribers, including District Forest Officers and focal persons of the Federation of Community Forestry Users in all districts of Nepal. The information is also published on ICIMOD's Mountain GeoPortal for visualization of fire locations on any given day.

Youth Champions Using Geospatial Tools

Through the SERVIR-Himalaya Initiative's youth programme, ICIMOD trains youth from the region in the use of earth observation and Geographic Information Systems (GIS) in the HKH. Initiatives include youth forums, participation in the DEVELOP initiative, internships at ICIMOD, and support for theses development. SERVIR-Himalaya Youth Forums held in Bangladesh, Bhutan, Nepal, and Pakistan combined technical sessions with innovative ways to teach about sustainability. Out of these forums came several 'champions' – talented youth taking action and inspiring others to use GIS technologies to address climate change-related issues.

For example, after participating in the regional SERVIR-Himalaya Youth Forum in Bhutan in 2012, Vineet Chhatria, India, started the NGO Habsut and organized workshops in Bangladesh, India, Nepal, and Sri Lanka. ICIMOD organized a special course on the basics of GIS and the use of GPS for 20 university students, including Ashish Adikhari, Nepal, who was enthusiastic about using these technologies in the development of his MSc thesis and fieldwork.

> During the SERVIR-Himalaya Bhutan Youth Forum, we learned about climate change, basic GIS, and how to apply GIS skills to enhance climate change adaptation. In Bhutan, I work for the Department of Disaster Management. During a six-month internship at ICIMOD to learn GIS for disaster risk reduction, I developed an emergency response system that will allow people in Thimpu to report their situation after a big earthquake through crowd-sourcing. With ICIMOD staff, we developed a concept for disaster reporting in a standard format and GIS information web page for Bhutan.
>
> – **Til Bahadur Gurung**, Bhutan

Through the NASA DEVELOP Programme, three ICIMOD interns from Kathmandu University – Laxmi Thapa, Florencia Tuladhar, and Eliza Shrestha – created a climate change vulnerability index for Nepal using socioeconomic, biophysical and satellite-derived data. In collaboration with DEVELOP interns in the United States and with guidance from resource persons at the National Space Science and Technology Center in Alabama, US, and advisers at the Global Hydrology and Climate Center and the University of Georgia, their team developed a technical report, presentation, poster, and video on their project, which won the grand prize in the NASA Develop Virtual Poster Session

SERVIR-Himalaya Youth Forum, Pakistan

> The maps we created could guide policy makers in identifying, prioritizing, and allocating resources to develop a robust, integrated approach to increase resilience to climate risk at national and local level,
>
> – **Laxmi Thapa**
> NASA DEVELOP Programme Intern

> It was neat to see students collaborating from around the globe to apply NASA earth observations to real-world issues. The Nepal project stood out with great teamwork, focused research, and a great video.
>
> – **Jonathan Gleason**, NASA Clouds and the Earth's Radiant Energy System (CERES) Data Management Lead and member of the judging panel