

# Forest Fire Detection and Monitoring System

ICIMOD



FOR MOUNTAINS AND PEOPLE



Forest fire has adverse ecological and economic impacts and is a major concern in many countries. An effective fire detection and monitoring system is an important component of forest fire management. In view of their large-area repetitive coverage, satellite data are useful for near real-time fire detection, monitoring, and burnt area assessment. Further, the Moderate Resolution Imaging Spectroradiometer (MODIS) sensors on board Terra and Aqua satellites of the United States National Aeronautics and Space Administration (NASA) are already used extensively for detecting and monitoring forest fires across the globe.

ICIMOD has developed a forest fire detection and monitoring system for Nepal and Bhutan based on MODIS data. The work was carried out in close collaboration with the Department of Forests in both countries and was supported by the United States Agency for International Development (USAID) and National Aeronautics and Space Administration (NASA) under the SERVIR-Himalaya initiative.

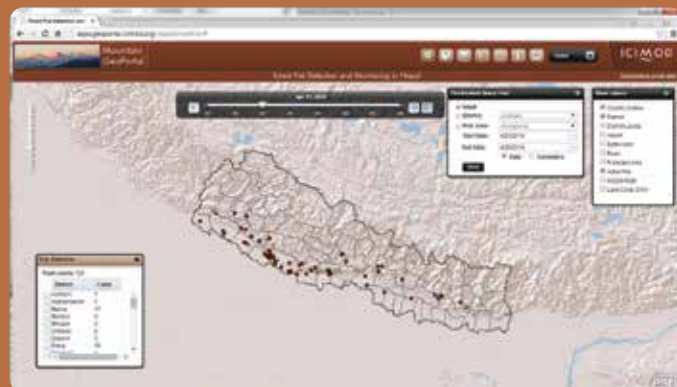
The system carries out automated data acquisition, processing, reporting, and feedback on fire location. It provides location information at 1x1 km resolution on active fires present during the satellite's twice-daily overpasses.

SERVIR connects space to villages by generating geospatial information, including Earth observation data from satellites, geographic information systems, and predictive models useful to developing countries. SERVIR is a joint initiative of USAID (United States Agency for International Development) and NASA (National Aeronautics and Space Administration). SERVIR-Himalaya is implemented in partnership with ICIMOD with an aim to bridge the gap between scientific knowledge and decision making through applications of Earth observation information in the Hindu Kush Himalayan region. Driven by the motto 'Connecting Space to Village', SERVIR-Himalaya works as a regional resource centre by developing relevant geospatial applications and creating enabling environments for their use.

**Fire notification through  
mobile text messaging**



## Online system showing fire locations in Bhutan and Nepal



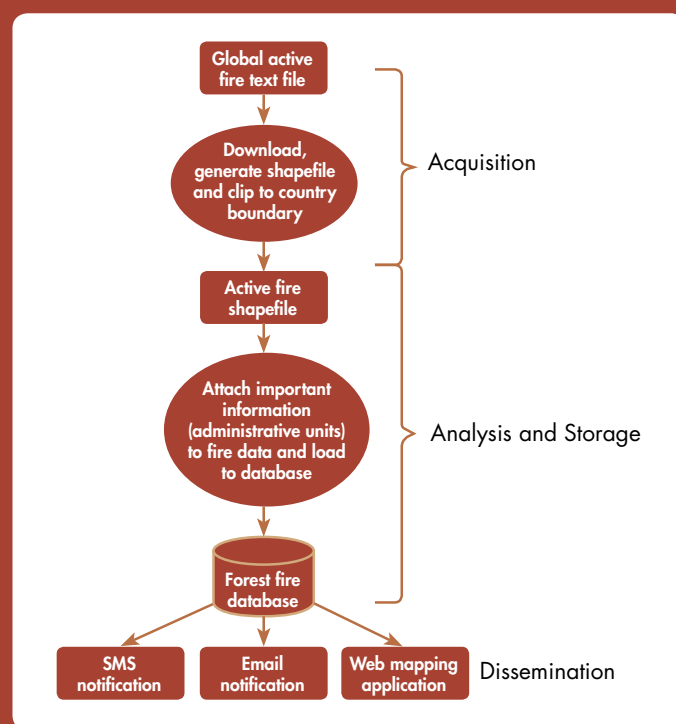
### Data Acquisition, Processing, and Dissemination

The system assimilates active fire data generated by ICIMOD's MODIS receiving station that adopts NASA's fire detection algorithm. The system automatically adds important information to these data such as administrative unit (i.e., district/dzongkhag, VDC/gewog, etc.), protected area identification, land cover type, elevation, and slope.

The system for Nepal currently sends email notifications about active fires throughout Nepal to some 180 subscribers. Furthermore, some 220 text message subscribers, including District Forest Officers and focal persons of the Federation of Community Forestry Users (FECOFUN) in all districts receive fire alerts on their mobile phones when a fire incident is detected in their area of subscription. Likewise, the system for Bhutan sends email and SMS fire notifications for detected forest fires in Bhutan to some 50 subscribers, including District Forest Officers, park managers and officials at Territorial Divisions of the Department of Forest.

Information on detected forest fires is published on ICIMOD's Mountain GeoPortal for users in Nepal (see <http://geoportal.icimod.org/nepalforestfire>) and Bhutan (see <http://apps.geoportal.icimod.org/bhutanforestfire>). The two web portals allow dynamic visualization of fire locations on any given day or in a user-specified time period of the fire disaster.

### Forest Fire Detection and Monitoring System work flow



The systems user database for Nepal is currently managed by the Department of Forests of Nepal through a customized web interface. The Department keeps the user database up-to-date, ensuring the timely delivery of SMS fire alerts to the correct individuals. A similar feature will be developed to allow the Department of Forests of Bhutan to manage the user database for the country.



### For further information, please contact:

Sudip Pradhan  
Deo Raj Gurung

sudip.pradhan@icimod.org  
deoraj.gurung@icimod.org

Photos: Rishi Bastakoti; Choidup Zangpo;

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International Centre for Integrated Mountain Development

GPO Box 3226, Kathmandu, Khumaltar, Lalitpur, Nepal

Tel +977 1 5003222 Email [info@icimod.org](mailto:info@icimod.org) Web [www.icimod.org](http://www.icimod.org)

[www.geoportal.icimod.org](http://www.geoportal.icimod.org)

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