

# Satellite-based Agricultural Monitoring

ICIMOD



FOR MOUNTAINS AND PEOPLE

## Using Geospatial Technologies for Informed Decision Making on Food Security in Nepal

Agriculture is one of the primary livelihood sectors in the HKH region. It generates a substantial proportion of rural income and provides employment opportunities to over 210 million people in the region. In Nepal, two-thirds of the total population depends on agriculture for their livelihoods and more than one-third of gross domestic product (GDP) comes from the agriculture sector. However, across the country, effective agriculture production remains a serious challenge due to various factors, such as a high degree of spatial and temporal climate variability, and farmers' fragile social and economic fabric.

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.

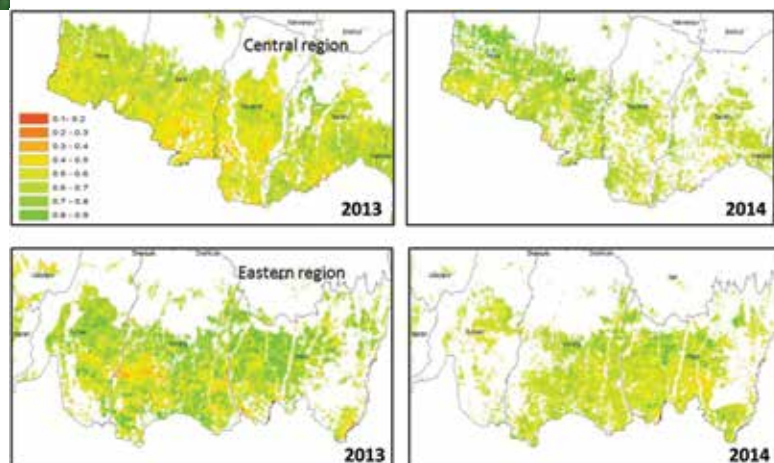


## SERVIR-Himalaya and Agricultural Monitoring

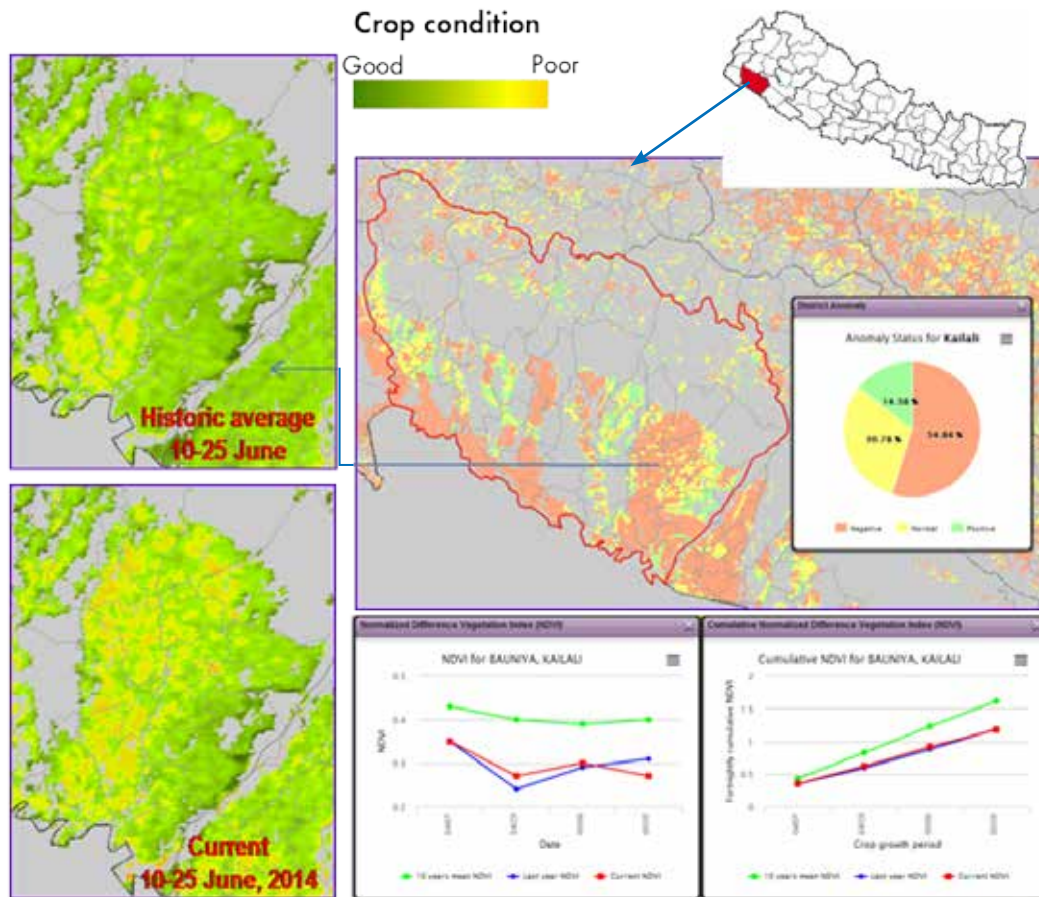
ICIMOD under the framework SERVIR-Himalaya is collaborating with the Ministry of Agricultural Development to operationalize the use of remote sensing and GIS for agricultural monitoring. To provide comprehensive information on agricultural monitoring and food security, long-term, spatially explicit agricultural records are being compiled into a database, and user-friendly web applications are being developed to allow decision makers and researchers to easily put this research to use.

## Remote Sensing-Based Agricultural Monitoring

One of the best ways to gauge food production at any given time is to monitor agriculture from space. By looking at the crop coverage and growth of a particular area, scientists are able to tell how much photosynthesis is occurring, thereby providing an indicator of how rewarding the harvest will be. An operational system has been developed that uses satellite-based Vegetation Index (VI) products for near real-time crop monitoring and reporting for the Terai region of Nepal. The system has three components: data collection and retrieval, data processing and analysis, and data reporting



Rice crop area and vegetation condition in the Terai region of Nepal as of 12 August 2014



and dissemination. The information generated through the system are being used in the seasonal crop status assessment jointly conducted by the World Food Programme (WFP) and the Ministry of Agricultural Development (MoAD), Nepal.

### Web Application

Agriculture monitoring datasets are made available online through a web application that features queries and visualization tools (<http://apps.geoportal.icimod.org/NepalAgriculture/>).

The web application allows users to compare recent vegetation conditions with long-term averages to determine anomalies and predict increases or shortfalls in production. Comparisons can be made both physically and in graphs and figures at the district and Village Development Committee levels. The existing system is now being expanded to provide remote sensing-based data on drought conditions in Nepal. Monitoring crops in such an integrated manner could significantly improve crop management.



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