

16th AOGEO Symposium: Country Report of Nepal

Prakash Joshi
Director General, Survey Department
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Nepal is a country surrounded by China in North and India in South, East and West. The elevation ranges almost from 60m to 8848.86m, the highest peak of the world, Mount Everest (Mount Sagarmatha). Out of 14 peaks around the world with more than 8000 m, 8 peaks are in Nepal. Geographically, It is the federal democratic republic with 7 province and 753 local levels. The population of the country is 29 million 164 thousand and 578 with multi lingual, multi ethnic and diverse culture. The country is divided into five physiographic regions namely: Terai (Plain area) 60-300 m, Chure 200-1500m, Middle hills 800-2400m, High hills 2200- 2400m and High mountain (Himalaya) 5000m -above. Due to a wide variation in the topographical characteristics different climatic variations are available in Nepal. Accordingly, Nepal offers tropical, sub-tropical, temperate, and alpine and sub arctic types of weather depending on the elevation. Besides this, it is also the country with full of adventures with ten world heritage sites.

While going into the field of surveying and mapping, Survey Department is the National Mapping Organization which is solely responsible for standardization of surveying and mapping, authorization of specifications for maps and data produced by different organizations, regulating the surveying and mapping activities of all the agencies in the country. It works as secretariat of the Mapping Committee responsible for all listed task and also the organization issuing survey license. The department also conducts precise geodetic observation and cadastral survey for first registration. It is also responsible for technical works related to international boundary and also the nodal agency for National Spatial Data Infrastructure (NSDI). It has conducted the prestigious Mt Everest Height measurement as well giving the new height of **8848.86 m**.

Nepal started photogrammetry to prepare series of topographical base maps since 1990. Satellite images were used to prepare the land use maps since 2000 for the implementation of land use policy. This includes layers of data like present land use, land system, soil maps, land capability, risk factor, land use zone and cadastral superimpose layer. Later on, the topographical base maps were updated using the satellite images. The department also completed LiDAR survey of the western Terai covering 20000 km² with the products of Point Clouds, DSM, DEM and ortho photos as well. Recently, it also started UAV images for cadastral survey. Besides this, wide range of sectors started using satellite images. Like, Ministry of Agriculture and Livestock Development used Remote Sensing (RS) based rice crop mapping to support evidence-based decision making in collaboration with ICIMOD. ICIMOD is also conduct annual land cover mapping at regional level

of Hindu Kush Himalaya region providing change analysis services to support information-based decision making. Department of Irrigation uses it for irrigation planning purpose to increase agricultural productivity and also every Detailed Project Report (DPR) study used RS technology. Department of Forest also used RS for mapping the crown coverage. International organization like ICIMOD uses this technology for conservation, disaster management, environment monitoring and many more.

Besides the listed field, disaster management is crucial sector, where technology intervention is necessary to handle it before and after the disaster. If we see the statistics, total 3 billion 54 million- and 709-thousand-dollar amount of loss happened in last five year due to climate induced disaster. From 1983 to 2023 total 37351 human casualties happened due to different natural disaster. The temperature data from Department of Hydrology and Meteorology (DHM) shows that the temperature is gradually increasing. This shows the impact of climate change triggering different disaster. Recent Glacial Lake Outburst Flood (GLOF) at *Thame* of Nepal is an example of such incident.

RS technology is seen most efficient for pre and post disaster management. Many organizations are involved in disaster sector. Ministry of Home Affairs (MoHA), Department of Water Induced Disaster Prevention (DWIDP), DHM, National Disaster Risk Reduction and Management Authority (NDRRMA), National Society for Earthquake Technology (NSET), Department of Mines and Geology (DMG), ICIMOD are some of them to list. Some of the organization works for early warning of disaster while some works for post-disaster restoration. DHM works for weather forecasting and early warning of flood through continuous monitoring of discharge level at various stations established at major rivers over the country. ICIMOD has also developed weather prediction for the HKH region and also prepared flood forecasting tool to support pre-disaster preparedness. It is also regularly conducting research on glacial lakes. DMG is monitoring the earthquake through Continuously Operating Reference Station (CORS).

All the organization are collecting and analyzing the data according to their scope. If we can share the data and information then the efforts on disaster management can be reduced and the efficient management can be done. In order to support in data sharing, Survey Department, as and National Mapping Agency, has developed a National Geoportal as a platform for working as a metadata and clearing house for spatial data. This can further in collaboration and coordination with line agencies can work together to go ahead in alignment with the GEO post 2025 strategy: Earth Intelligence to address the environment issues, societal needs, economic changes, adaptation in climate change and ultimately supporting in achieving the objectives of sustainable development goals.