The Fundamental Role of GNSS in Modern Surveying and Mapping to Support Climate Responsive Land Governance and to Enhance Disaster Resilience

Sandesh Upadhyaya, Prabin Gyawali, Shanker KC, Suresh Shrestha and Stallin Bhandari (Nepal)

Key words: Cadastre; Digital cadastre; Engineering survey; Geoinformation/GI; GNSS/GPS; Informal settlements; Land distribution; Land management; Positioning; Reference frames; Reference systems; Security of tenure; Spatial planning; Young surveyor; SDGs

SUMMARY

The geodetic infrastructure such as terrestrial reference frames and Continuously Operating Reference Station (CORS) infrastructure is fundamental to build and support climate responsive land governance and disaster resilience. Similarly, the surveying and mapping information from modern surveying methods such as Real Time Kinematic (RTK), Light Detection and Ranging (LiDAR) and Unmanned Aerial Vehicle (UAV), etc. is equally important to address climate challenges and disaster management. However, whether it be reference frame or CORS or modern surveying methods; Global Navigation Satellite System (GNSS) is key to provide precise positioning. The role of GNSS is important here because precise and accurate positioning is fundamental. Nowadays, GNSS is the only method that offers precision, accuracy, efficiency, and cost-effectiveness as a precise positioning tool.

Climate responsive land governance and disaster resilience draw a huge contribution from the surveying and mapping profession as this is closely tied to climate change, disaster risk reduction, tenure security, land governance, geospatial information management, land administration and land management, spatial planning and land valuation. In turn, surveying and mapping get their precise and accurate positioning from GNSS. Thus, in various ways, GNSS has an important role in supporting climate responsive land governance and disaster resilience. In this paper, we explored how GNSS in the form of reference frame, CORS, and precise positioning tools in modern surveying methods has been directly and indirectly contributing to achieve climate responsive land governance and disaster resilience.

In addition, we discuss both the advantages and challenges of applications of GNSS in various forms and to meet various purposes from technological, policy, existing infrastructure and future perspectives. Also, we present and discuss gaps and limitations in order to find better ways to to

address climate challenges and disaster management.