

Identification and monitoring of Hydro-Metrological hazards using GIS and RS technology in mountainous area of Gilgit – Baltistan, Pakistan

Alamgeer Hussain and Nusrat Nasab
Focus Humanitarian Assistance Pakistan
alamgeer.hussain@focushumanitarian.org,

Abstract

Climate change is caused by global warming which is direct threat to human being in mountainous regions in the form of disaster like flood, flash flood, GLOF and debris flow e.t.c, In world developing countries are more vulnerable to climate changes disaster then under developing countries. Asia suffer the maximum damages/losses due to flooding in general and south Asian Nation, In particular, are worst suffers further, among south Asian countries, Pakistan is one of the most affected by climate change induced disasters.

In Pakistan, nearly 20 to 30 % of its territory is prone to various degrees of flooding hazard, frequently affecting the human life, livelihood, livestock, living places, structures, infrastructures and natural resources. Flash floods are spread over the north and northwestern part of Pakistan particularly in KPK and Gilgit-Baltistan (GB). The most sensitive areas are Hindu Kush - Himalaya-Karakoram Ranges having thousands of Glaciers and Lakes.

Geographically Gilgit Baltistan is located in the north of Pakistan the area borders internationally with the Xinjiang-Uighur region of People Republic of China through the famous Khunjab, Kilik and Mintika passes and with the Afghan Wakhan and India. There are more than 800 villages with about 50, 00000 inhabitants and ground distance of almost 700 km from Islamabad. It has prominent three mountainous ranges Karakorum, Himalaya and Hindu-Kush which having vulnerable glacial lakes which poses direct threat to low lying community of Gilgit Baltistan in form of glacial lake outburst flooding (GLOF) and flash floods.

Temporal changes of glaciers and formation of glaciers lakes are silent visible indicator of climate change. The 2010 and 2015 climate Induce flooding in Gilgit Baltistan causes of 632 casualties and damages of Karakorum High Way (KKH) and public infrastructures. Glacier lake outburst (GLOF) is climatic induced hazard which posed direct threat to communities in Gilgit Baltistan. Historical GLOF events been recorded, though with limited detail. One GLOF event occurred in 1890 in Bagrote Gilgit and another was reported in skardu in 1980.

Therefore, using of Geographical Information System (GIS) and Remote Sensing (RS) methods are used to identify vulnerable glacier lakes, climate induced flood hazard potential and adaptation practices are especially important in a region experiencing rapid urban development, wide spread land use change and the construction of water and energy resource projects on major rivers. New GIS and Remote Sensing techniques based on the Image segmentation, interpretation of aerial photographs, satellite imagery, digital elevation, thematic mapping of glacier lakes, change detection methods and spatiotemporal analysis are the best solution for monitoring of Hydro-Metrological Hazards.