

IMPACT OF CLIMATE CHANGE ON FLOOD FACTORS AND EXTENT OF DAMAGES IN THE HINDU KUSH REGION

Atta-ur Rahman¹, Shakeel Mahmood², Mohammad Dawood¹, and Fang Chen³

¹Department of Geography, University of Peshawar, Pakistan

²Department of Geography, Government College University, Lahore, Pakistan

³Institute of Remote Sensing and Digital Earth (RADI), Chinese Academy of Sciences, Beijing, China

atta_urp@yahoo.com

Abstract:

Hindu Kush is a high mountain system located in the immediate west of Karakorum and Himalayas. It is the greatest watershed of River Kabul, River Chitral, River Swat and River Panjkora in Pakistan and the Amu River in Central Asia. Hindu Kush system host numerous glaciers, snow clad mountains, fertile river valleys, support large population and provides year-round water to recharge streams and rivers. The study region is vulnerable to a wide range of hazards including floods, earthquakes, landslides, drought and desertification. However, in the Hindu Kush region, riverine and flash floods are frequently occurring and deadliest extreme hydro-meteorological events. The upper reaches experiences characteristics of flash floods, whereas the lower reaches dominates the scene of river floods. In the upstream areas, flash floods are sudden and more destructive in nature. Every year in summer, monsoonal rainfall together with the heavy melting of snow, ice and glaciers accelerate discharge in rivers. The climate change has a strong relationship with trend in temperature and resultant changes in rainfall pattern and river discharge. In wake of observed climate change, there is a rising trend in temperature, which indicates the early and rapid melting of snow and glaciers in the catchment areas. The analysis reveals that during the past three decades a radical change in behavior of numerous valley glaciers have been noted. Similarly, a fluctuation in the amount of snowfall occurrences together with its timing and seasonality have been recorded. In addition, the spatial and temporal scales of violent weather events have been grown during the past thirty years. Such changes in water regimes including the frequent but substantial increase in heavy precipitation events and rapid melting of snow in the headwater region, siltation in active channels, excessive deforestation in the past three decades, human encroachments onto the active flood channel and the bursting of temporary dams have further escalated the flooding events. The analysis reveals that Hindu Kush region is beyond the reach of existing weather RADAR network and hence flood forecasting and early warning is ineffective. In the study region, almost every year, the floodwater overflows the levees and cause damages to standing crops, infrastructure and sources of livelihood earnings and incurs human casualties.