Snow and glacier melt form a considerable contribution to three major Himalayan rivers: Indus, Ganga, and Brahmaputra in different proportions, and a large population depend on the water of these rivers. The transboundary nature of all the major Himalayan Rivers, which sustain the world’s most populous region, ensure constant focus on their waters. The Indian Himalayan Region (IHR) of  Ganga and Brahmaputra basins have around 3700 km2 of glacier cover, whereas upper Indus basin alone has around 7100 km2covered by glaciers with large number of big glaciers. Thus the major part of glacier resources of India lies in the upper Indus basin in Ladakh where glacier melt contribution is critical to the downstream flow. Shyok basin alone has the largest glacier ice reserve in the country, which is more than that of the Ganga- Brahmaputra basins put together and is critical for the geopolitical dynamics of the region. However, Indian research efforts in the upper Indus basin is inadequate compared to the efforts in Uttarakhand or Himachal Pradesh.

Traditionally, cryospheric research is glacier centric in India and the research methodologies we practice are entrenched in borrowed “Alpine” concepts and methodologies. This has led to the undermining of specific characteristics of precipitation dominant “Himalayan catchments” and its unique stream discharge response at its downstream reaches. Observed asynchronous fluctuation of the cryosphere across the region further complicate the Himalayan conundrum. Inadequate level of research and knowledge creation in the Indian Himalayan Region (IHR), which constitutes a major part of the Himalaya, therefore, remains as a major gray area.For most parts of the Himalayas, changes occurring to the precipitation regime may lead to reduced downstream flow and enhanced glacier melt concurrently. This suggests that research on snow cover, permafrost and elevation control on precipitation is critically important for many basins in the Himalayas. The lack of studies are resulting in our inability to fathom a true and clear picture of the climate change response of the Himalayan Rivers. As climate change exacerbates the current challenges in understanding the variability and interplay between snow- glacier- monsoon dynamics in the region, informed decision making is a formidable challenge at present and for the future.It is important to significantly enhance field-based research in these areas for evolving a science-based policy framework for managing the water resources of the region.

Data restrictions existing in the Indian Himalayan region due to geo-political reasons is another key roadblock restraining the free flow of knowledge generation. This paper calls for a paradigm shift in research priorities to fill knowledge gaps in the present understanding of the Himalayan cryosphere to facilitate a robust and transparent science based policy framework by the stakeholders in the region.