

Need for a Paradigm shift in the Cryospheric Research priorities in the Himalayas



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4th Conference on Science and Geopolitics of Himalaya- Arctic- Antarctic Focusing Climate Change Nov 30- Dec 1 2017 JNU Convention Centre, New Delhi



- Diminishing focus (programmes/funding) on Himalayan glaciers/ Cryosphere after the dismantling of Programme Advisory and Monitoring Committee for Himalayan Glaciology (PAMC-HG) of DST-SERB, which led the activities for nearly 30 years.
- > Specialised institute for Himalayan Glaciology remain a non-starter
- > Lack of response to the changing perception on the role of Himalayan glaciers.
- > Lack of policy relevance of research outcomes
- Unknowns are remained unknowns for long period (eg. Monsoon accumulation, winter mass balance, precipitation and temperature gradients etc.) affecting the quality of further research.
- For managing the resources internally and geopolitics externally we need robust scientific understanding of the system response, at present and for the future.



Key cryosphere areas left out from the research focus in the IHR





Major Cryospheric components are not integrated in the research framework





NETWORK

Lack of policy input from glacier centric research programmes





Benchmark glacier strategy, USGS, 1997 (Meier, 1965)



Gulkana Glacier, Alaska (USGS)

Climate forcing & Feedback





Strategy for Cryosphere Research: Linking orography & Snow/glacier discharge with downstream hydrology





Cryosphere Research Station – Ladakh National Institute of Hydrology





Cryosphere system response to runoff: Cold-arid system Snow, Glacier & Ground ice melt



Monthly % contribution

	2010	2011	2012
May(15-30)	0.9	9.4	8.4
June	9.4	22.0	12.0
July	41.9	24.2	37.8
August	39.6	24.0	25.3
Sept.	8.2	20.5	16.6





Implications of Ground ice thawing: Challenges in downstream runoff modeling

2010

2012





2011





Unique characteristics of temperature Lapse rate : Cold arid system



Thayyen & Dimri, 2014



Temperature Lapse rates : Monsoon regime





Temperature Lapse rates : Monsoon regime





Stable lapse rate at valley scale & Unstable lapse rate at nival-glacier regime (Data 25 years)





Steep precipitation gradient –Cold-arid regime



 $Ph=Pb(Ah/Ab)^{6.9}$

Ph - Precipitation at desired higher altitude(h) Pb - Known precipitation at the base station Ah -Altitude of the desired altitude Ab -Altitude of the base station.





Steep Hydrological gradient : Cold-arid regime





Glacier – downstream flow linkages & Challenges : Cold- Arid system



Missing winter & Summer mass balance measurements in the Himalaya limit our ability to link glacier regimes with down stream hydrology



Conclusions

Research focus should also extend to key glacier resource areas to make it policy relevant, Nationally and internationally

Promote research on snow, glacier and permafrost on equal footing in an integrated manner to arrive realistic understanding of variations in water availability.

Restrictions on the discharge data of the Himalayan rivers should be eased to facilitate fearless policy oriented research by wider research community.

