



ESCAP

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Regional impacts of glacier melt on water-food-energy nexus

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ESCAP-ICIMOD Side event: IYGP 2025

Glaciers at the crossroads: climate challenges and responses

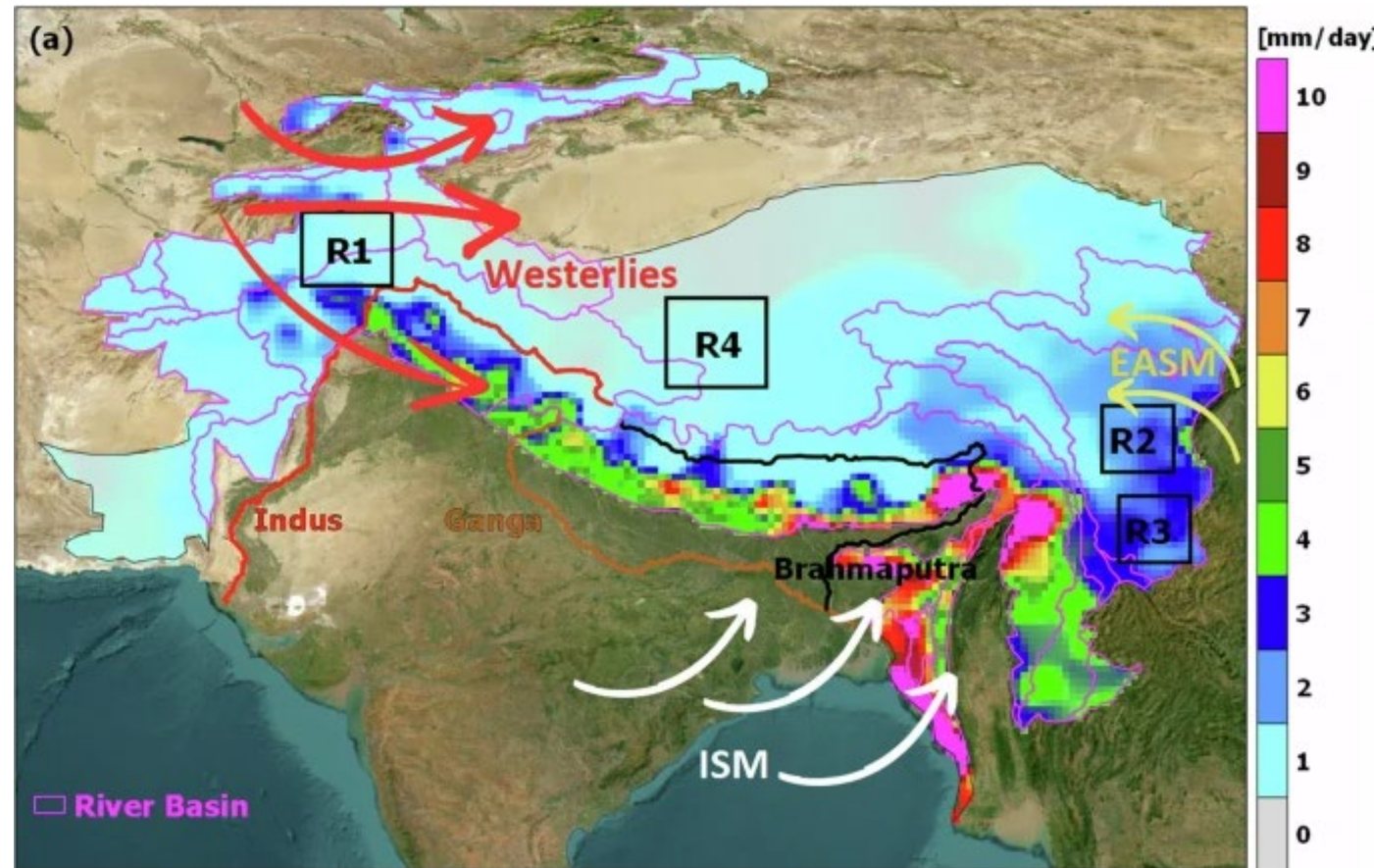
21 January 2025



1. Understanding the teleconnections and drivers of regional impacts in HKH/Third Pole

- Influence of geophysical drivers on snow melt (SM) and precipitation (P)
- Large variations across four different areas that represent the snow-dominant region R_1 in the west TP,
- Snow and precipitation-governing region R_2 in the east TP,
- High precipitation region R_3 in the east TP and a region with very low precipitation and snow R_4 in the central TP.

• Source: Jayanarayanan K et al (2024), Clim and Atmos J



#2 Impact Modeling: water-food-energy nexus

IMPACT DRIVERS in TP/HKH

1

Relationships between different geophysical parameters are responsible for the variations in annual mean climatology of precipitation, temperature and snow cover in different TP regions.

2

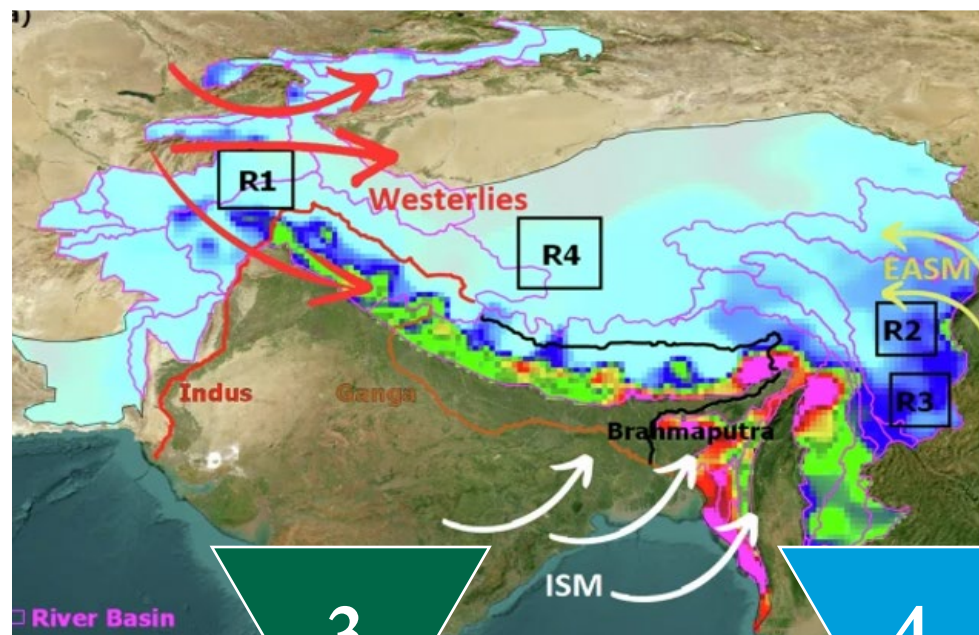
Temperature variability drives snow melt (SM), Specific Humidity (SH)

3

There is a positive and direct connection of aerosols (Aerosol optical depth, AOD) with SM.

4

Variability in aerosols affects the melting of snow or glaciers by changing albedo through the deposition of absorbing aerosols like dust (natural) and black carbon (anthropogenic), and regional warming.



Science led regional co-operation mechanism Third Pole Regional Climate Centre Network (TPRCC-N)

Network Nodes



Northern TP Node

Consortium: China (Lead), Bhutan, Mongolia,
Nepal, Pakistan



Southern TP Node

Consortium: India (Lead), Bangladesh, Bhutan,
Myanmar, Nepal



Western TP Node

Consortium: Pakistan (Lead), Afghanistan,
China, Tajikistan, Uzbekistan

Partners



Global Cryosphere
Watch



Third Pole Environment



The International
Centre for Integrated
Mountain Development



The Global Energy and
Water Exchanges



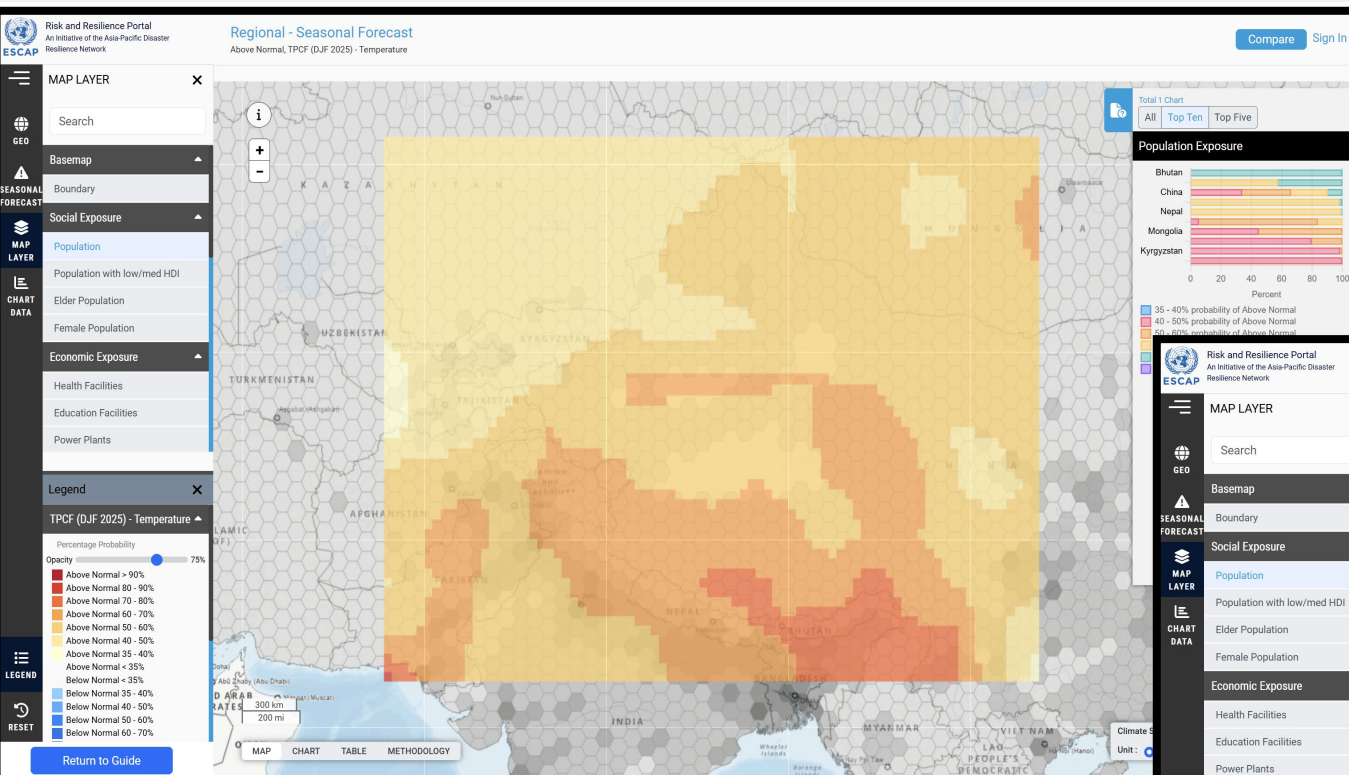
Mountain Research
Initiative



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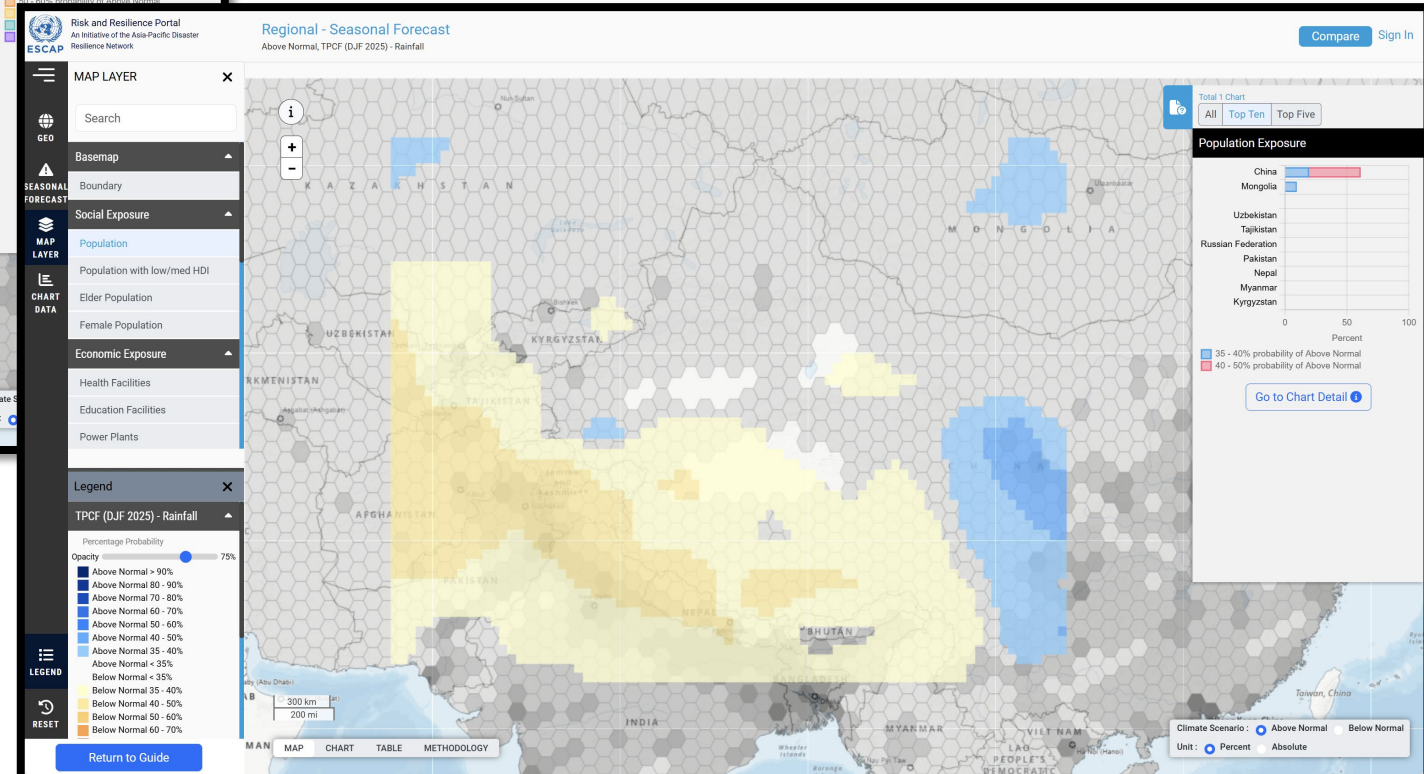


#3. Leverage HKH DRR Knowledge Hub to operational Impact-based Forecasting products – transboundary and regional approach



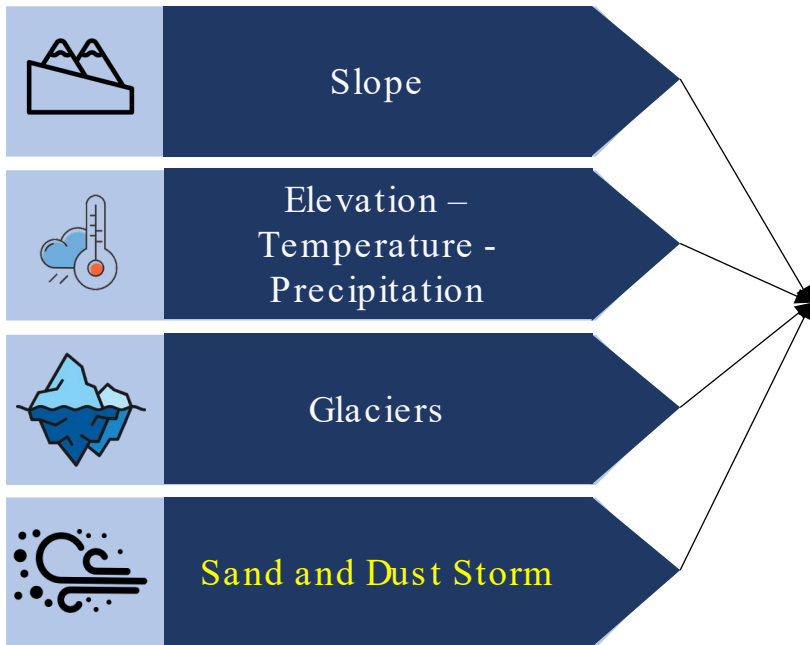
Seasonal Forecast Temperature Data (DJF 2024-25)

Third Pole Climate Forum Products
Translating seasonal outlook to impact forecasting across the sectors

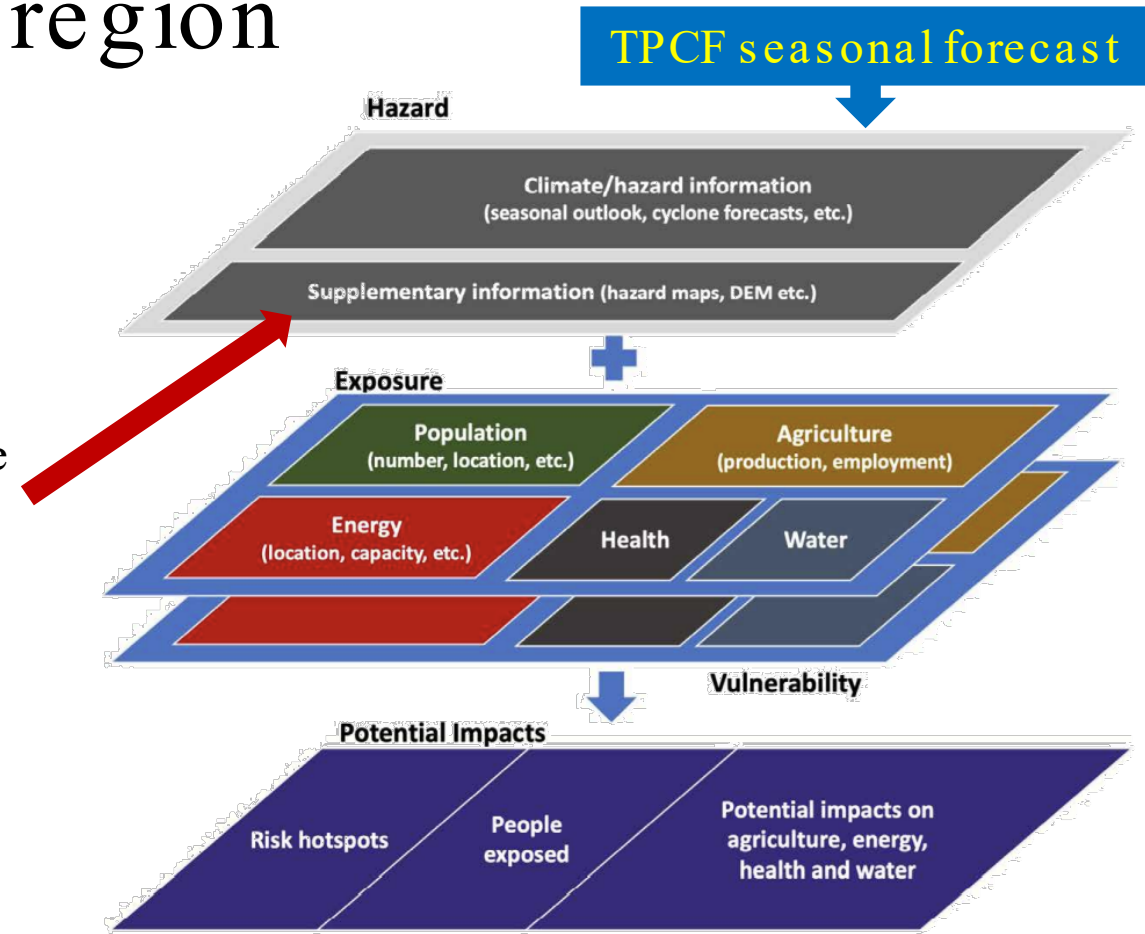


Seasonal Forecast Rainfall Data (DJF 2024-25)

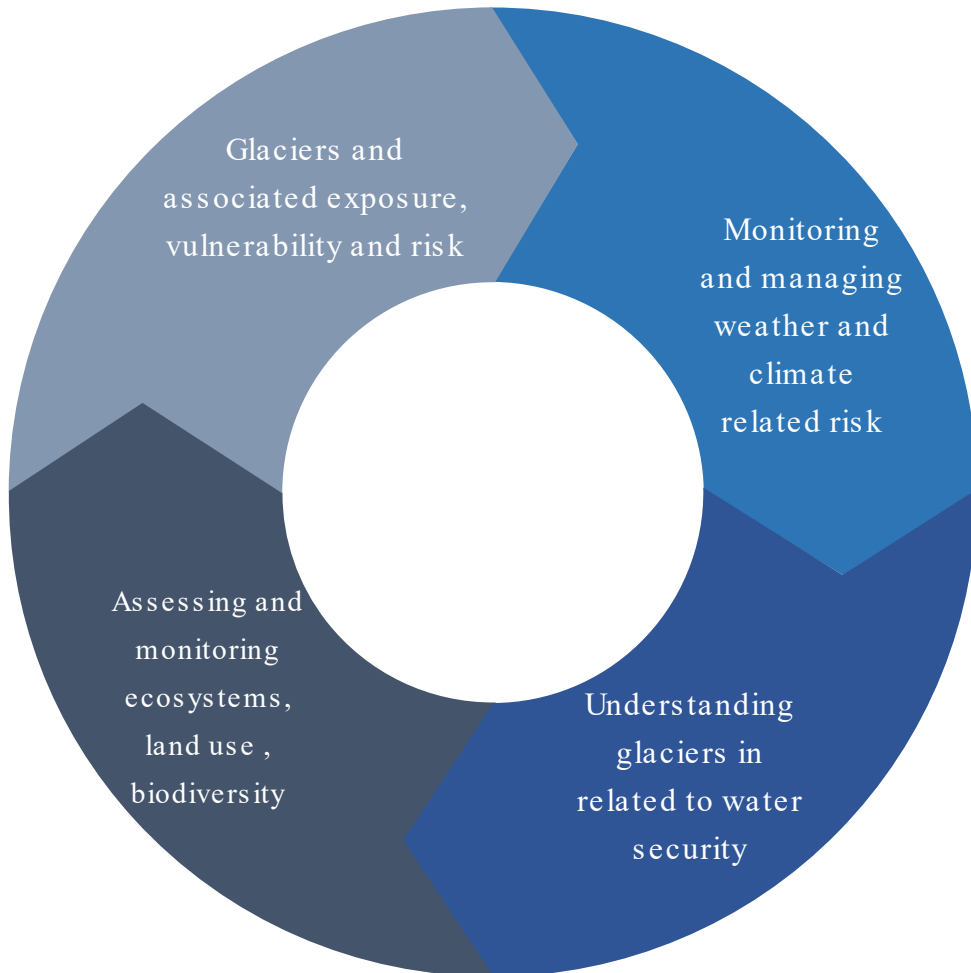
Partnership with ESCAP to develop IBF methodology for the TP/HKH region







IBF methodology for the mountainous region (to be developed)



Pathway for adaptation and resilience



-  **Glaciers**
Assessment – its seasonal, sub-seasonal and long-term patterns, spatial variations and scenarios across the Third Pole region.
-  **Associated weather and climate systems**
Seasonal outlooks of temperature, precipitation and snow cover – TP Climate Forum, Impact forecasting and scenarios.
-  **Water systems**
Glacier and snow melt are key components of water flow rivers that contribute to food and energy security in the TP region.
-  **Ecosystems**
Preserve and manage TP ecosystems and their biodiversity, land surface changes and human impact.





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