ICIMOD

ICIMOD – understanding of risk for building resilience in the Hindu Kush Himalaya

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5 June 2024


10 major Asian river systems
THE THIRD POLE
Third largest ice mass
4 of 36 global biodiversity hotspots and 330 Important Bird and Biodiversity Areas
The Hindu Kush Himayala: the Power of 8

The Hindu Kush Himalaya – an extraordinary asset of huge importance but facing an accelerating crisis

A 'tsunami in the sky' – Sikkim, Oct 4, 2023

India

4 October 2023

82
people died so far

7,644
People displaced by floods

1200 MW Hydropower project and several **roads and bridges** swept away

Himachal and Uttarakhand

India

14 August 2023

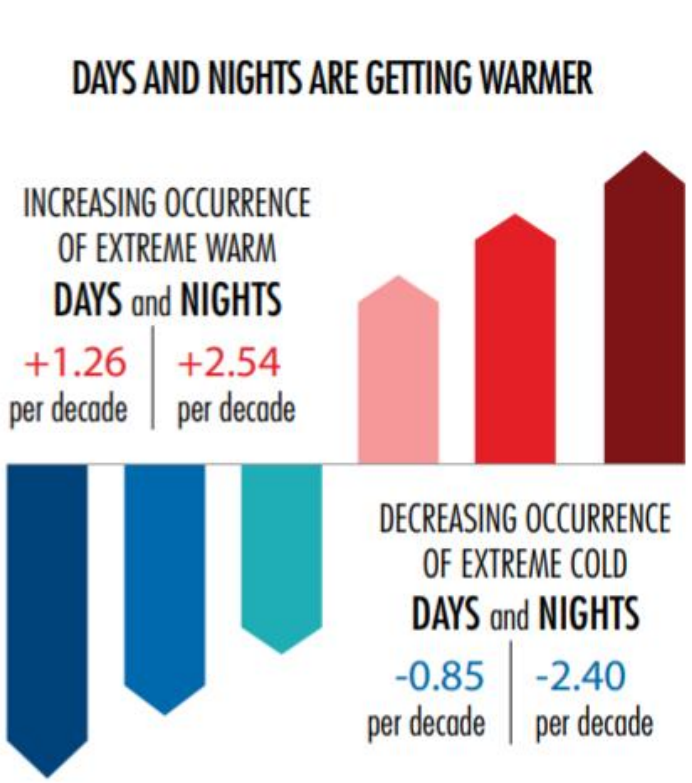
81
people died

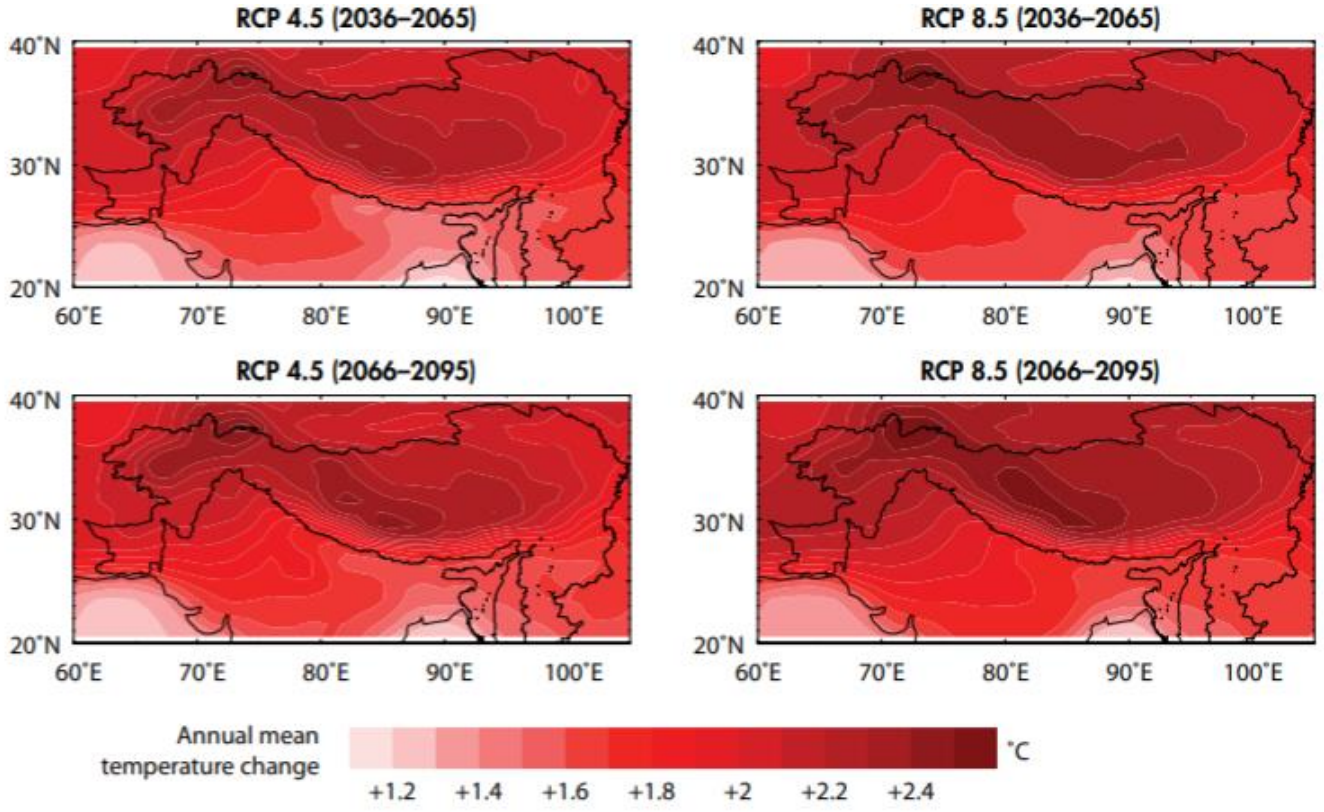
281
Roads including National Highway blocked

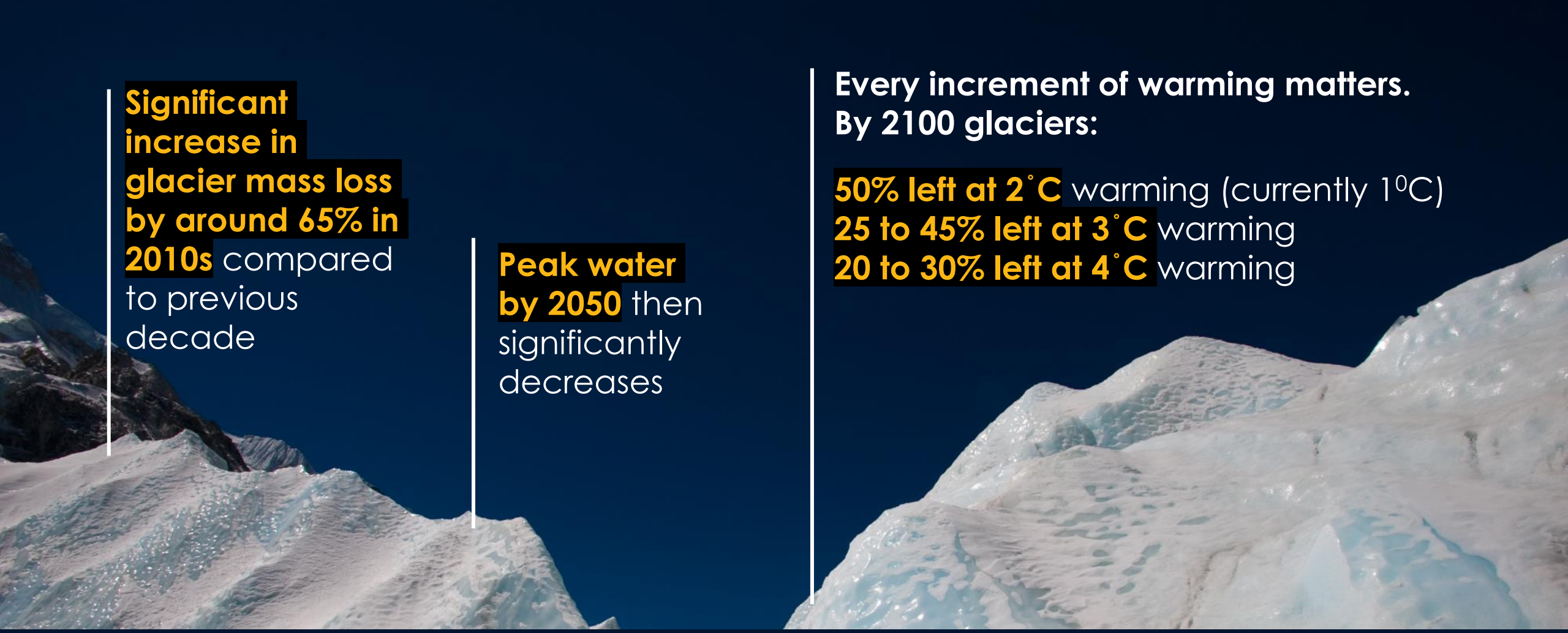
Himachal Pradesh has witnessed

113 landslides in 55 days since the beginning of the monsoon in 2023.

The HKH will warm more than the global mean and more rapidly at higher elevations







Significant increase in glacier mass loss by around 65% in 2010s compared to previous decade

Peak water by 2050 then significantly decreases

Every increment of warming matters.
By 2100 glaciers:

50% left at 2˚C warming (currently 1^{0}C)
25 to 45% left at 3˚C warming
20 to 30% left at 4˚C warming

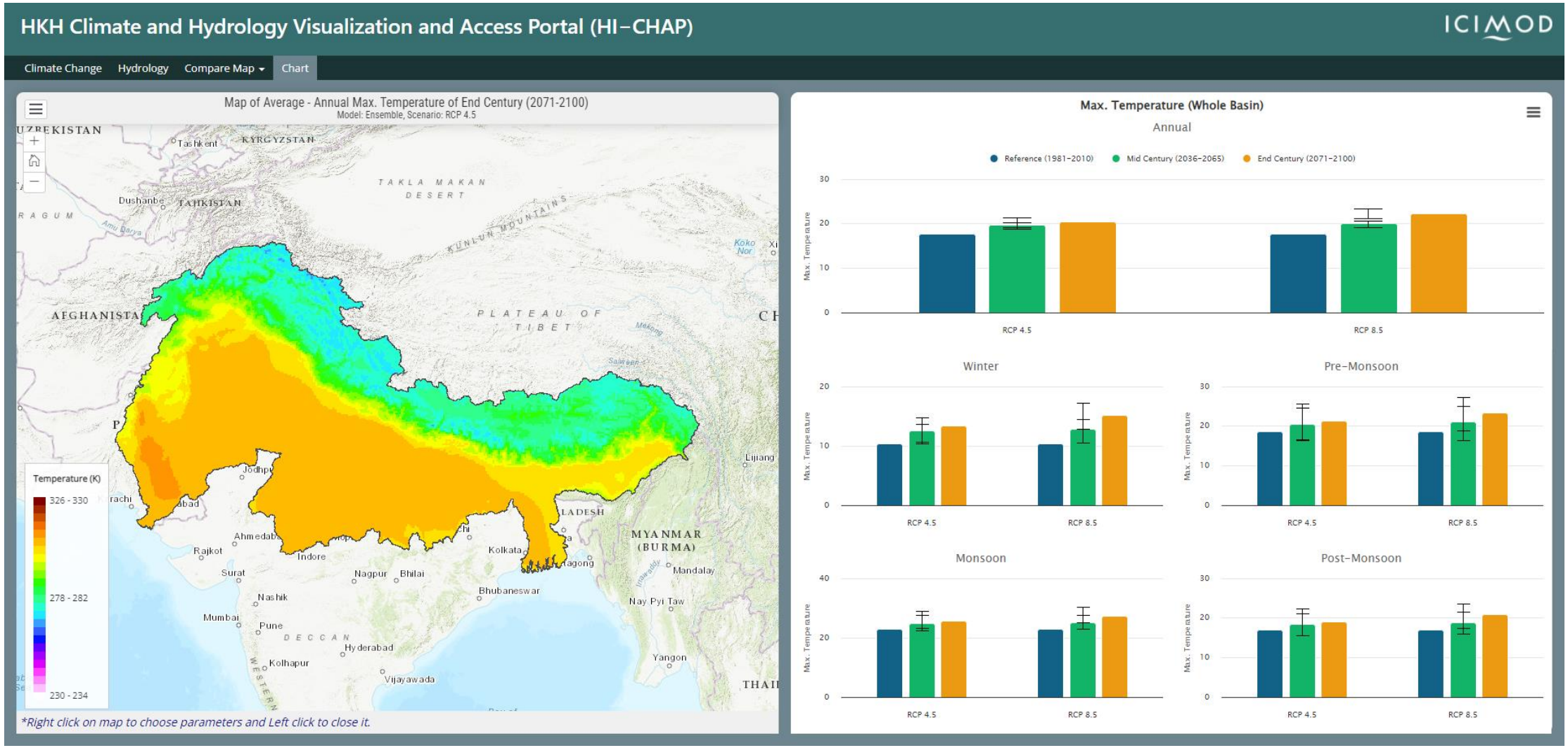
Current funding flows are 'woefully insufficient'

Regional cooperation and international finance are vital for urgent, near-term adaptation and loss and damage

Source: HI-WISE cryosphere chapter

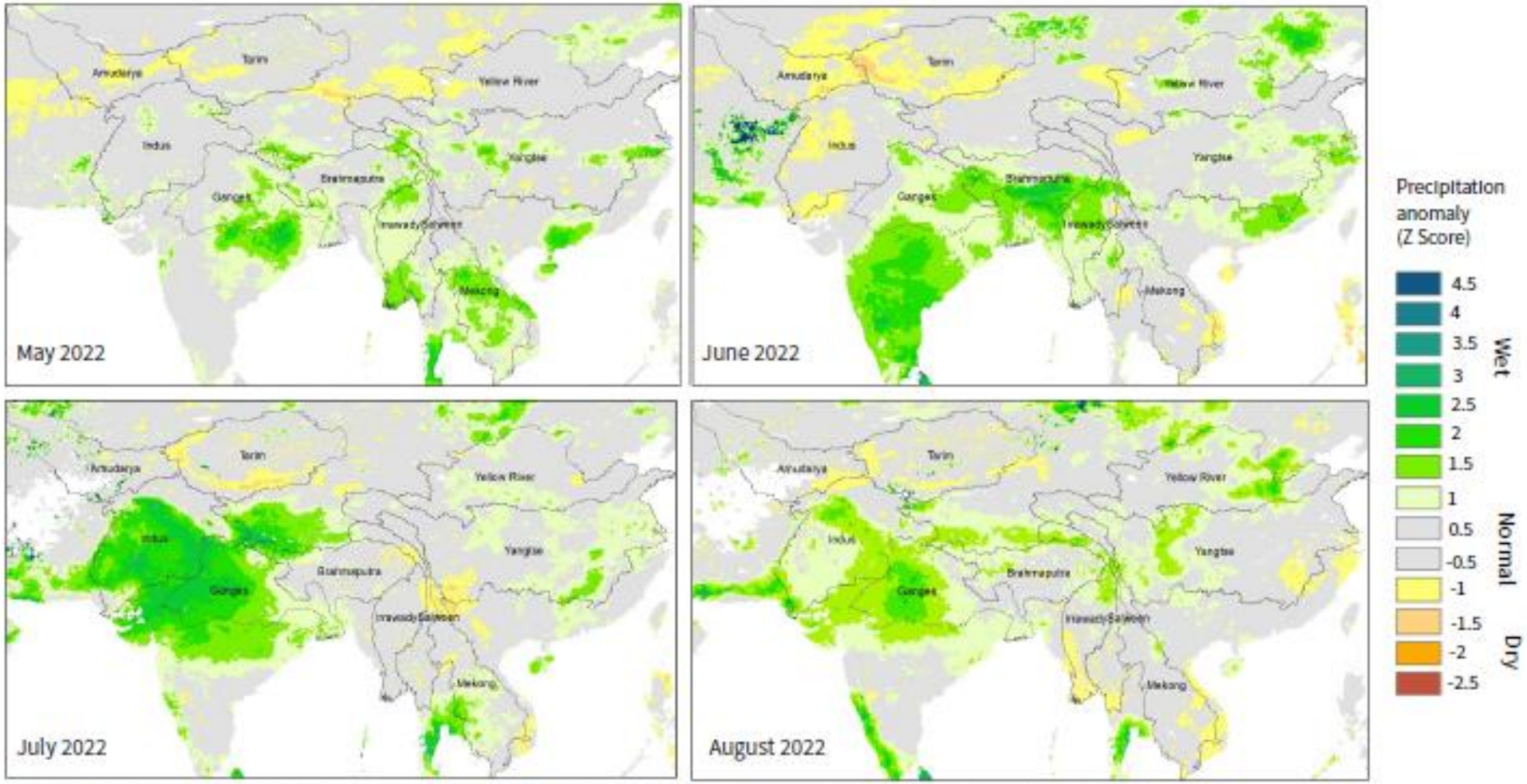
Delivering Information on key trends, events and risks to build resilience

Regional climate modelling to understand future scenarios



Seasonal/sub-seasonal (3-9 month) drought outlooks

South Asia Land Data Assimilation System (SALDAS) provides outlooks on weather parameters e.g. rainfall, temperature, soil moisture, and evapotranspiration which are useful for early anticipation of drought conditions



Extremely dry(< -3), Very dry(-2 to -3), Dry(-1 to -2), Near normal (1 to -1), Wet(1 to 2), Very wet(2 to 3), Extremely wet(>3)

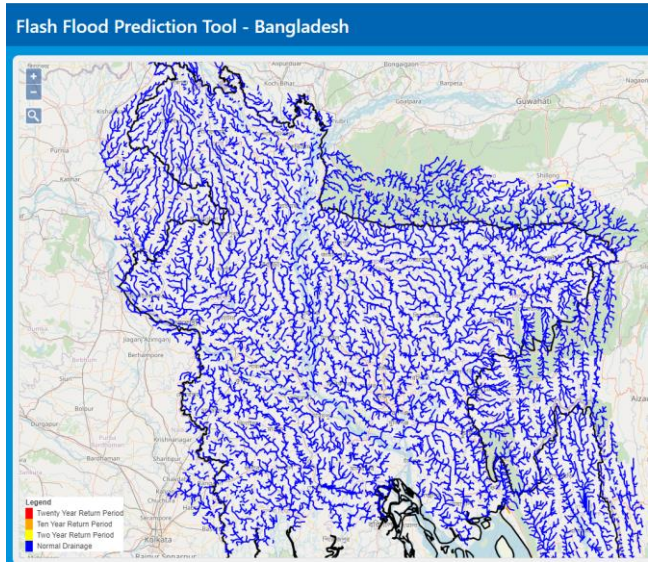
PRECIPITATION OUTLOOK FOR MAY–AUGUST 2022

Predicting short term high impact weather events

Ensemble-based modeling for predicting probabilities High Impact Weather Assessment Tool (HIWAT)

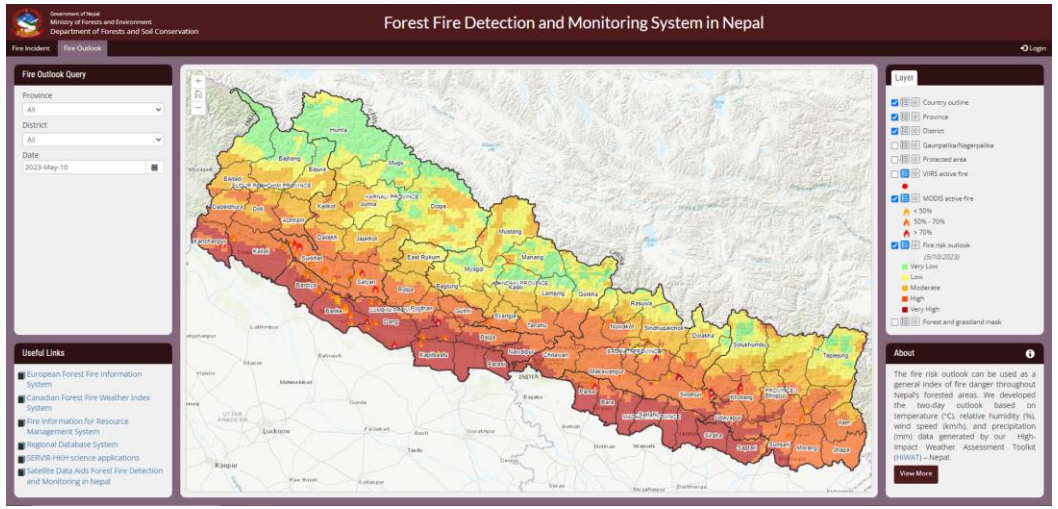
2 to 5 days forecasting of thunderstorm, hail, rainfall, wind etc.

Afghanistan, Bangladesh, Bhutan, Pakistan, Nepal



Flash Flood Prediction Tool developed using HIWAT

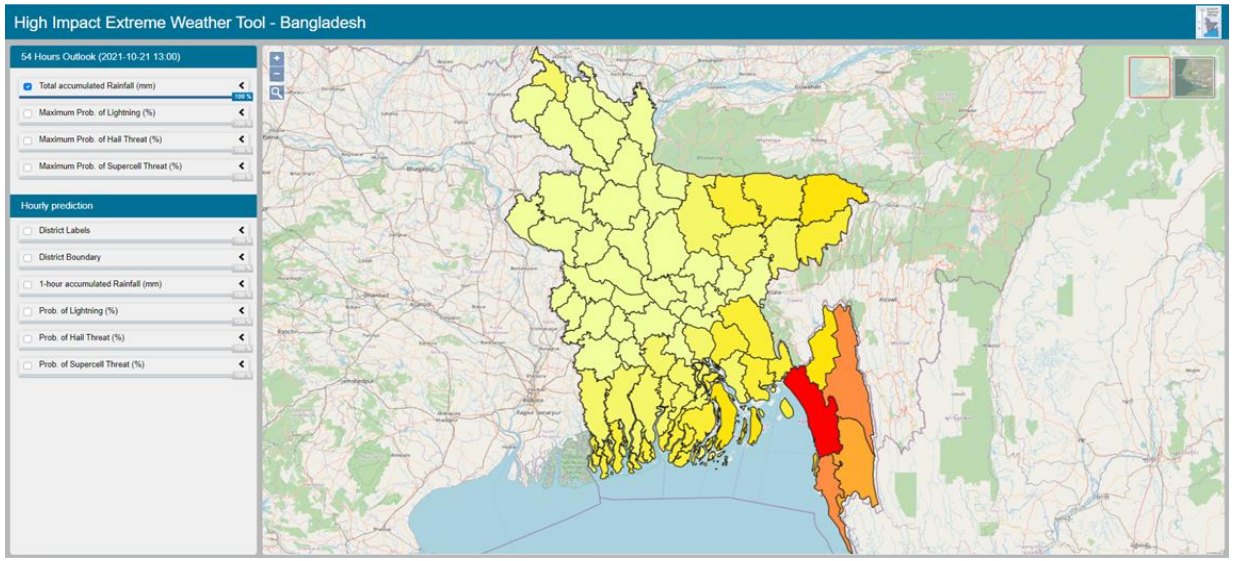
2 days lead time
HIWAT rainfall
Localized flood



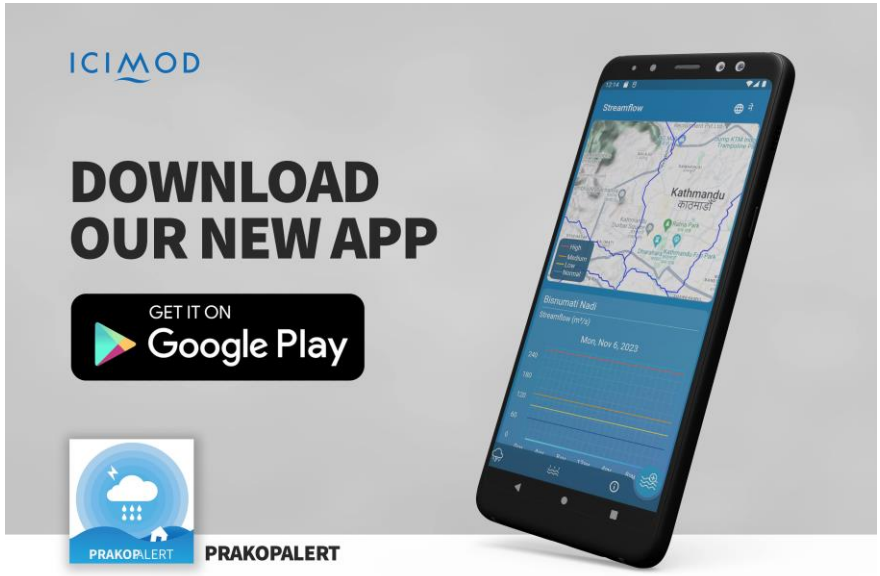
Fire weather index based on HIWAT for two days' outlook on areas with high fire risks

Customized applications for reaching out to communities

Web applications with simple user interfaces for easy understanding of information – HIWAT in Nepal and Bangladesh



Prakop Alert a mobile app developed on user demand (Red Cross, Start Network) to provide weather and flood forecast information generated from HIWAT System in Nepal



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Air Quality Watch - HKH

Recent | Archive | Forecast | Emission | Demography | RGB Product

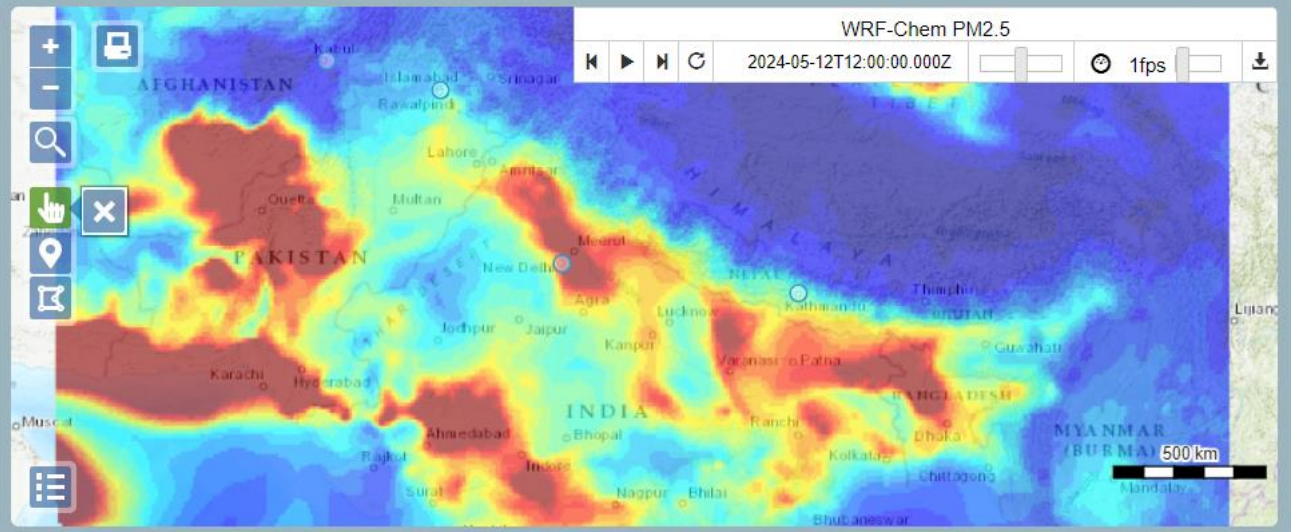
Map Controls

Select By: Parameter

Pollutants: PM / Model-PM2.5 (WRF-Chem)

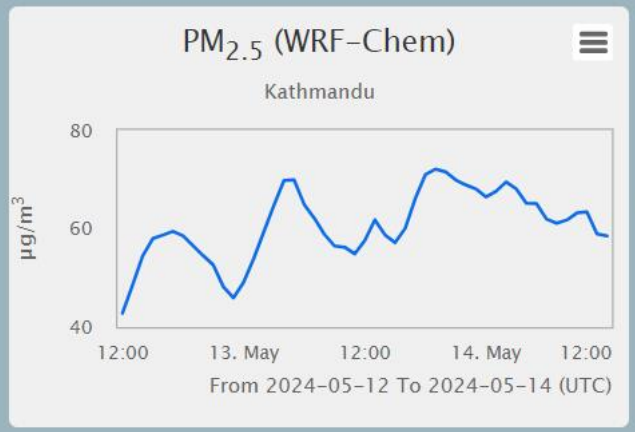
Select Locations

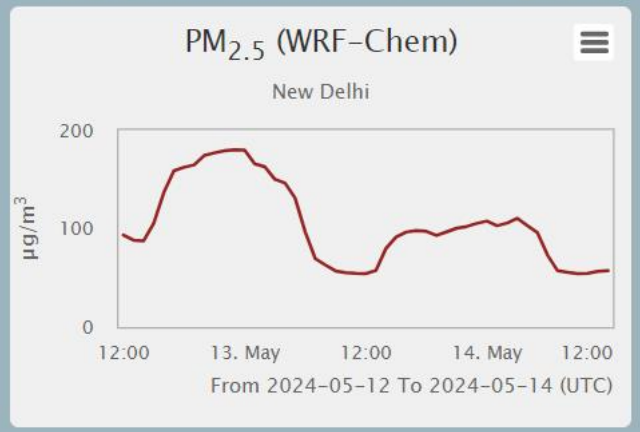
- Major Cities - Kathmandu
- Major Cities - New Delhi
- Major Cities - Islamabad

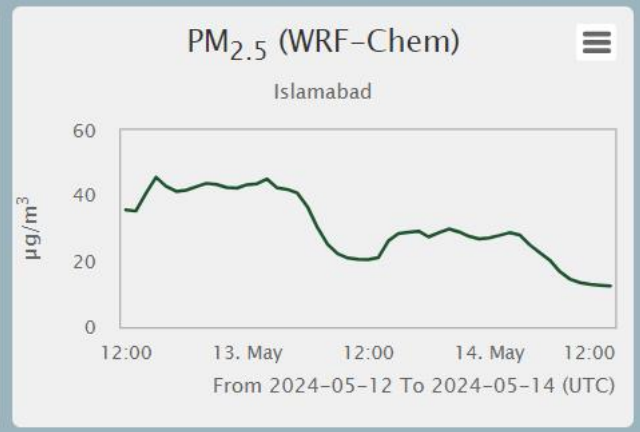


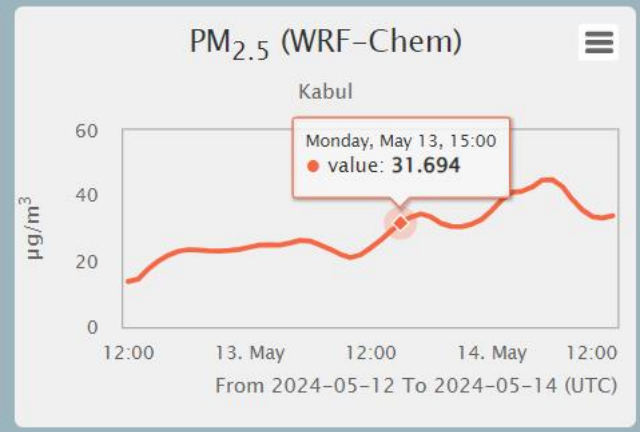
Layer Control

WRF-Chem PM2.5 — 60 %









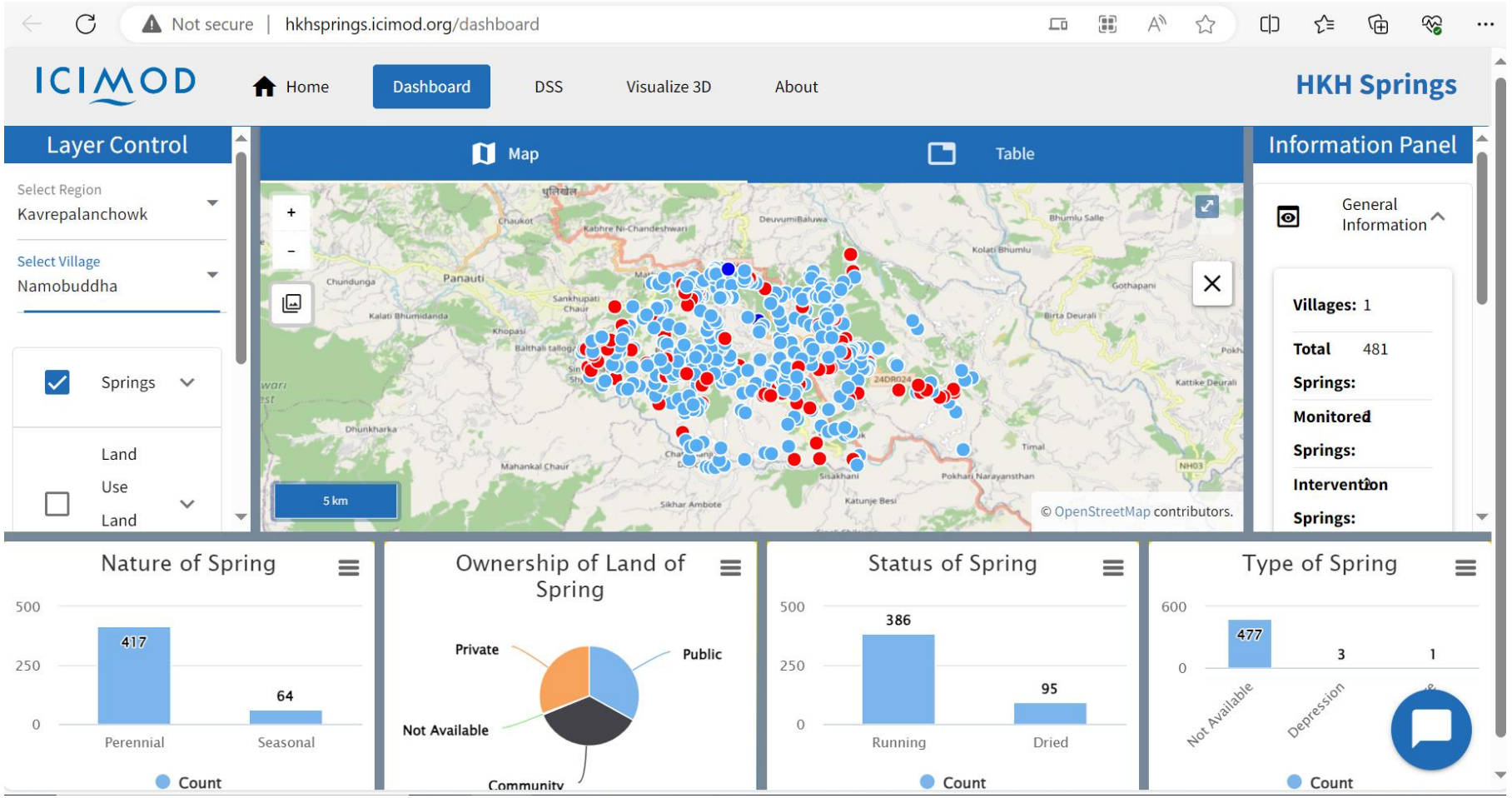
AIR QUALITY OBSERVATIONS

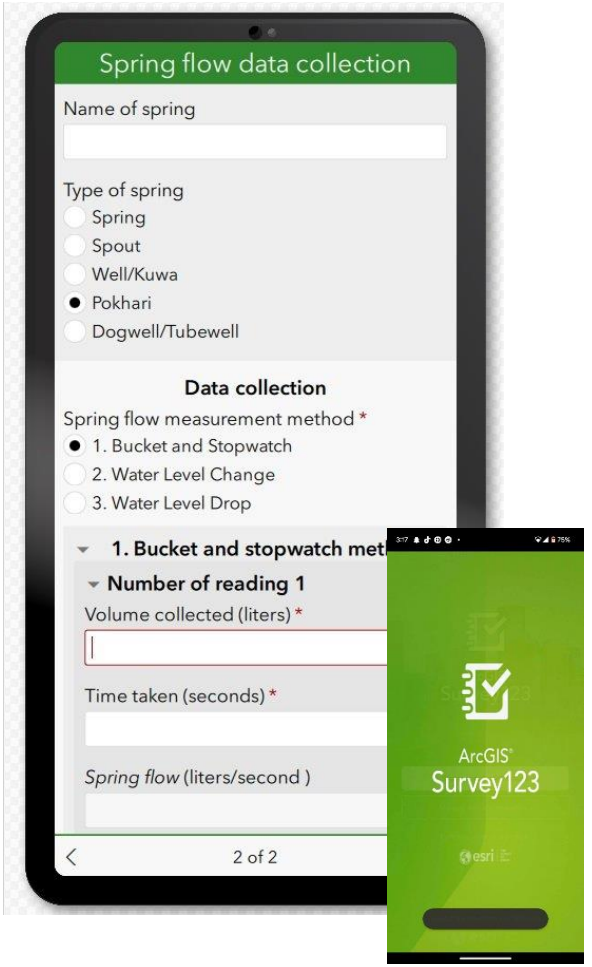
(Using MODELS, SATELLITE DATA, AND MONITORING STATIONS FOR DUST, AOD AND TRACE GASES)

Trend Mapping

Trends in land use cover and settlement changes over last two decades

Deploying citizen science for springs mapping use a mobile application





Supported by: UK-FCDO funded Himalayan Resilience Enabling Action Programme (HI-REAP)

But many research and data gaps still exist

ICIMOD funding compared to other Regions*

ARCTIC

$1.1trillion

research was **spent on the Arctic** between 2007 and 2016

ANTARCTICA

$700 million

Was received for **Antarctica** in 2010

HKH- ICIMOD

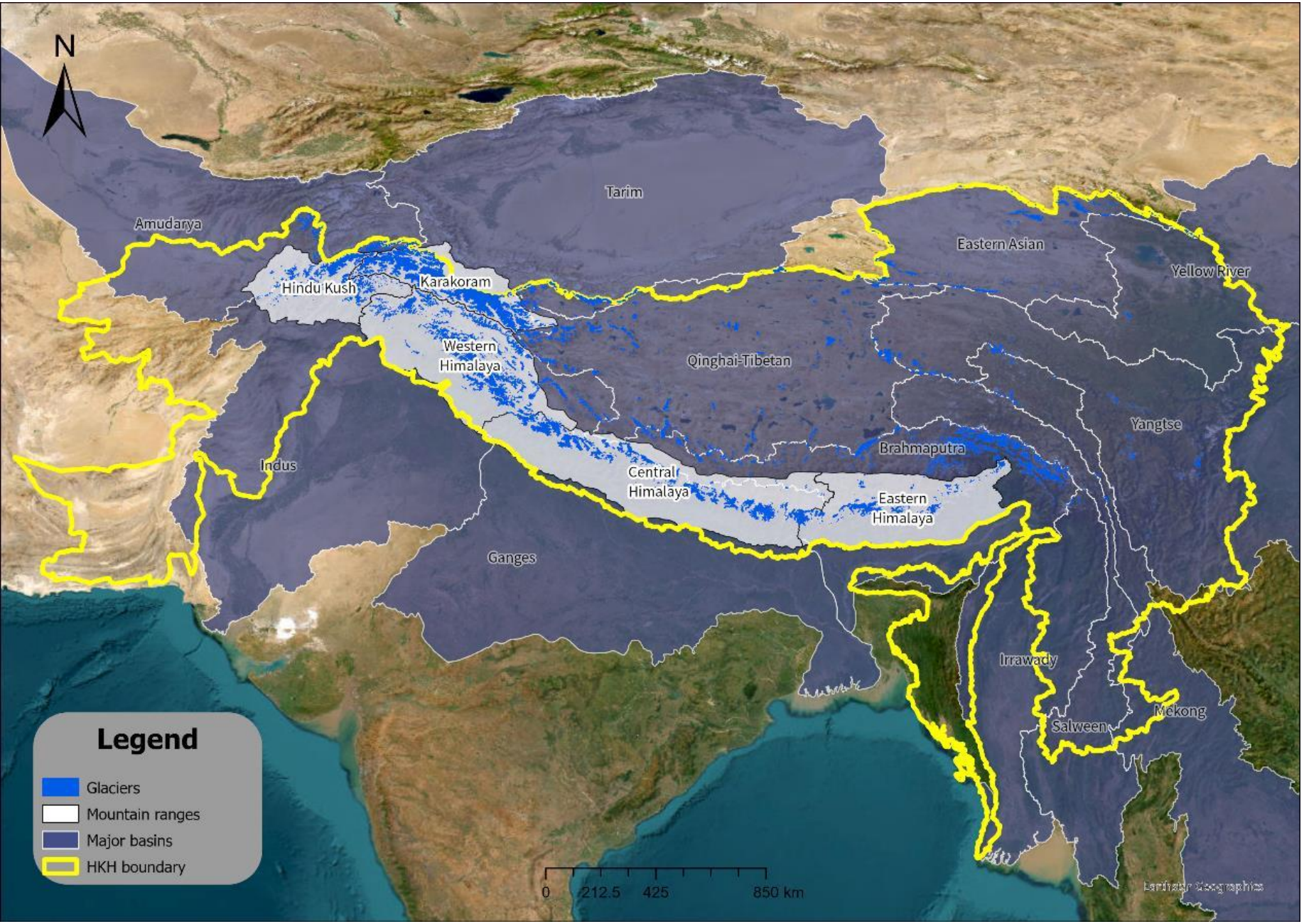
$5.8 million

ICIMOD received for cryosphere research in the **HKH** between 2018 and 2022

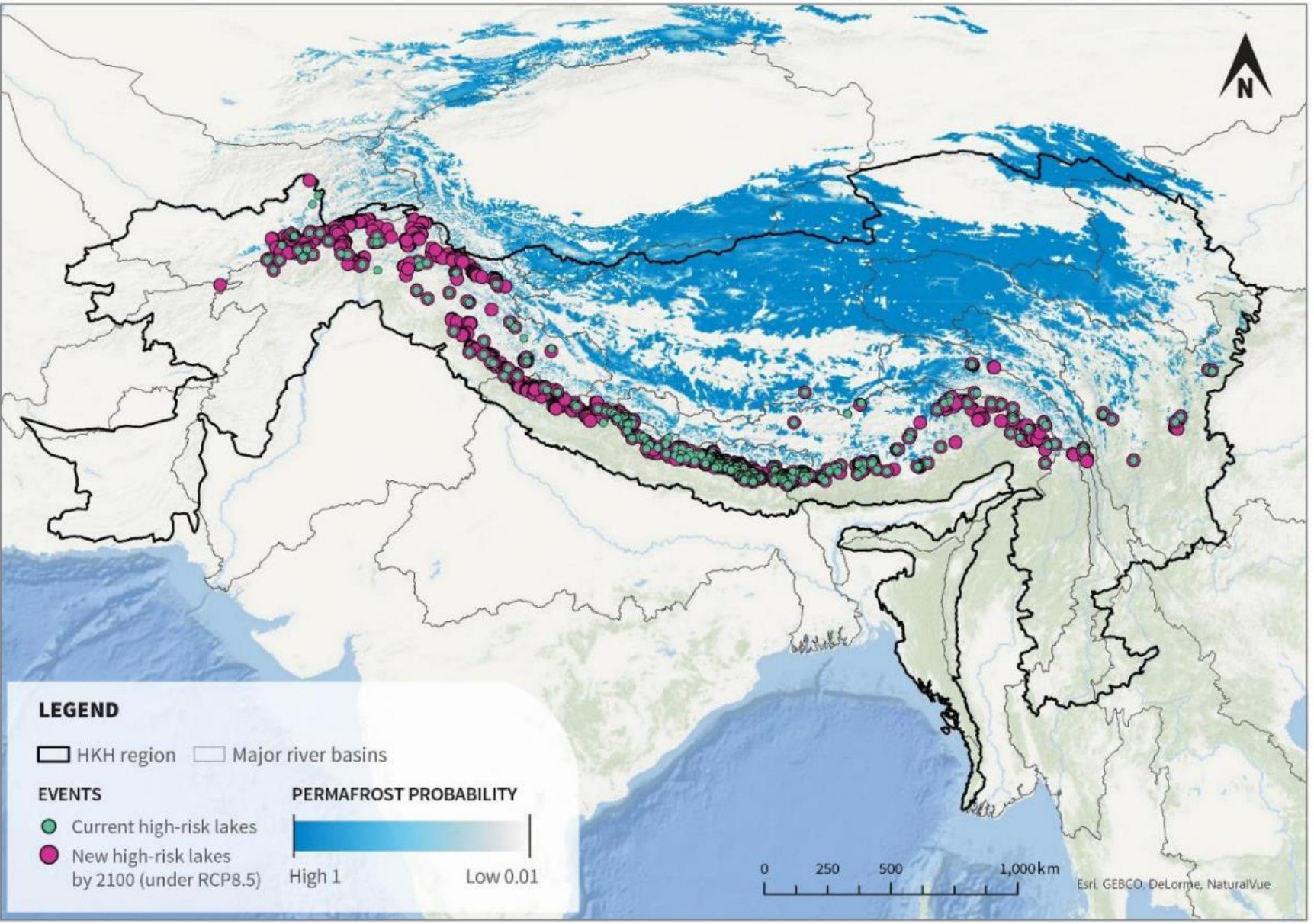
ICIMOD compared to ARCTIC	**0.00109%**
ICIMOD compared to ANTARCTICA	**0.6363%**

**these are very crude figures and there is spending on science by university in the HKH and other regions that is not captured here.*

Cryosphere – Ice, Snow and Permafrost



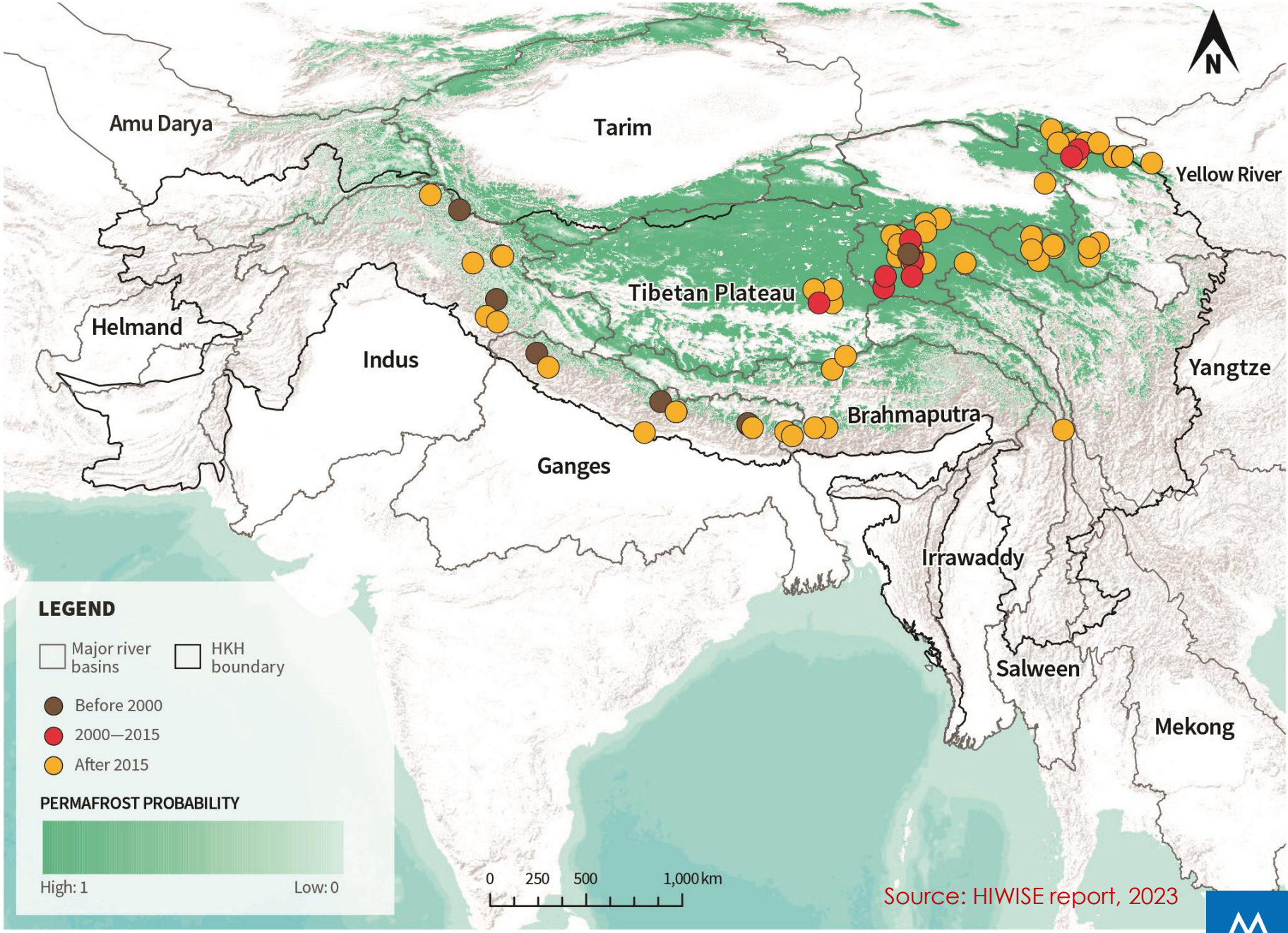
More than 50,000 glaciers – only 28 have comprehensive mass balance monitoring



Only 5 out of 200 potentially dangerous glacial lakes in HKH are monitored

Uncertainty over permafrost decline

Permafrost area is extensive, but very few measurements.



Source: HIWISE report, 2023

Huge Knowledge Gaps on Snow

Snow is crucial for irrigation, hydro, domestic uses

Significant **decrease in snow cover** during summer & winter months, and slarge easonal shifts

Very hard to measure, however, increases in use of satellite imagery means more information

Livelihoods and Landscapes

Few effective future proofed solutions

Lack of mountain focus in national surveys

Research and innovation small scale and geographically concentrated

Mountain crops and livelihoods considered low value/ insignificant

Impacts of vast social change including gender and migration poorly understood

The story of Yartsa gunbu:
so much we don't know
about mountain biodiversity


And the forgotten multiple values of high-altitude rangelands and wetlands

Even when the science is there: policy and investment do not always respond

More on policy implementation (procedures, standards, guidelines)

Economic incentives and financial mechanisms


1.5 DEGREES IS TOO HOT
#SaveOurSnow
www.icimod.org/saveoursnow