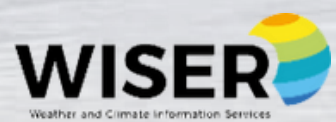# PLANNING WORKSHOP ON
Impact-Based Forecasting and Climate Services

21–24 January 2025 | Bangkok, Thailand

ESCAP's Technical Assistance to SAHF

Analytical work to support intergovernmental dialogues and agreements

ESCAP Flagship publications, knowledge products and services

Asia Pacific Disaster Report for ESCAP Subregions 2024 – South and South-West Asia

- **Climate Hazards**: The region faces intensifying climate hazards such as droughts, floods, heatwaves, and surface winds, impacting millions of lives, economies, and ecosystems.

- **Vulnerable Areas**: The Ganges-Brahmaputra-Meghna basin, Indus basin, and parts of Türkiye, Bhutan, and Nepal are identified as hotspots for intensifying multi-hazard risks.

- **Biodiversity Threats**: Critical mangrove ecosystems face increasing pressure, further jeopardizing regional resilience.

TARGETING TRANSFORMATIVE DISASTER RISK RESILIENCE IN SOUTH AND SOUTH-WEST ASIA

Asia-Pacific Disaster Report 2024 for ESCAP Subregions

ESCAP
Economic and Social Commission
for Asia and the Pacific

ESCAP-UKMet and ARRCC learning

Regional learning platform for addressing shared vulnerabilities and risks of floods and drought in **South Asia**: Twin track approaches

ARRCC
Asia Regional Resilience
to a Changing Climate

Science track

- South Asia Climate Forum
- South Asia Hydromet Forum

- Learning Platform for floods and drought
- Asia-Pacific Disaster Resilience Network

Policy Track

- South Asia SDG Forum
- SDG Progress Monitoring reports

Inter-governmental Committee on Disaster Risk Reduction

Progress Tracking for interventions

- Climate sensitive SDGs
- Sendai framework for DRR
- Adaptation and resilience tracks of Climate Action

Engaging key stakeholders for climate sensitive investment and development planning
e.g. Planning commission, finance ministries, NDMAs etc

TARGETING TRANSFORMATIVE DISASTER RISK RESILIENCE IN SOUTH AND SOUTH-WEST ASIA

Asia-Pacific Disaster Report 2024
for ESCAP Subregions

ESCAP's Mandate to support EW4All

Early Warnings for All

Mandated by Member States of Asia and the Pacific including Tajikistan

1 Develop early warning systems for all at the regional level

ESCAP Resolution 79/1:Accelerating climate action for sustainable development (May 2023)

2 Develop a regional strategy in support of the global and country-level implementation of the four pillars of multi-hazard early warning systems

ESCAP Committee on Disaster Risk Reduction (July 25-27, 2023)

3 Building of national capacities by leveraging innovations, including digital and geospatial applications for multi-hazard early warning systems

ESCAP Committee on Disaster Risk Reduction (July 25-27, 2023)

**4** Financial contributions to the ESCAP multi-donor trust fund to achieve early warnings for all

ESCAP Committee on Disaster Risk Reduction (July 25-27, 2023)

ESCAP
Economic and Social Commission for Asia and the Pacific

Support to SAHF's IBF Process

ESCAP data platforms and services

ESCAP's Impact Based Forecasting (IBF) approach follows the WMO Global Framework for Climate Services.
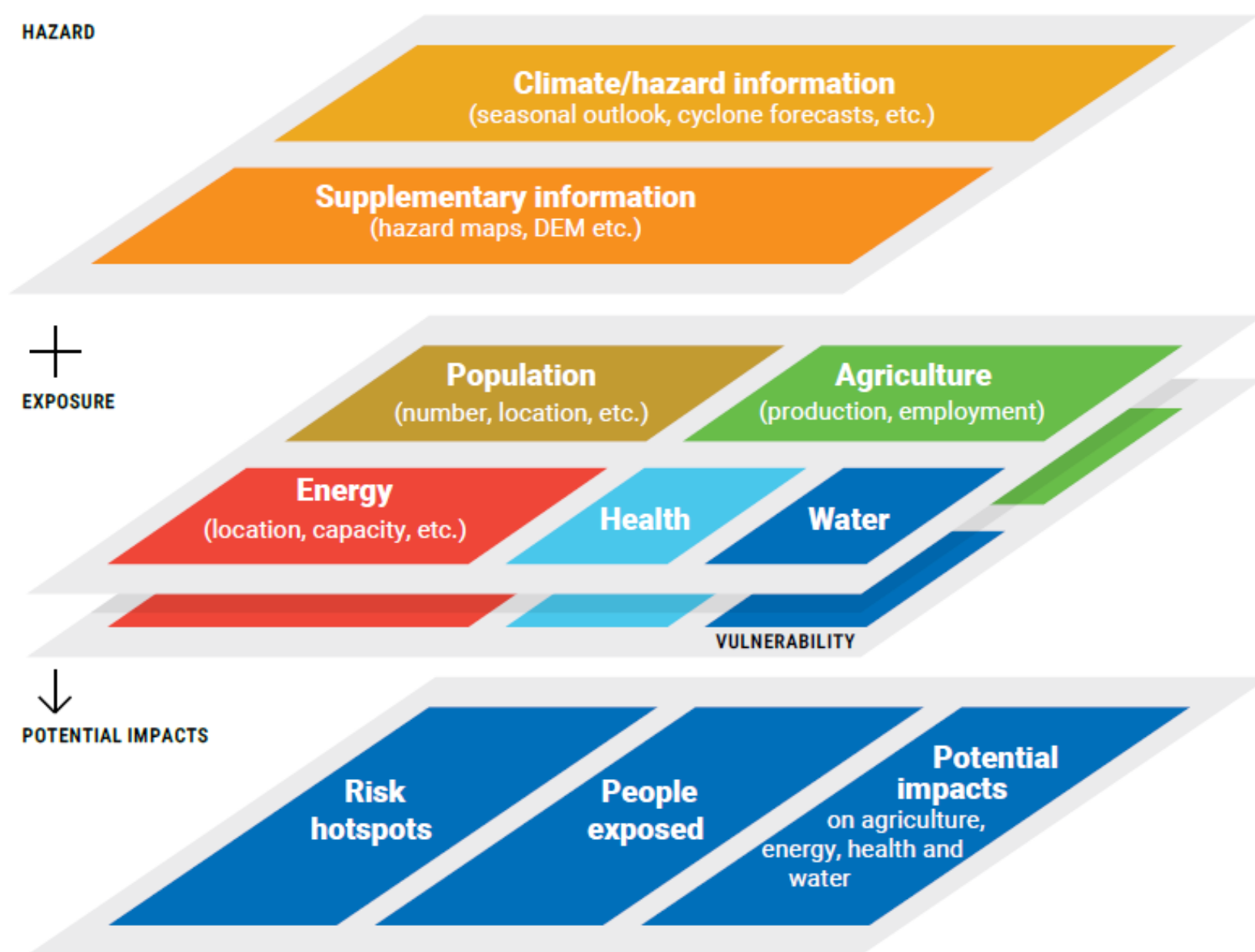
- **IBF based on seasonal forecast products** - Concept and cases were presented to SASCOF, EASCOF, ASEANCOF and FOCRAII.

- **IBF based on observed and forecast tracks of tropical cyclones (quadrant wind)** - Concept and a case were presented to and discussed at TC and PTC.

Source: ESCAP (2022) APDR – Pathways to Adaptation and Resilience in South and South-West Asia Overview of the work of secretariat and the UN system at the regional level. ESCAP/CDR/2021/INF/1

Putting data and technology ecosystems together to protect @ risk people

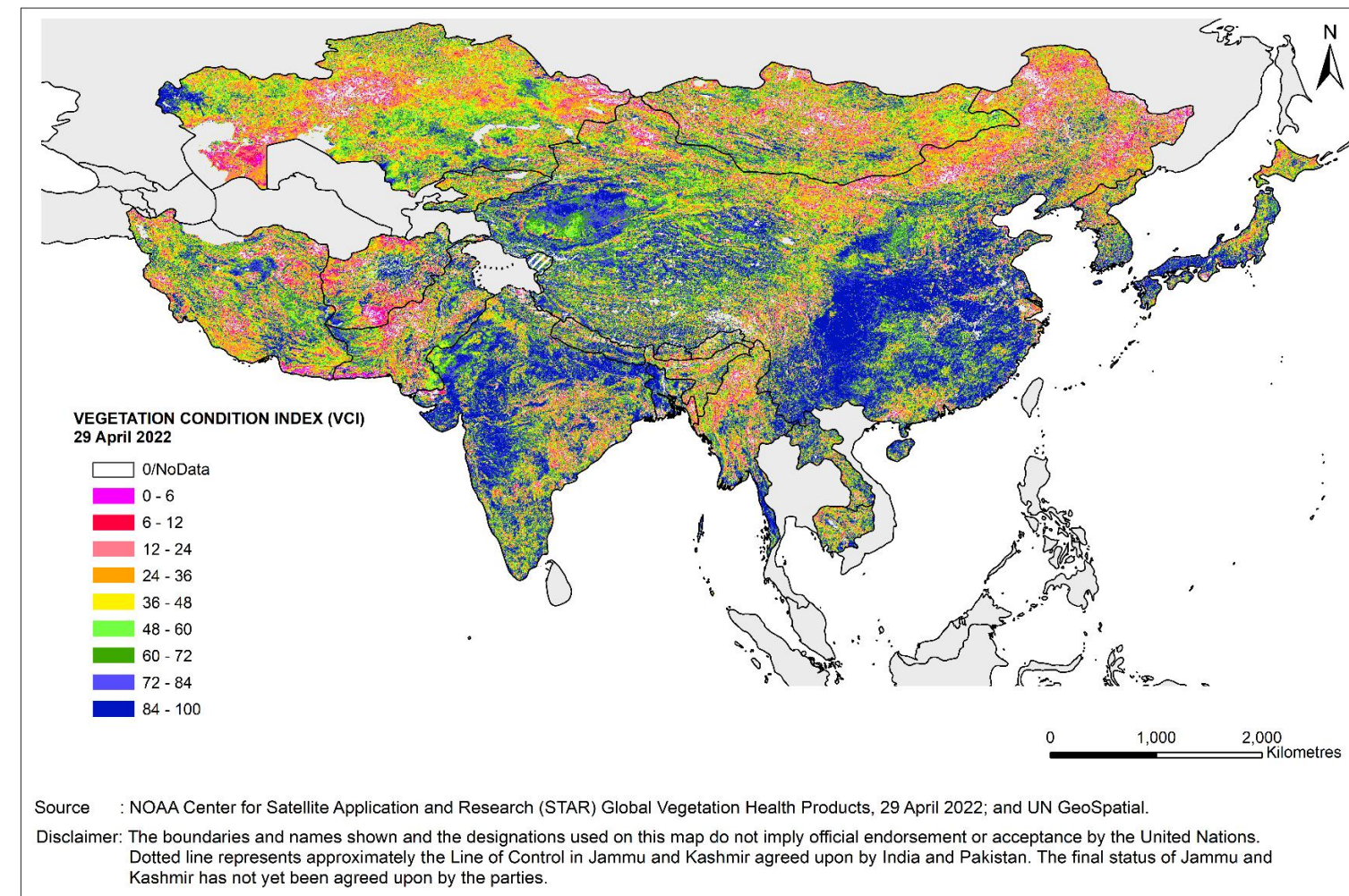**ONE data ecosystem analyzing multiple datasets**
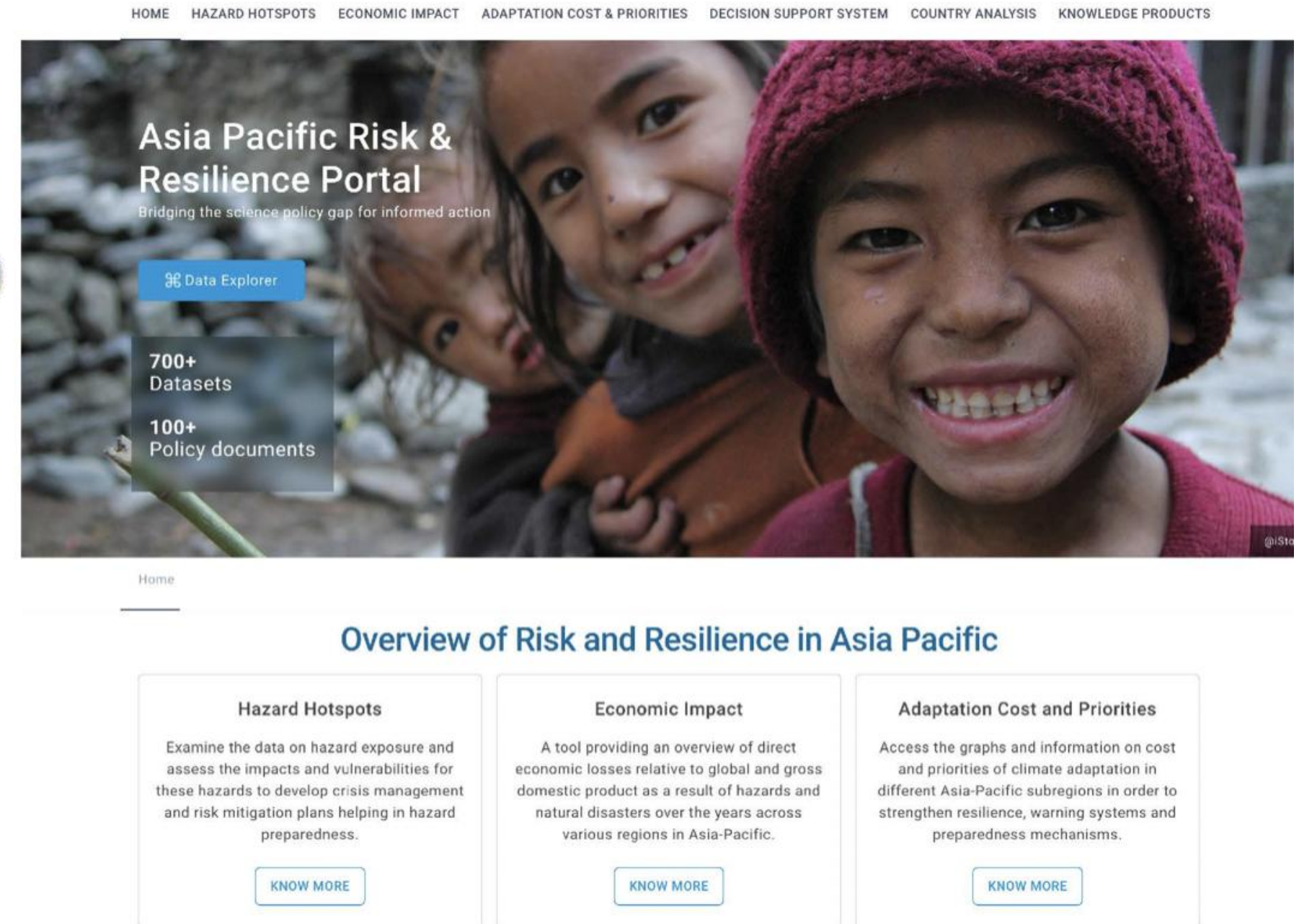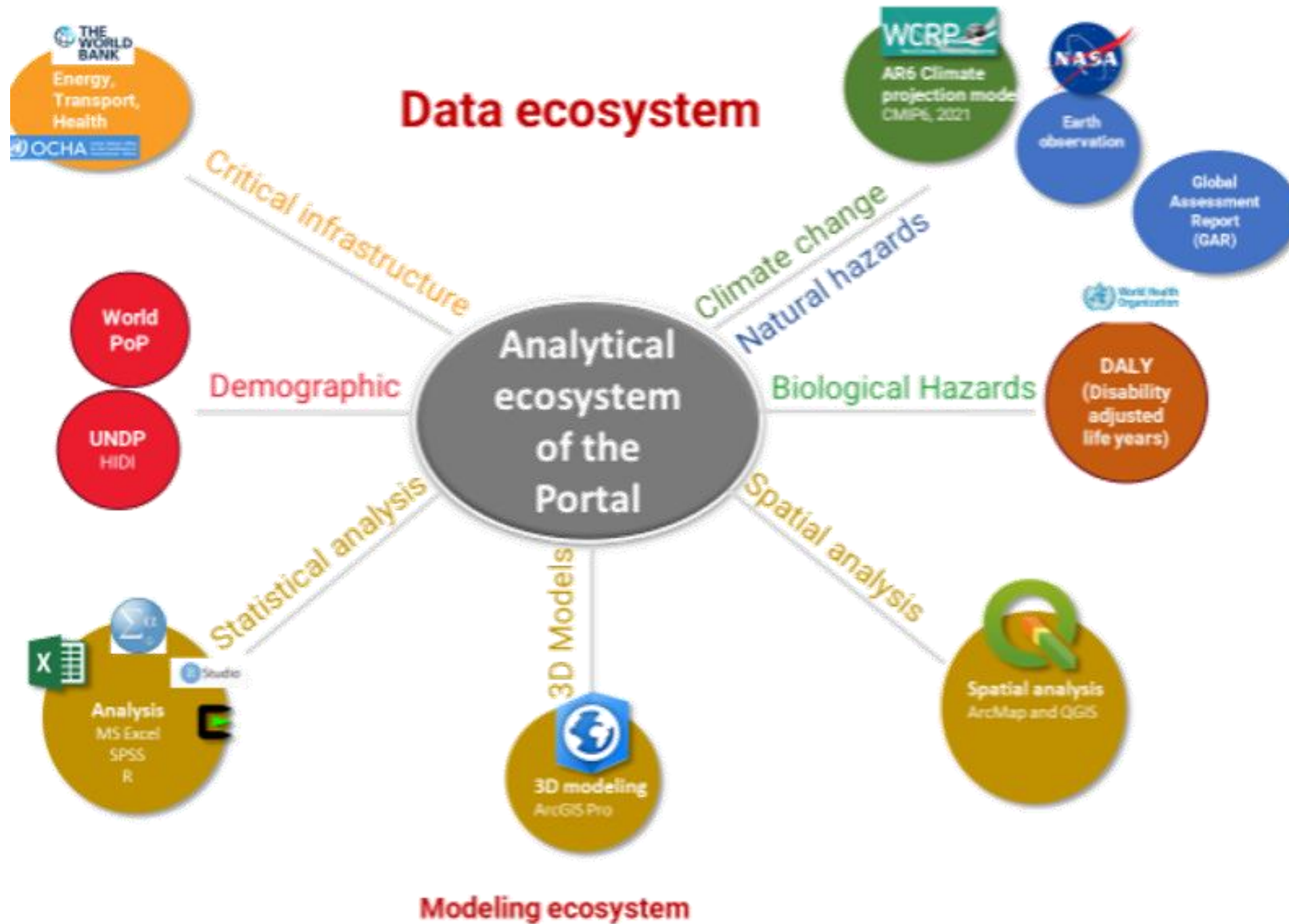
The Portal is built on a state-of-the-art data intensive and risk analytics
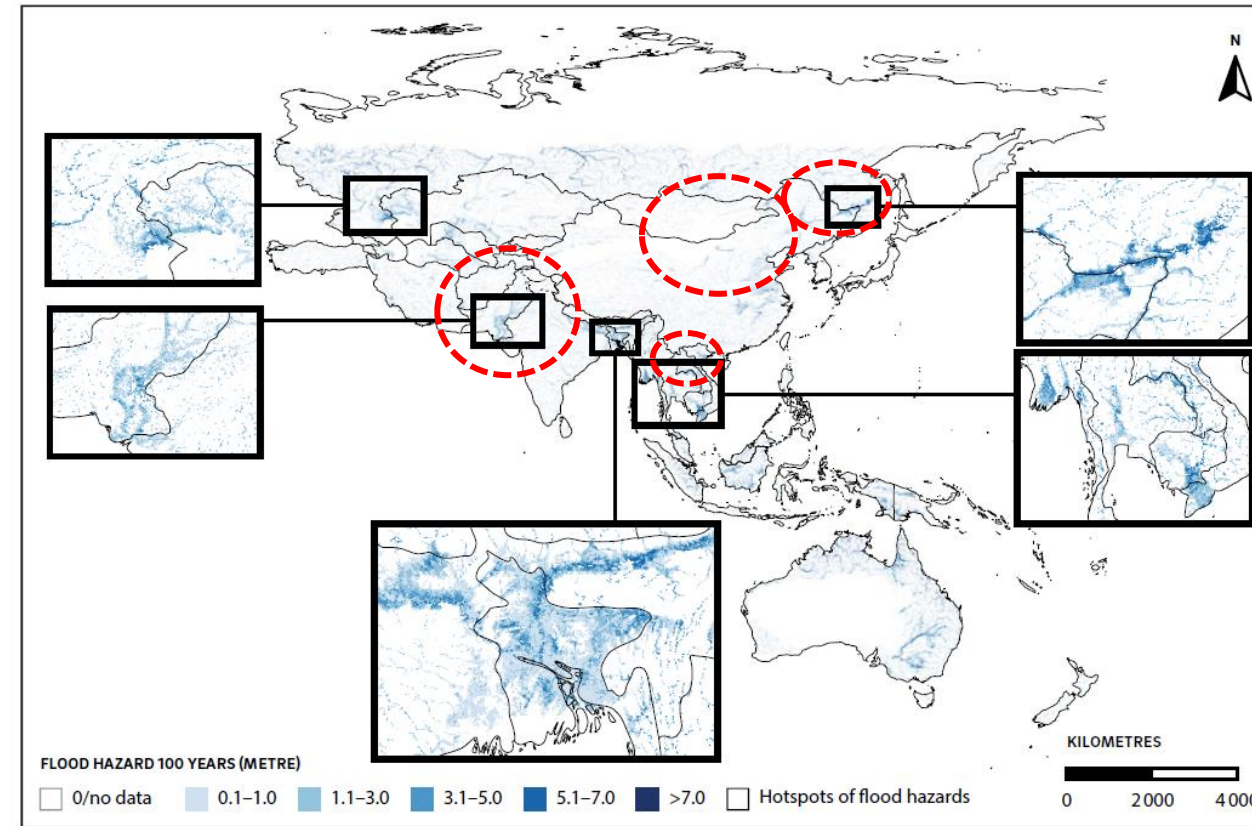
Translating Seasonal Outlook 2022 to Impact Forecasting in specific context of floods: Areas of attention with above-normal precipitation

Vegetation health and flood hazard map were used to find out the areas of attention for above-normal precipitation.
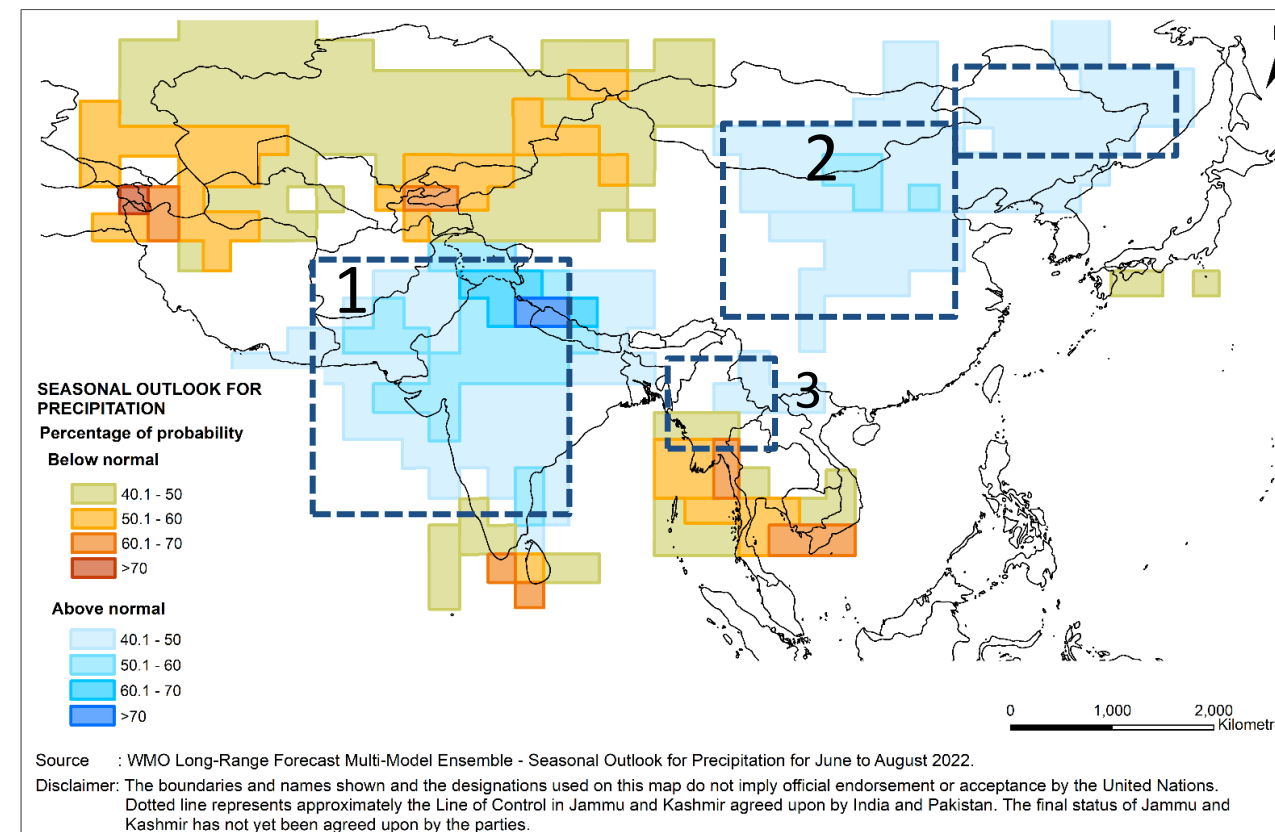
Vegetation condition index as of 29 April 2022

VEGETATION CONDITION INDEX (VCI) 29 April 2022

- 0/NoData
- 0 - 6
- 6 - 12
- 12 - 24
- 24 - 36
- 36 - 48
- 48 - 60
- 60 - 72
- 72 - 84
- 84 - 100

Source : NOAA Center for Satellite Application and Research (STAR) Global Vegetation Health Products, 29 April 2022; and UN GeoSpatial.

Disclaimer: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.

Flood hazard in 100-year return period

FLOOD HAZARD 100 YEARS (METRE)

- 0/no data
- 0.1–1.0
- 1.1–3.0
- 3.1–5.0
- 5.1–7.0
- >7.0
- Hotspots of flood hazards

Seasonal forecast for precipitation JJA 2022

SEASONAL OUTLOOK FOR PRECIPITATION
Percentage of probability

Below normal
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- >70

Above normal
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- >70

Source : WMO Long-Range Forecast Multi-Model Ensemble - Seasonal Outlook for Precipitation for June to August 2022.

Disclaimer: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.

Areas of attention for above-normal precipitation

1. South:

Pakistan and north-eastern parts of India neighboring with Pakistan;

northern parts of India neighboring with Nepal, south-east parts of China (60% – more than 70% probability of above-normal precipitation); central parts of India and east parts of India, and Bangladesh.

2. North-east:

North-eastern parts of China.

3. South-east:

Southern parts of China neighboring with Myanmar and Lao
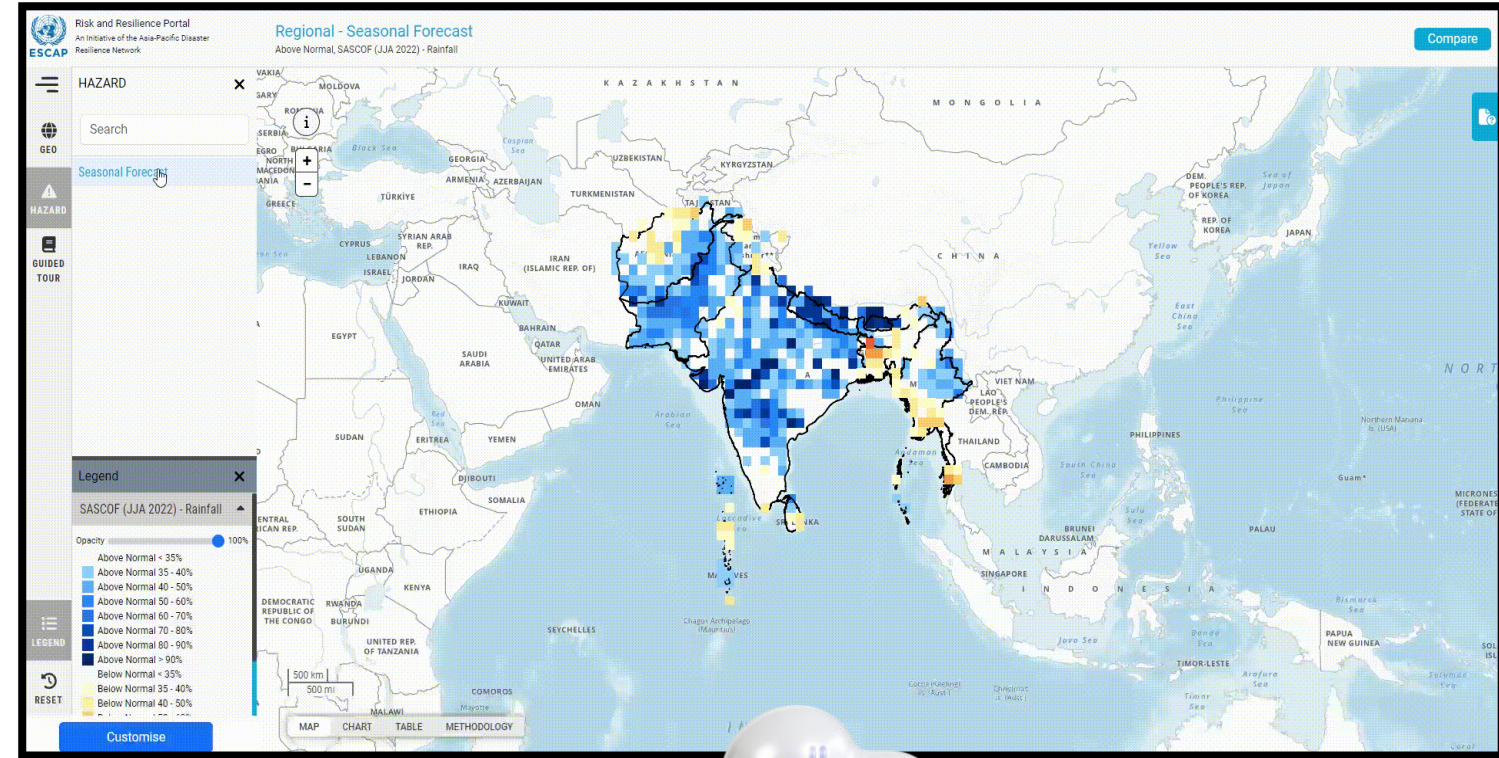
The Impact-Based Forecasting Tool
Transforming Data into Action: AI-Driven Disaster Preparedness

INPUT*

- Population data
- Infrastructure data
- Hazard data
- Digital map
- Boundary data

OUTPUT

- Exposure and intensity zone of hazards
- Map & exportable table

The Impact-Based Forecasting Tool

GEOSPATIAL PRE-PROCESSING

- Setting Coordinate Reference Systems
- Setting resolution
- Classifying hazard (based on intensities, create different hazard intensity zones)

PROCESS IDENTIFICATION

- Auto recognize type of infrastructure / population data

GEOSPATIAL EXPOSURE ANALYSIS

- Calculate exposure to all infrastructure and population
- Overlay & count exposure

*Georeferenced raster data

WMO/ESCAP PTC Attachment Trainings in 2020, 2021, 2023, 2024

Training on Seasonal Prediction to Operational Services in South Asia Climate Research & Services, IMD, Pune
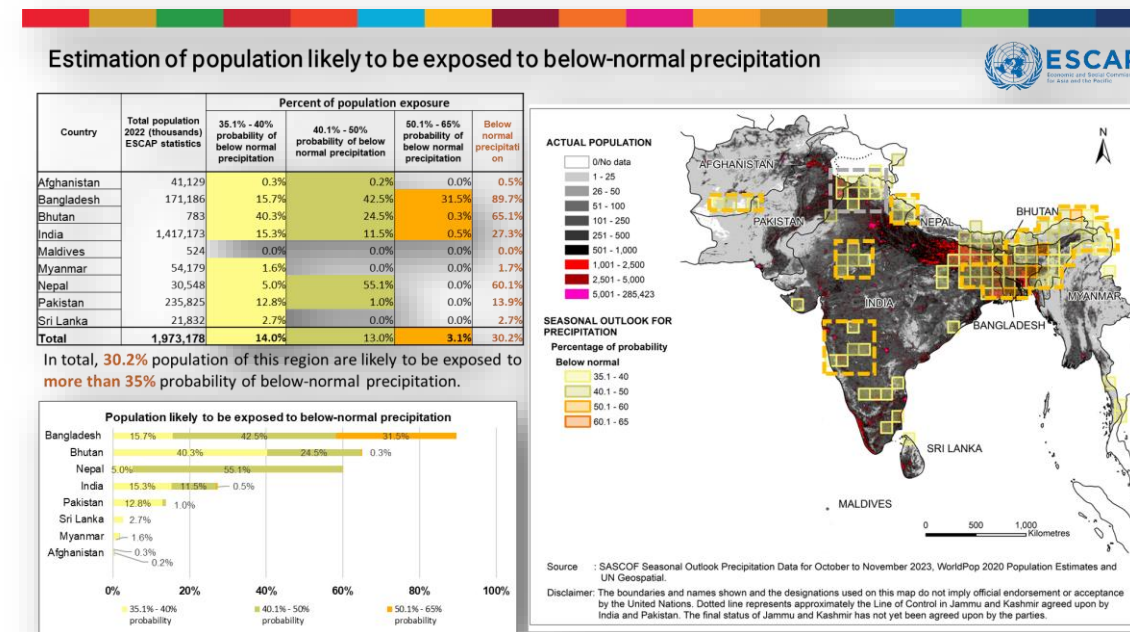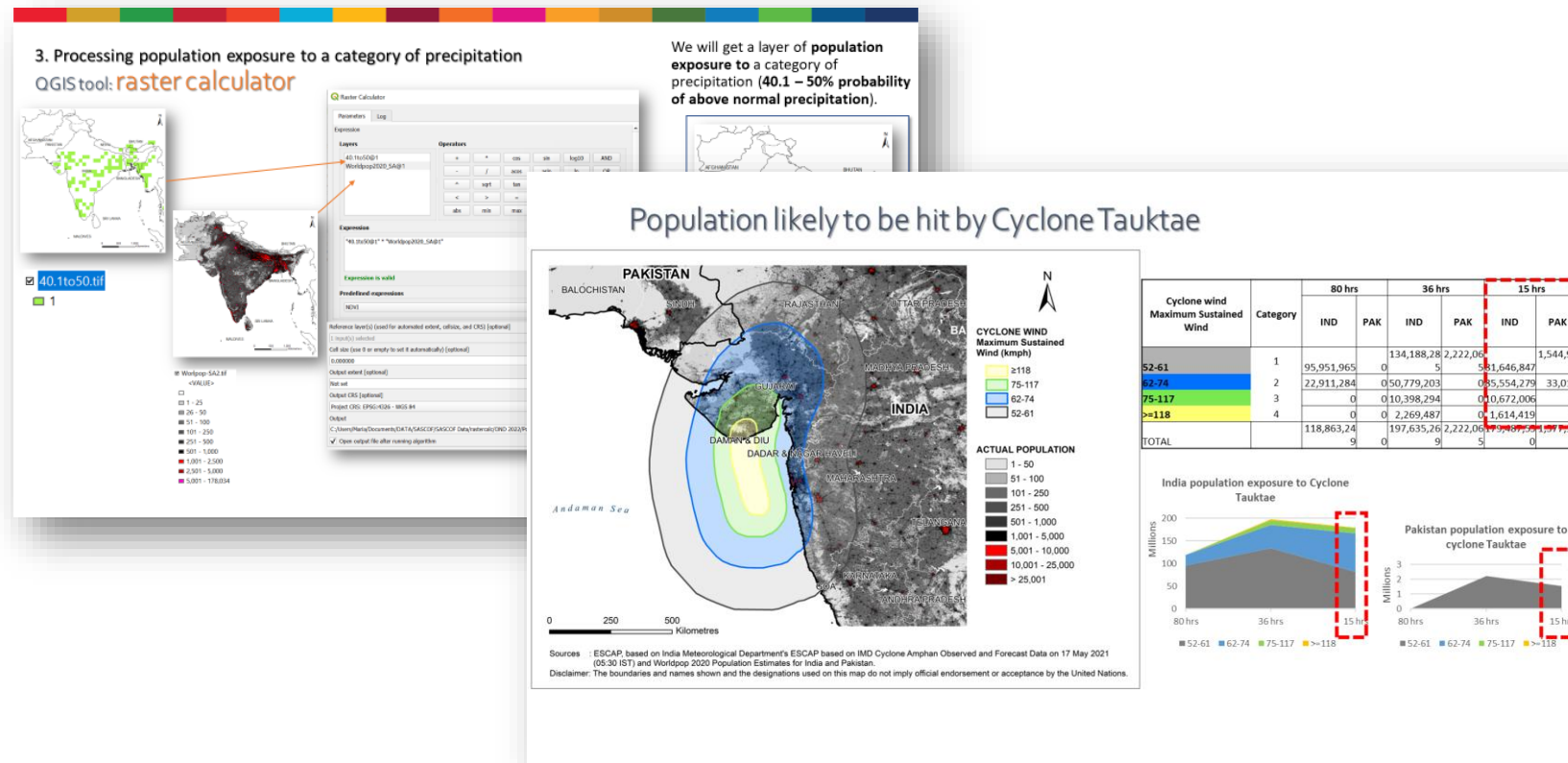

In **2023**, ESCAP delivered training on methodology and tools for impact-based forecasting for seasonal outlook and Cyclone Tauktae.

- The concept of Impact-Based Forecasting
- Impact-based forecasting for seasonal outlook in South Asia
- Impact-based forecasting for cyclones

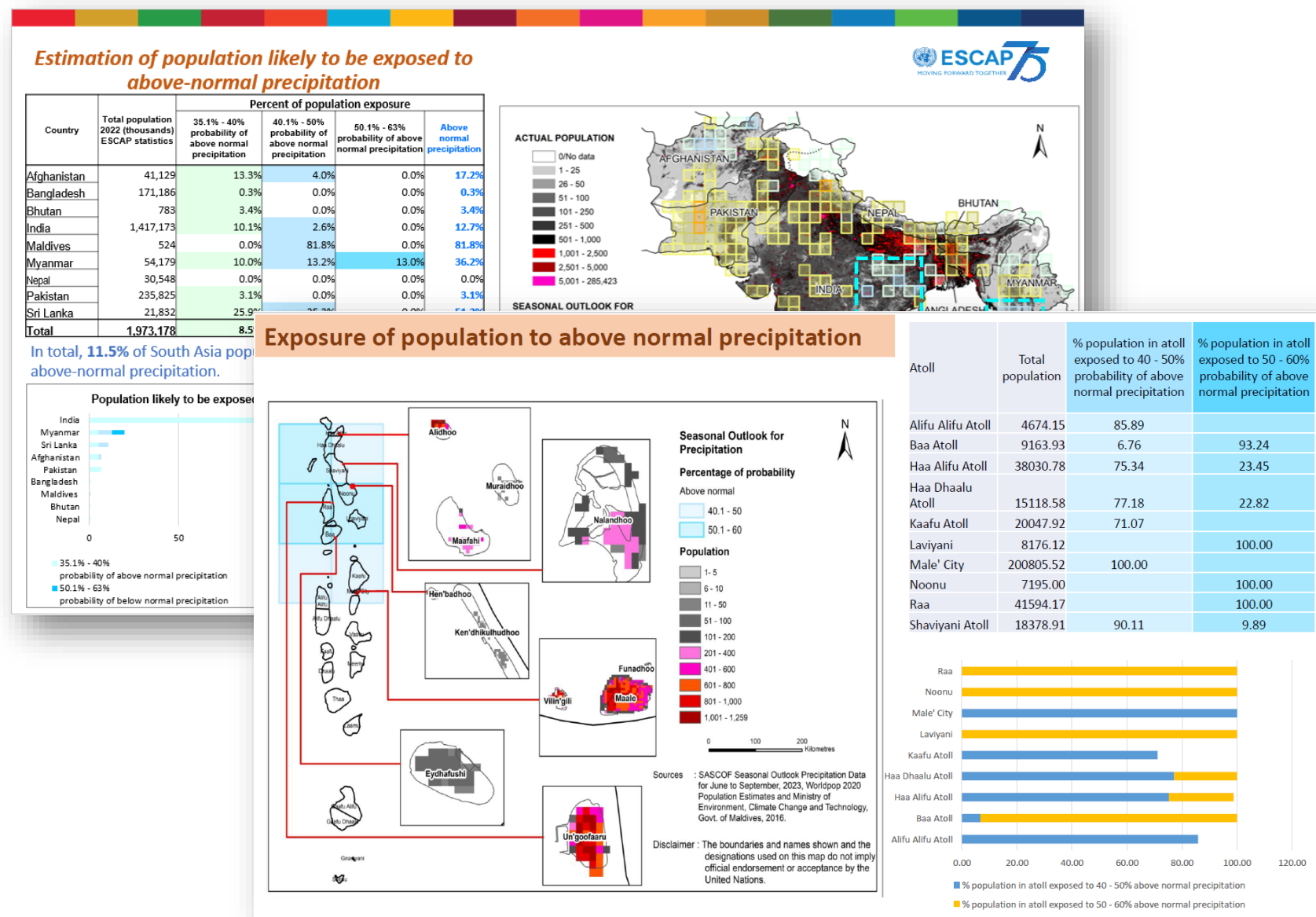Attended by representatives from 10 member countries along the Bay of Bengal and Arabian Sea.

Last month, ESCAP delivered training on methodology and tools for impact-based forecasting for seasonal outlook and an introduction to ESCAP IBF automation tool. Attended by hydromet services from Sri Lanka.
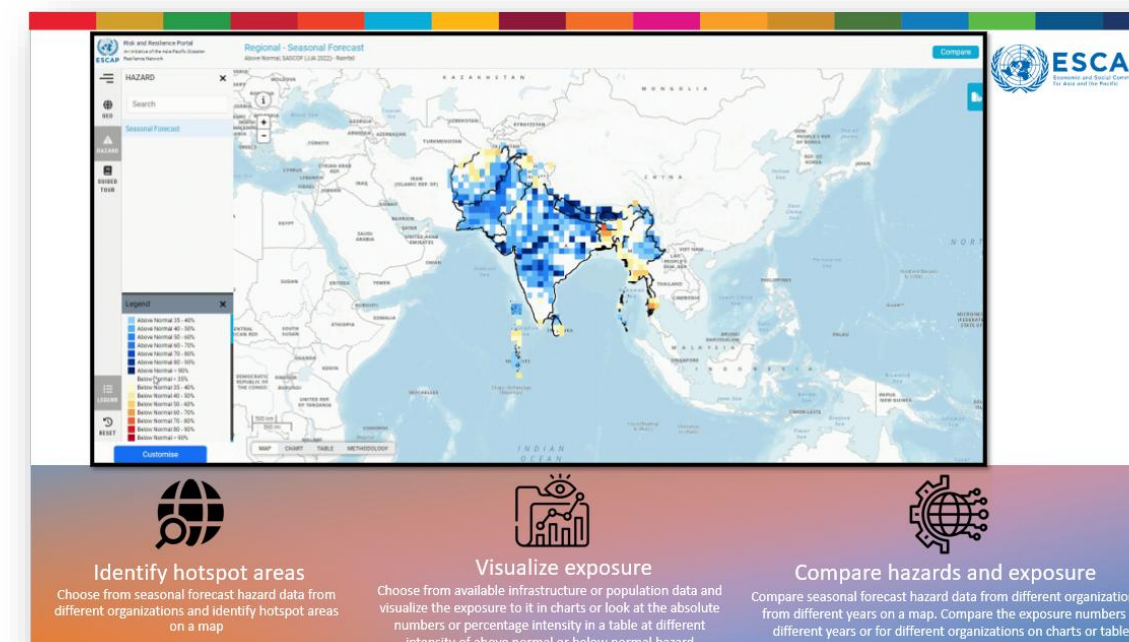
South Asia Climate Outlook Forum (SASCOF), ESCAP IBF since 2019

- During **SASCOF-25** in **March 2023**, ESCAP presented the Impact-Based Forecasting for the Seasonal Outlook JJAS 2023.

- For the first time, an in-depth subnational IBF analysis was also provided for the Maldives' case study.

- During **SASCOF-26** in **October 2023,** ESCAP presented the Impact-Based Forecasting for the Seasonal Outlook OND 2023.
- The automation tool was introduced.

Verification of the SASCOF OND 2023 IBF percent exposure from automation tool with the manual calculations on QGIS

| Country	Method	BELOW-NORMAL				ABOVE-NORMAL					
		Exposed to 35.1% - 40% probability of below normal precipitation	Exposed to 40.1% - 50% probability of below normal precipitation	Exposed to 50.1% - 65% probability of below normal precipitation	Percent of exposure to below normal precipitation	Exposed to 35.1% - 40% probability of above normal precipitation	Exposed to 40.1% - 50 % probability of above normal precipitation	Exposed to 50.1% - 70% of above normal precipitation	Exposed to 70.1% - 90% of above normal precipitation	Exposed to 90.1% - 100% of above normal precipitation	Percent of exposure to above normal precipitation
Afghanistan	Manual	0.3%	0.2%	0.0%	0.5%	8.3%	56.1%	31.6%	2.5%	0.0%	98.5%
	Script	0.3%	0.2%	0.0%	0.5%	8.4%	56.4%	31.9%	2.5%	0.0%	99.2%
	% difference	0.1%	0.3%	0.3%	0.3%	0.1%	0.3%	0.3%	0.0%	0.0%	0.7%
Bangladesh	Manual	15.7%	42.5%	31.5%	89.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Script	15.9%	43.2%	31.7%	90.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	% difference	0.1%	0.3%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bhutan	Manual	40.3%	24.5%	0.3%	65.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Script	40.5%	24.4%	0.5%	65.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	% difference	0.1%	0.3%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
India	Manual	15.3%	11.5%	0.5%	27.3%	12.8%	4.0%	1.3%	0.0%	0.0%	18.1%
	Script	15.5%	11.6%	0.5%	27.7%	12.9%	4.0%	1.4%	0.0%	0.0%	18.3%
	% difference	0.1%	0.3%	0.3%	0.3%	0.1%	0.1%	0.0%	0.0%	0.0%	0.2%
Maldives	Manual	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.4%	0.0%	83.9%	87.3%
	Script	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.9%	0.0%	79.1%	83.0%
	% difference	0.1%	0.3%	0.3%	0.3%	0.0%	0.0%	0.5%	0.0%	-4.8%	-4.3%
Myanmar	Manual	1.6%	0.0%	0.0%	1.7%	19.9%	14.8%	14.7%	9.4%	1.1%	59.9%
	Script	1.6%	0.0%	0.0%	1.7%	20.1%	14.9%	14.8%	9.5%	5.2%	60.5%
	% difference	0.1%	0.3%	0.3%	0.3%	0.3%	0.1%	0.1%	0.1%	4.0%	0.6%
Nepal	Manual	5.0%	55.1%	0.0%	60.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Script	5.2%	55.0%	0.0%	60.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	% difference	0.1%	0.3%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pakistan	Manual	12.8%	1.0%	0.0%	13.9%	18.7%	6.0%	1.7%	0.0%	0.0%	26.4%
	Script	12.9%	1.0%	0.0%	13.9%	19.1%	6.1%	1.7%	0.0%	0.0%	26.9%
	% difference	0.1%	0.3%	0.3%	0.3%	0.4%	0.1%	0.0%	0.0%	0.0%	0.5%
Sri Lanka	Manual	2.7%	0.0%	0.0%	2.7%	6.2%	39.9%	25.2%	0.0%	0.0%	71.3%
	Script	2.7%	0.0%	0.0%	2.7%	6.3%	40.0%	25.5%	0.0%	0.0%	71.8%
	% difference	0.1%	0.3%	0.3%	0.3%	0.1%	0.1%	0.3%	0.0%	0.0%	0.5%
TOTAL	Manual	14.0%	13.0%	3.1%	30.2%	12.2%	5.6%	2.5%	0.3%	0.0%	20.6%
	Script	14.2%	13.1%	3.1%	30.5%	12.3%	5.6%	2.5%	0.3%	0.1%	20.9%
	% difference	0.1%	0.3%	0.3%	0.3%	0.1%	0.1%	0.0%	0.0%	0.1%	0.2%

- Percent difference from automation and manual calculations, for population exposure ranges from **0.1% to 0.3%** in each country for **below-normal precipitation.**

- Percent difference from automation and manual calculation in each country, for population exposure ranges from **0% to 4% and -4.8%** in each country for **above-normal precipitation.**

Collaboration with RIMES to advance IBF at national level

Through support from the ESCAP Trust Fund for Tsunami, Disaster and Climate Preparedness, ESCAP and RIMES have been partnering to 'Enhance Weather and Climate Resilience in RIMES Member States through Capacity Building on Impact Forecasting', leading to the development of an online learning platform for IBF

ESCAP Multi-Donor Trust Fund for
Tsunami, Disaster and Climate Preparedness

Regional Integrated Multi-Hazard Early Warning System

RIMES
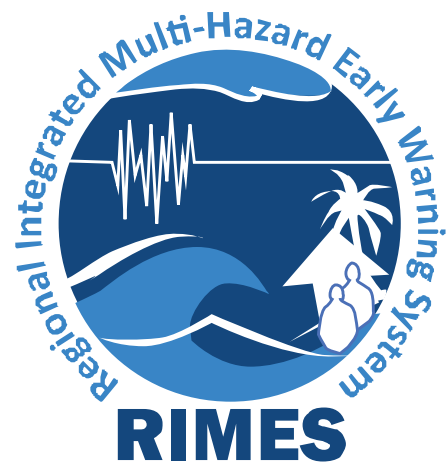
The meteorology and climatology field is constantly growing and improving. So, as forecasters we also need to keep updating our knowledge and skills. The trainings have been very useful.
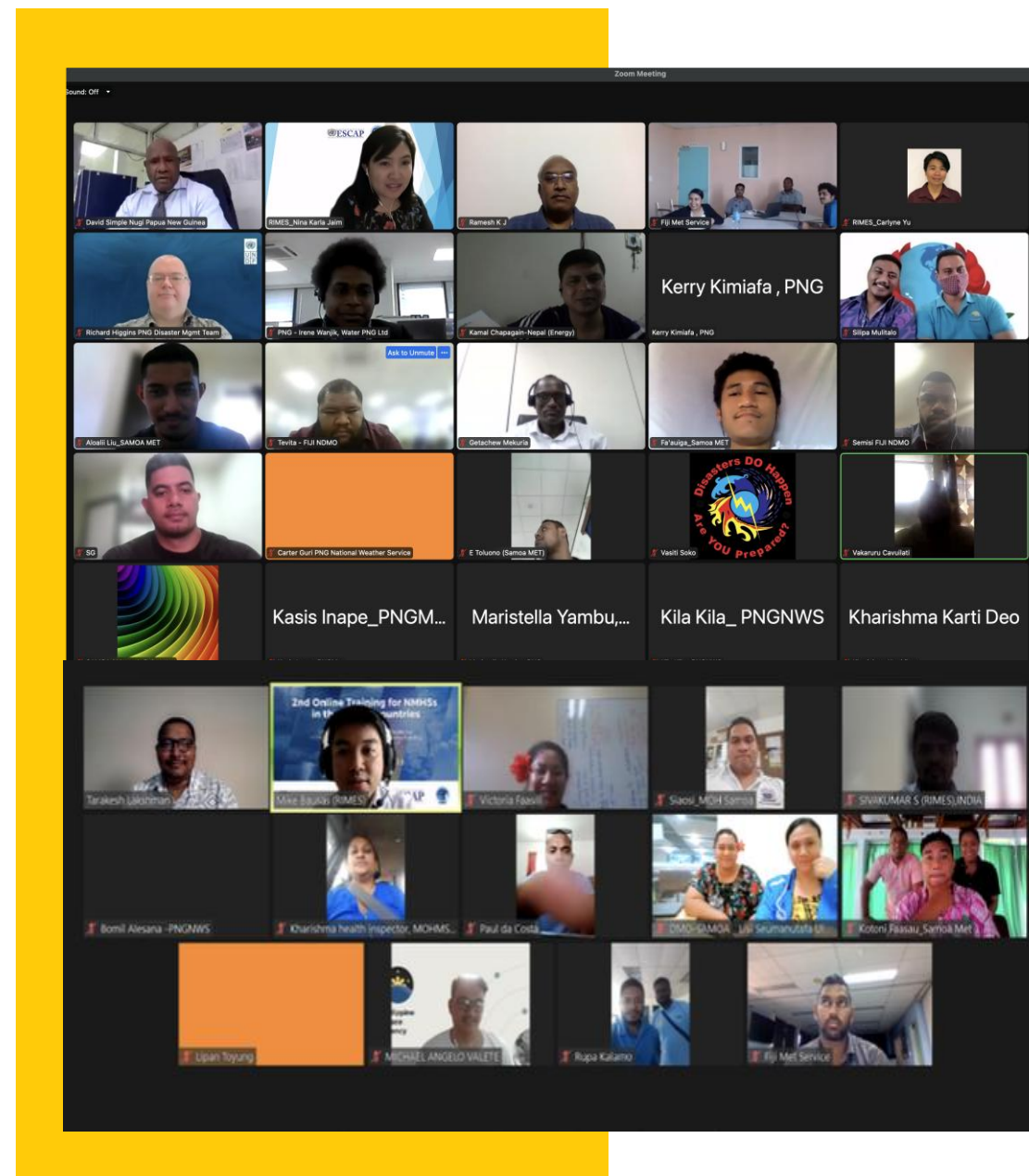
Weather and Climate
Weather and climate drivers

NMHS and Sector Discussion
NMHS products and services and sectoral applications
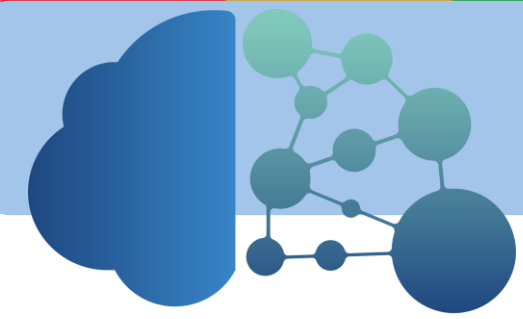
Impact Forecasting
Concepts, methodological framework and approach, and ICT tools

Developing IBF System
Sector-specific impact forecasting system/service

Communicating IBF
Communication, Dissemination & Verification of IBF and warnings

ESCAP
Economic and Social Commission
for Asia and the Pacific

keenportal.rimes.int

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

TPRCC-N
Third Pole Climate Forum (TPCF): Seasonal forecast bulletins

1st Third Pole Climate Forum Consensus Statement
(TPCF-1)
Lijiang, China, 4-6 June, 2024
State of the Climate for December 2023 to April 2024 and
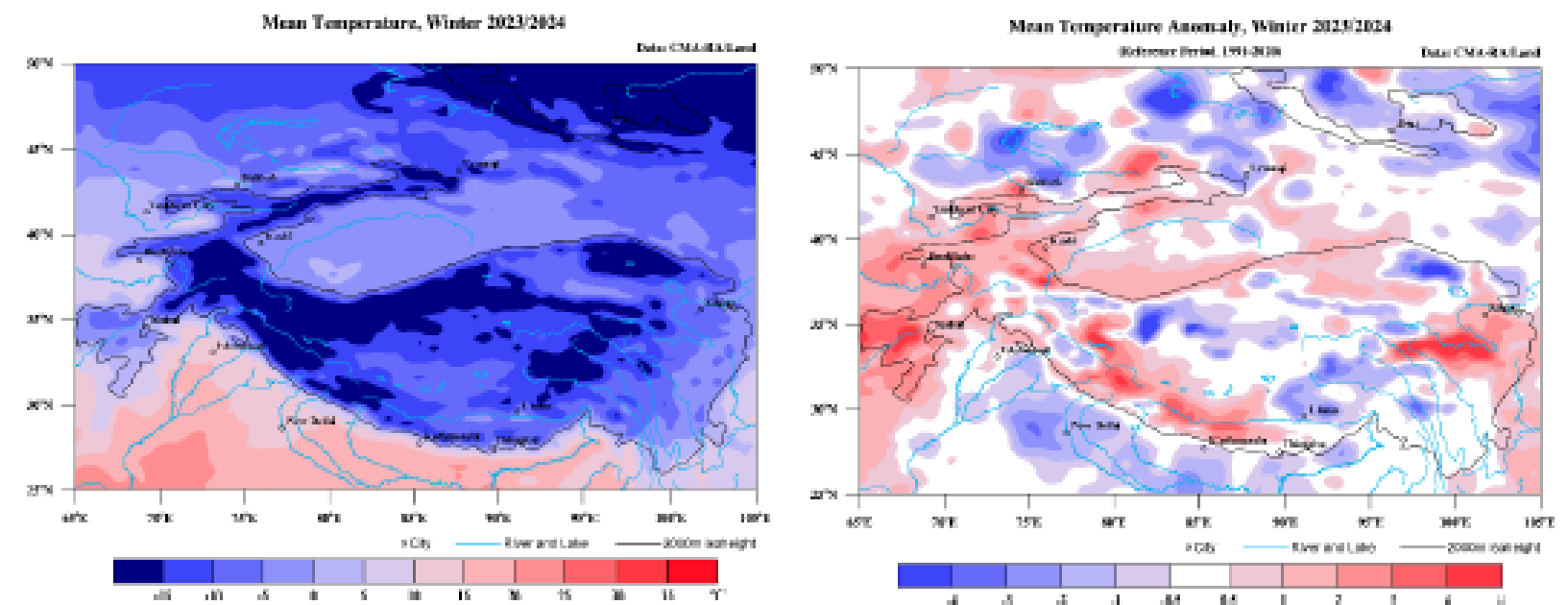the Seasonal Outlook for June to September 2024

Climate Summary for December 2023 – April 2024

Temperature

In winter (DJF) 2023/2024, most of the TPCR (Figure 1) experienced above normal3 SAT, except for the inner and southeastern Qinghai-Tibet Plateau. The northeastern and southwestern parts of the TP region were colder than normal (with respect to the baseline period 1991-2020), with 2-4°C negative anomalies observed over the parts of western Mongolia.

Figure 1 Winter (DJF2023/2024) mean surface air temperature (left) and anomalies.
(relative to 1991-2020, right) . Data source: CMA-RA/Land

Operationalizing IBF: Moving forward

01 Scaling up IBF to support early actions: SAHF process, WISER, CARE/UKMO,PTC Attachment training, WMO/ESCAP dedicated IBF training, SASCOF, FOCRII, TPCF

02 Scaling up IBF through the UN Early Warnings for All initiative– Pillar 2 – Impact based Forecasting

03 IBF to be included in Synergized Standard Operating Procedure for Coastal Multi-hazard Early Warning System (SSOP III) in PTC member Countries

04 Resource mobilization for IBF – FCDO, GCF, CREW, ESCAP Trust Fund,

Sanjay Srivastava

Chief, Disaster Risk Reduction

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