Forecasting disaster impacts to support anticipatory actions

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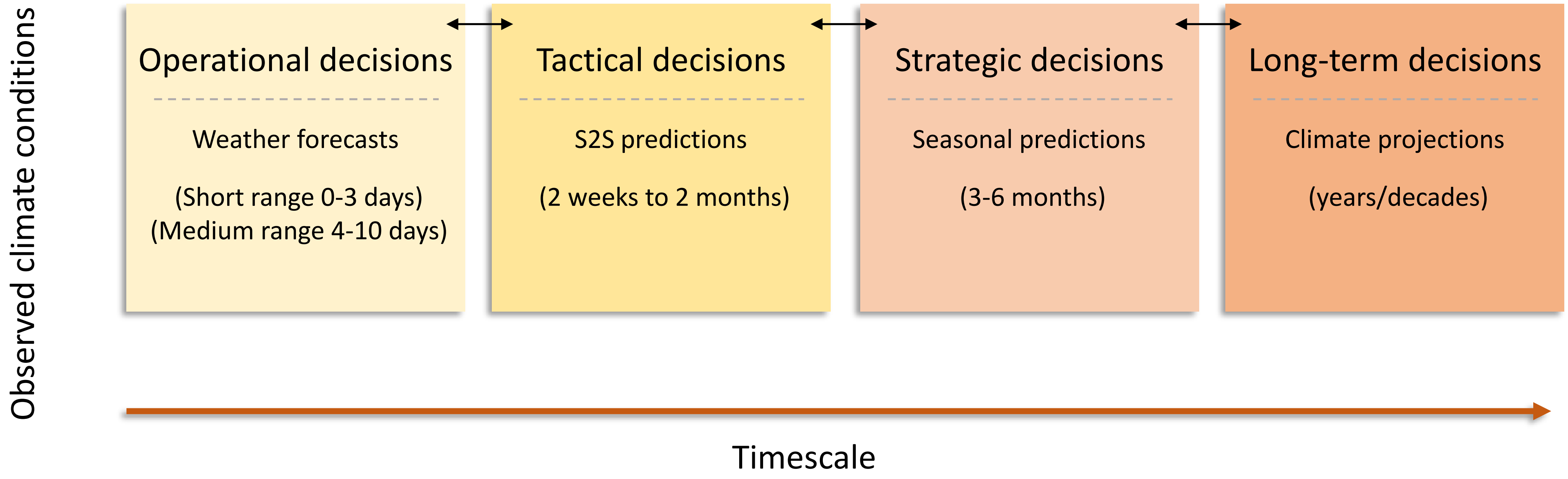
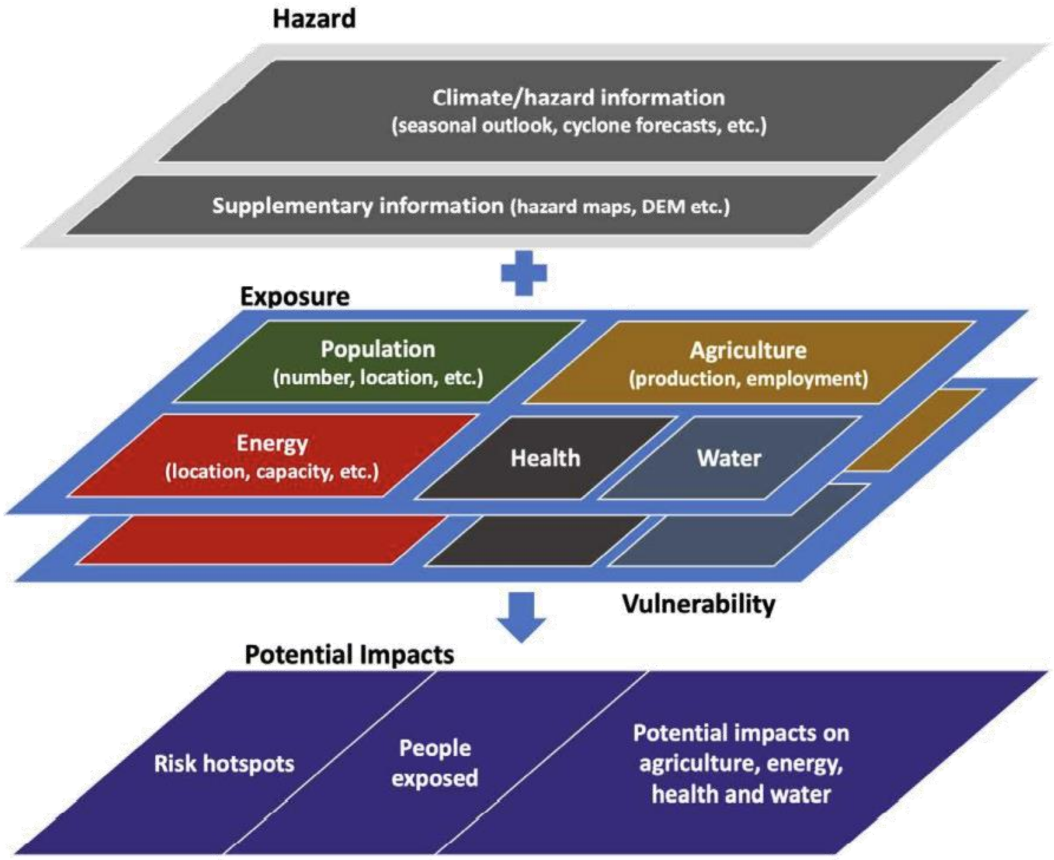
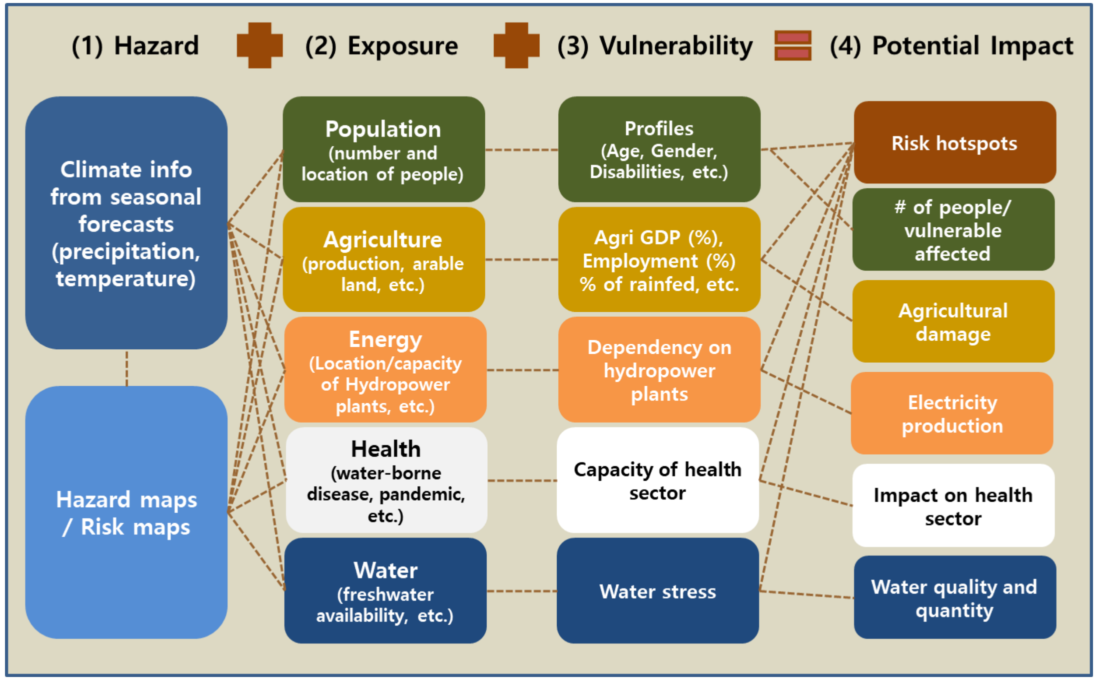
Forecast: Facilitate decision-making of stakeholders at different time scale



Source: ESCAP(2018) Asia-Pacific Disaster Report 2017

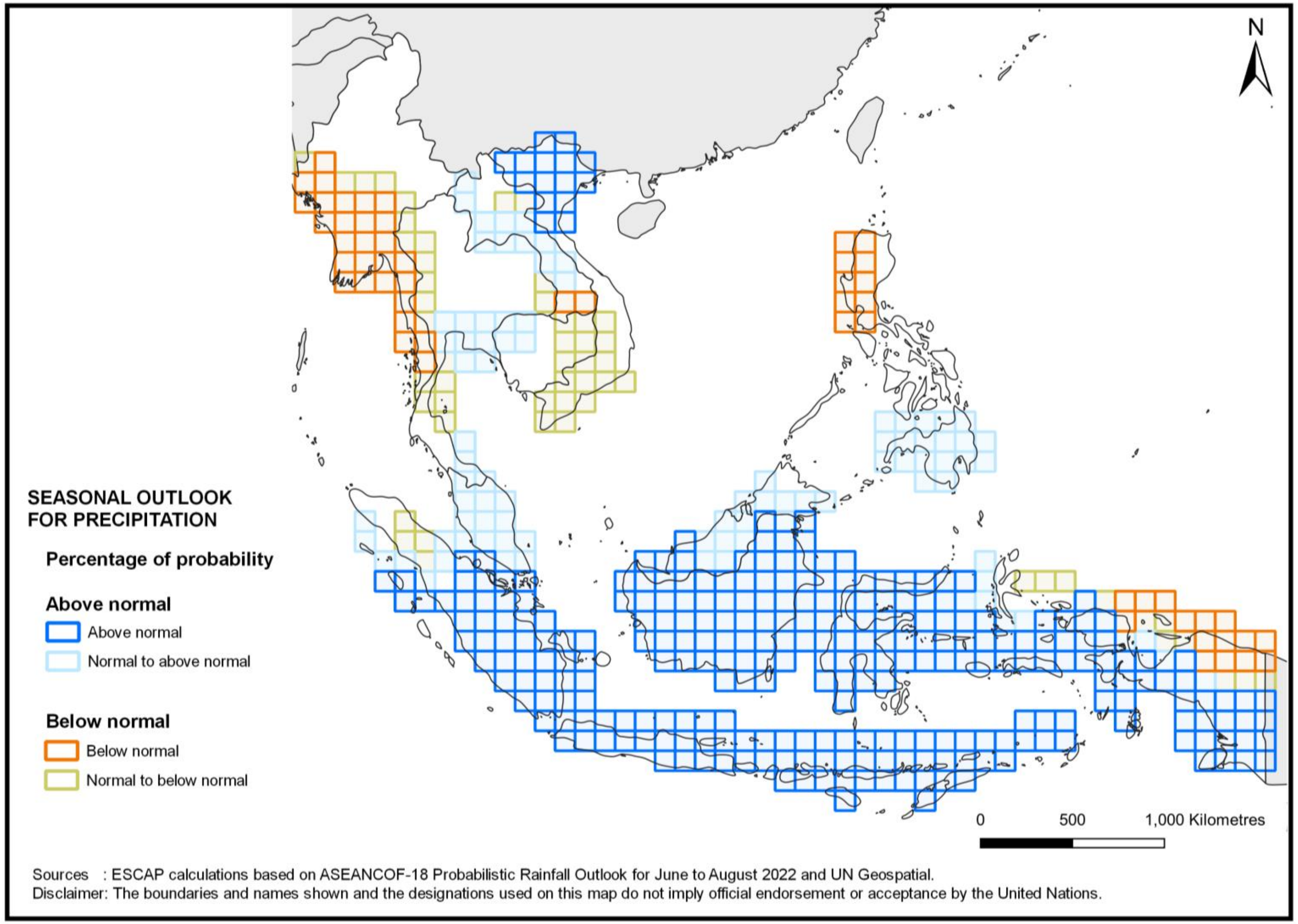
Impact-based forecasting: Approach





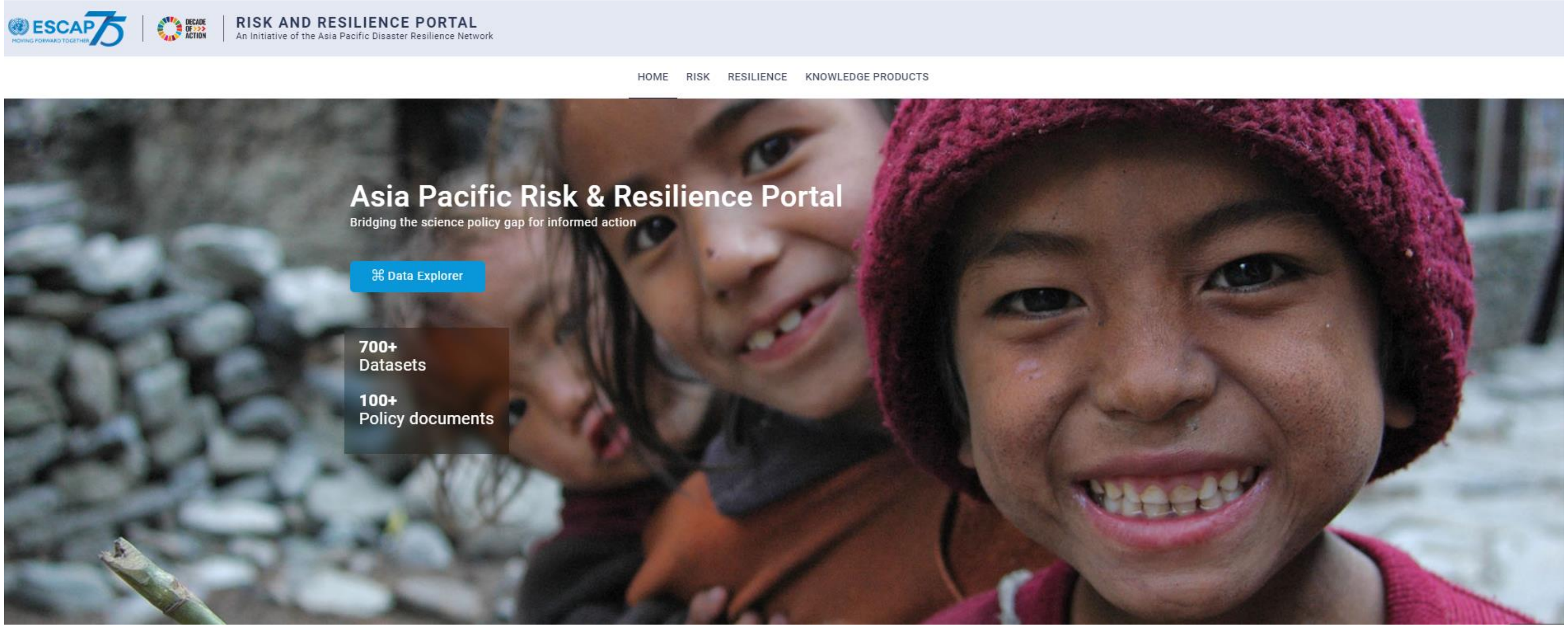
Source: ESCAP (2021) Overview of the work of secretariat and the UN system at the regional level. ESCAP/CDR/2021/INF/1
Global Framework for Climate Services: https://gfcs.wmo.int/

Seasonal outlook for precipitation JJAS 2022 for ASEAN



18th Session of the ASEAN Climate Outlook Forum (ASEANCOF-18)

From Seasonal outlook to impact-based forecasting with key indicators



Vegetation condition

Population

Agricultural production value

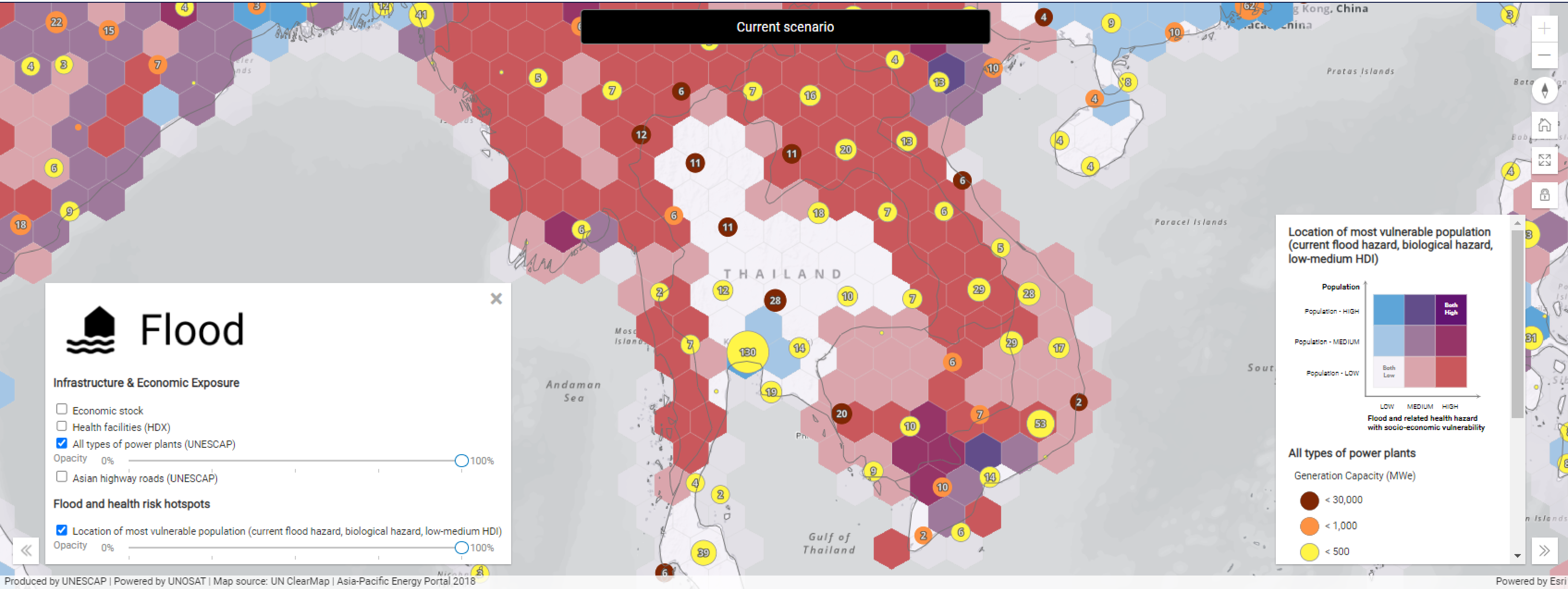
Vulnerability

Hydro powerplant

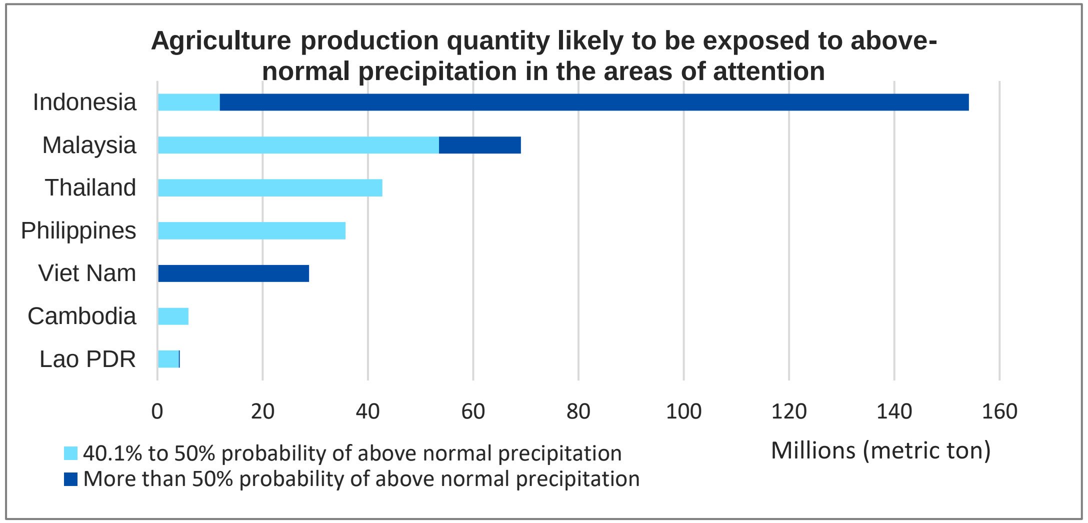
Agricultural production qty

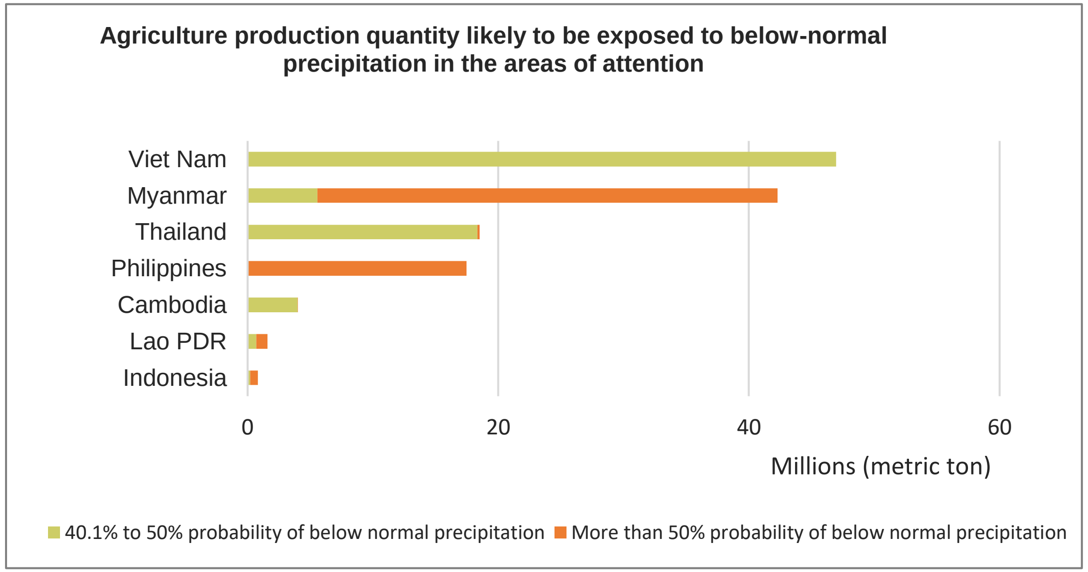
Vector-borne disease

ESCAP Risk and Resilience Portal and impact-based forecasting



Impact-Based Forecasting – Agriculture production quantity



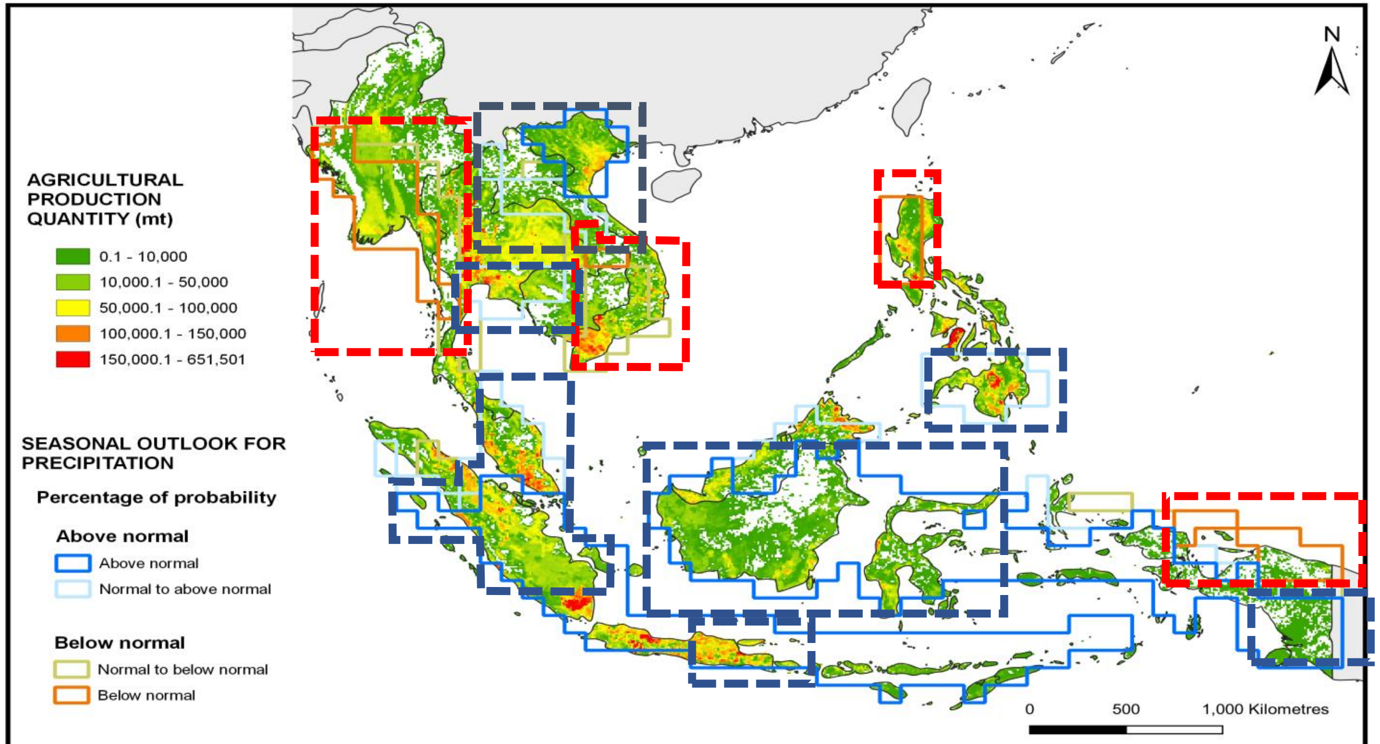


41.6% of South-East Asia agricultural production quantity were likely to be exposed to **more than 40.1%** probability of above normal precipitation.

Under this precipitation category, 142.3 million mt of **Indonesia** agricultural production quantity were likely to be exposed.

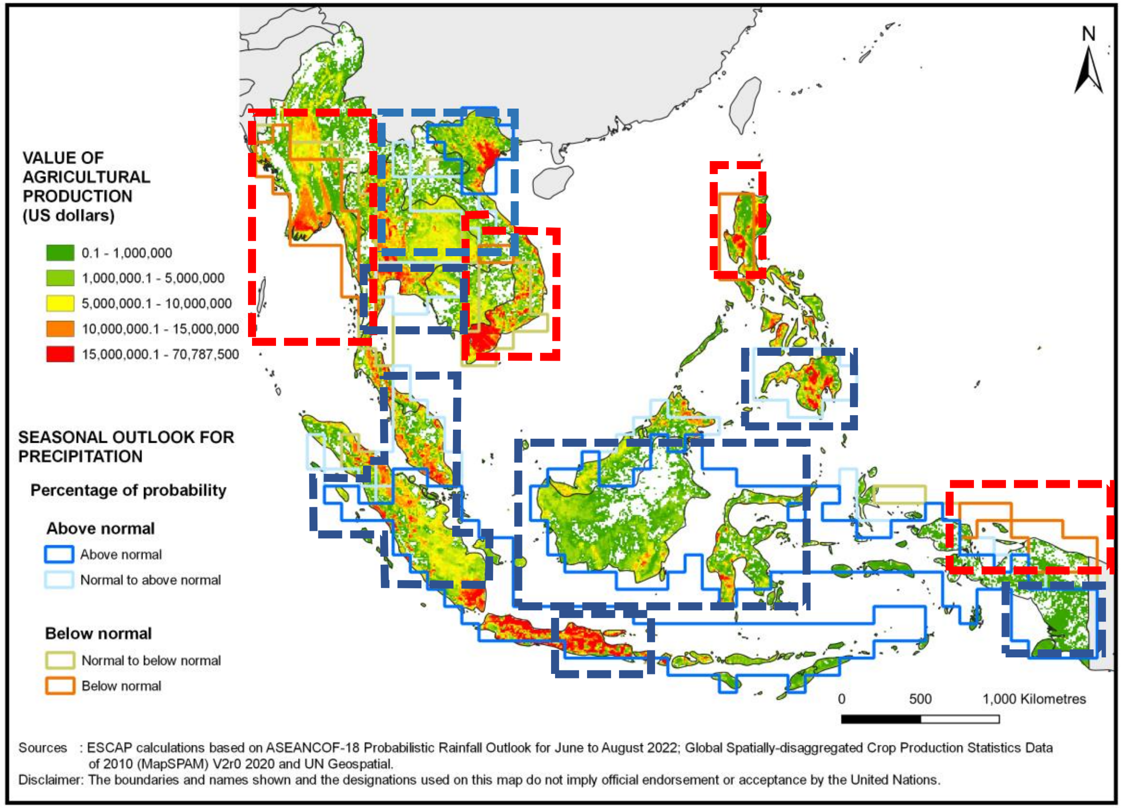
16.1% of South-East Asia agricultural production quantity are likely to be exposed to **more than 40.1% probability of below normal precipitation.**

Under this precipitation category, 46.9 million mt of **Viet Nam** agricultural production quantity value were likely exposed.



Sources : ESCAP calculations based on ASEANCOF-18 Probabilistic Rainfall Outlook for June to August 2022; Global Spatially-disaggregated Crop Production Statistics Data of 2010 (MapSPAM) V2r0 2020 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.

Impact-Based Forecasting – Agricultural production value



- The total value of agricultural production in South-East Asia is **$149 billion**.
- **In total, $60.8 billion**, or **40.8%** of South-East Asia total agricultural value was potentially exposed to **above normal precipitation**.
- **24.3%** of the region's agricultural production value were likely to be exposed to **more than 50% probability of above normal precipitation**.

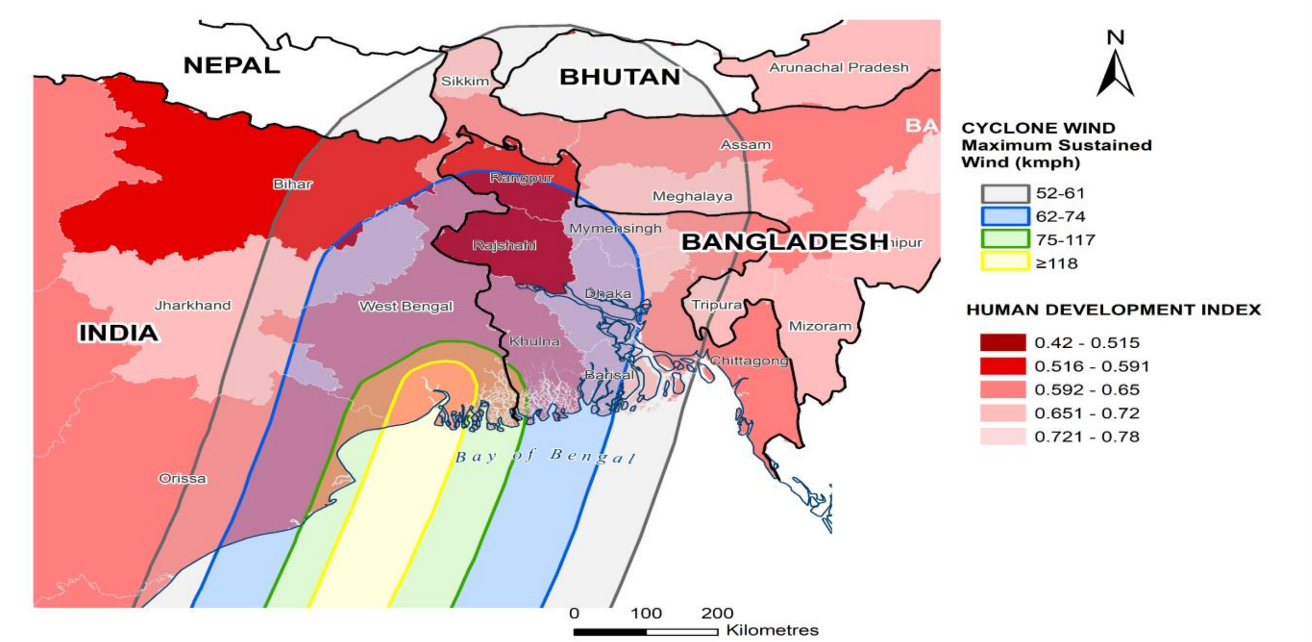
It was estimated that **$29.4 billion** of **Indonesia** agricultural value would be potentially exposed to **above-normal precipitation**, accounted for **55.5%** of its total agricultural value.

Followed by **Malaysia** at **$8.7 billion**, accounted for **72.7%** of its total agricultural value, **Thailand** at **$7 billion** and **Viet Nam** at **$6.8 billion.**

Country	Total agriculture production value (Millions of USD)	Percent of exposure to 40.1% to 50% probability of above normal precipitation		Percent of exposure to more than 50% probability of above normal precipitation		Percent of total exposure to above normal precipitation	
		Agricultural production value	Agricultural production quantity	Agricultural production value	Agricultural production quantity	Agricultural production value	Agricultural production quantity
Singapore	2,655,849	0.0%	0.0%	100.0%	100.0%	100.0%	100.0%
Malaysia	11,579,044,215	60.0%	56.3%	14.8%	16.4%	74.8%	72.7%
Lao PDR	1,621,232,211	56.1%	55.1%	2.3%	2.2%	58.4%	57.3%
Indonesia	53,037,781,613	3.4%	4.2%	52.1%	50.3%	55.5%	54.6%
Philippines	15,539,801,763	43.2%	38.1%	0.0%	0.0%	43.2%	38.1%
Cambodia	3,438,167,174	33.7%	36.4%	0.0%	0.0%	33.7%	36.4%
Viet Nam	21,700,250,837	0.1%	0.1%	31.2%	31.2%	31.3%	31.3%
Thailand	25,726,653,019	27.3%	25.1%	0.0%	0.0%	27.3%	25.1%
Brunei Darussalam	7,592,594	9.1%	6.7%	0.0%	0.0%	9.1%	6.7%
Myanmar	16,276,803,711	0.1%	0.1%	0.0%	0.0%	0.1%	0.1%
Timor-Leste	85,080,971	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	**149,015,063,957**	**16.5%**	**18.8%**	**24.3%**	**22.8%**	**40.8%**	**41.6%**

Impact-based forecasting with storm trajectory projection

Tropical Cyclone Amphan, May 2020



Sources : ESCAP, based on India Meteorological Department's ESCAP based on IMD Cyclone Amphan Observed and Forecast Data on 16 May 2020 (1200, UTC) and Sub-National Human Development Index (SHDI) Version 4.0, 2020.
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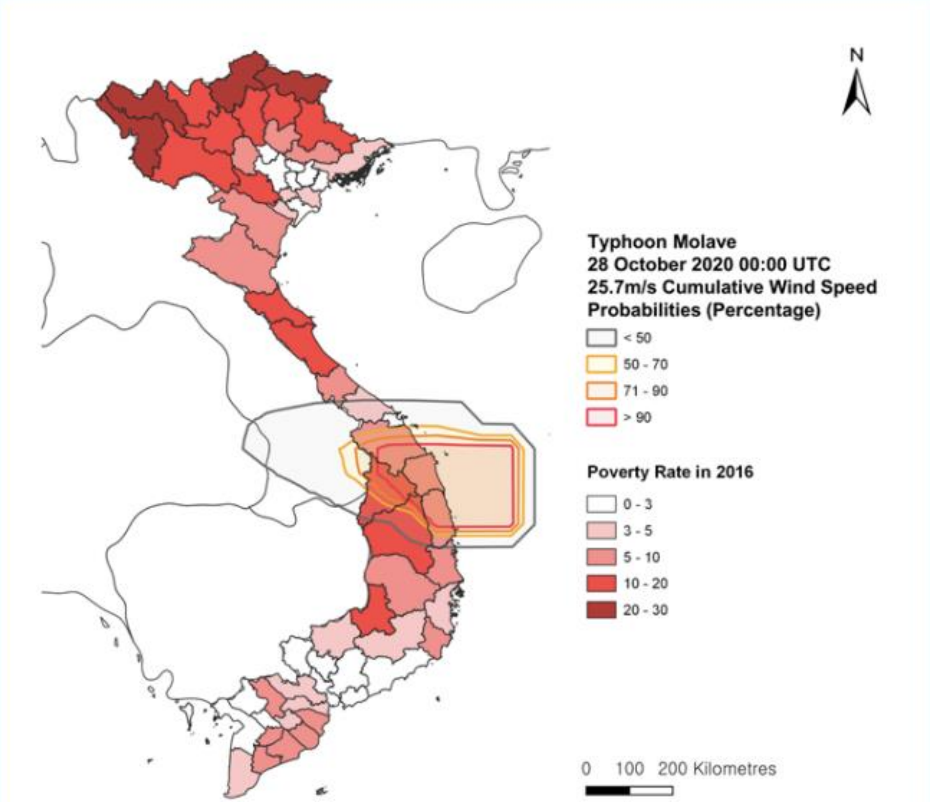
HDI or poverty rate is overlaid to understand the vulnerability of people exposed.

Other indicators (poverty, income, education, literacy, or other vulnerability indicators) can be used as appropriate.

Typhoon Molave, October 2020



Sources : ESCAP, based on National Oceanic and Atmospheric Administration-Regional and Mesoscale Meteorological Branch (NOAA-RAMMB) Typhoon Wind, 28 October 2020 and Viet Nam General Statistics Office (GSO).
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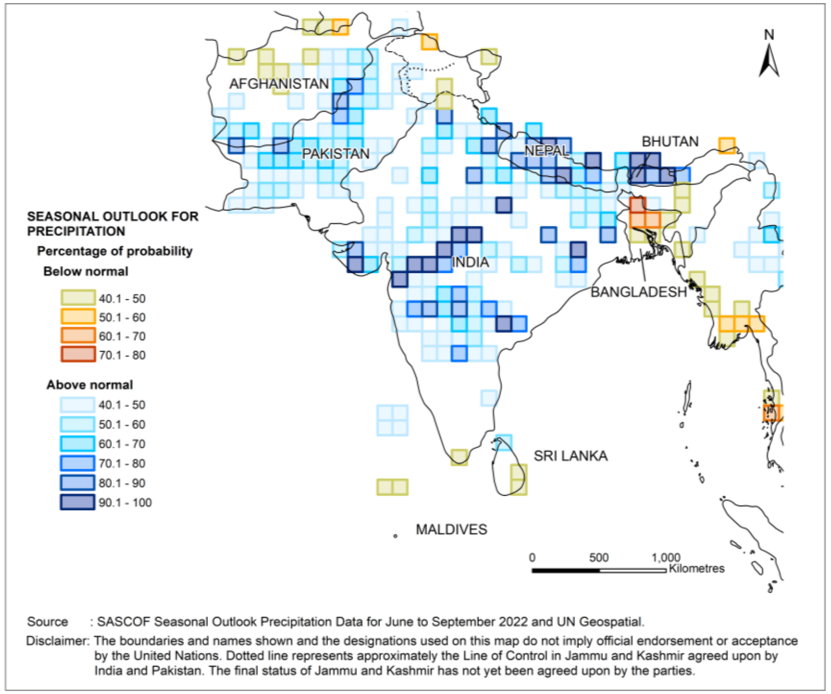
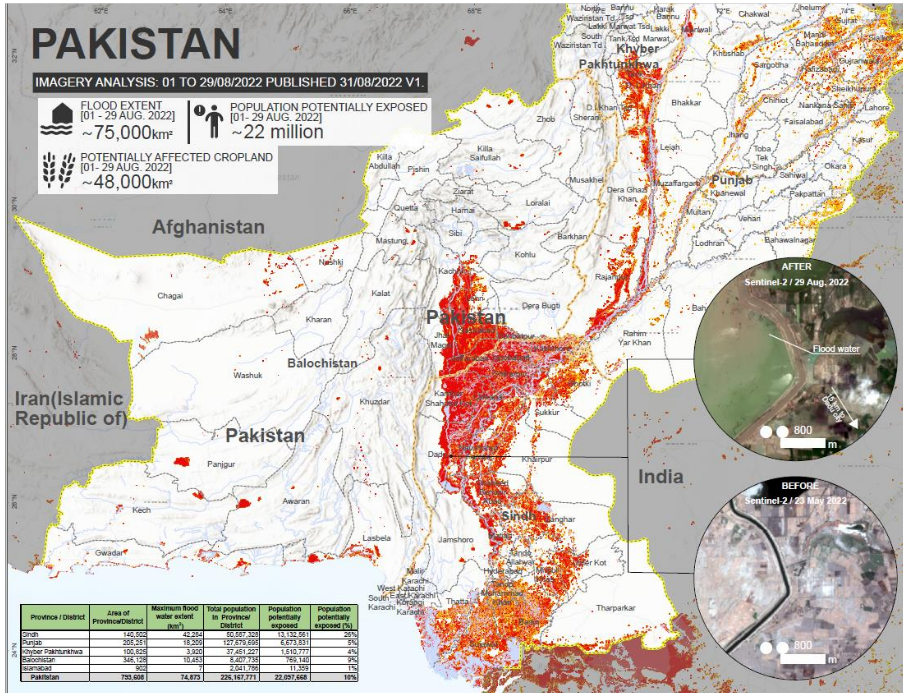
Seasonal outlook and Pakistan flood 2022

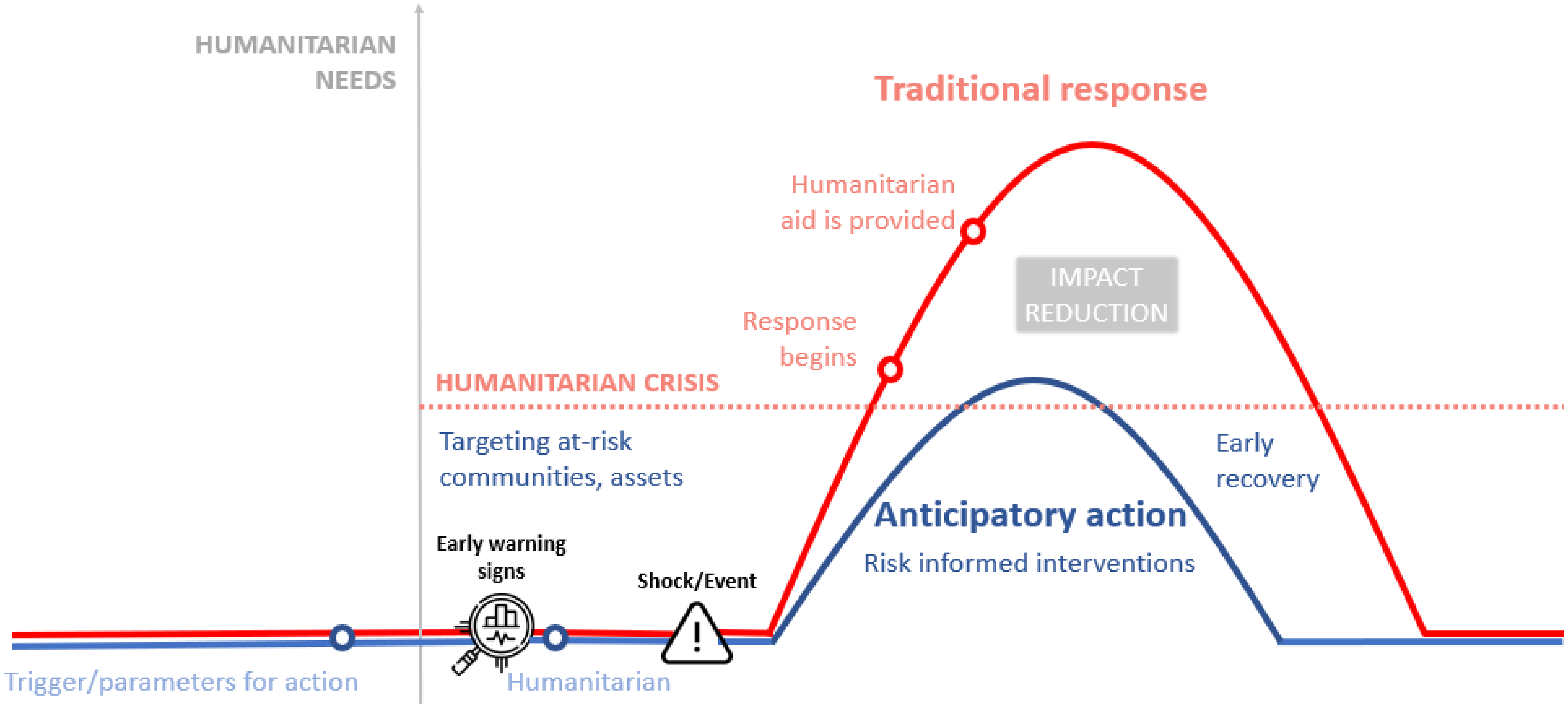




Province / District	Area of Province/District	Maximum flood water extent (km²)	Total population in Province/ District	Population potentially exposed	Population potentially exposed (%)
Sindh	140,502	42,284	50,587,328	13,132,561	26%
Punjab	205,251	18,209	127,679,695	6,673,831	5%
Khyber Pakhtunkhwa	100,825	3,920	37,451,227	1,510,777	4%
Balochistan	346,128	10,453	8,407,735	769,140	9%
Islamabad	902	7	2,041,786	11,359	1%
Pakistan	**793,608**	**74,873**	**226,167,771**	**22,097,668**	**10%**

- **Hotspots that stand out in the seasonal forecast coincide with provinces hit by floods in Pakistan:** Sindh, Punjab, Khyber Pakhtunkhwa, Balochistan, Islamabad.
- Despite certain limitations related data granularity and probabilistic nature of the analysis, it accurately identifies the hotspots of impending risks.
- Seasonal outlook for precipitation can prove to be an **effective decision-making support** for policymakers on the ground.

Early warning is to enable anticipatory action



Source: Anticipatory action before the tipping point in Bangladesh (OCHA, UNRCO (Bangladesh), Anticipatory Action Pilot, 2020)

Four components of an early warning system

Disaster risk knowledge

Systematically collect data and undertake risk assessments

- Are the hazards and the vulnerabilities well known by the communities?
- What are the patterns and trends in these factors?
- Are risk maps and data widely available?

Detection, observations, monitoring, analysis and forecasting of hazards

Develop hazard monitoring and early warning services

- Are the right parameters being monitored?
- Is there a sound scientific basis for making forecasts?
- Can accurate and timely warnings be generated?

Preparedness and response capabilities

Build national and community response capabilities

- Are response plans up to date and tested?
- Are local capacities and knowledge made use of?
- Are people preapred and ready to react to warnings?

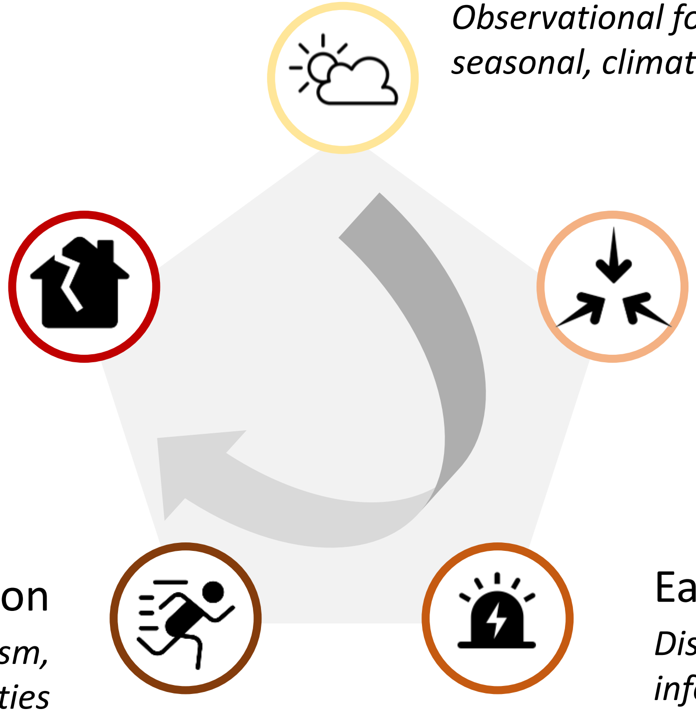
Warning dissemination and communication

Communicate risk information and early warnings

- Do warnings reach all of those at risk?
- Are the risks and warnings understood?
- Is the warning information clear and usable?

Source: Executive Action Plan 2023-2027: Early Warning for All (2022)

Forecasting to action: end-to-end cycle



Forecasting

Observational forecasts, S2S, seasonal, climate projections

Impact-based forecasting

Exposure, vulnerability data
Potential impact, risk hotspots

Early warning

Dissemination of information

Early action & Adaptation

Response mechanism, adaptation priorities financing for resilience,

Reduce loss and damage

Minimize disruptions, able to refocus on reducing emission

Partnerships for forecasting and anticipatory action

WORLD METEOROLOGICAL ORGANIZATION

IFRC

asean

PACIFIC ISLANDS FORUM

WFP World Food Programme

OCHA

AP-PLAT
Asia-Pacific Climate Change Adaptation Information Platform

Thank you!

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