ESCAP
MOVING FORWARD TOGETHER

28th South Asian Climate Outlook Forum (SASCOF-28)

Climate Services User Forum (CSUF)

Impact-Based Forecasting for the Seasonal Outlook JJAS 2024

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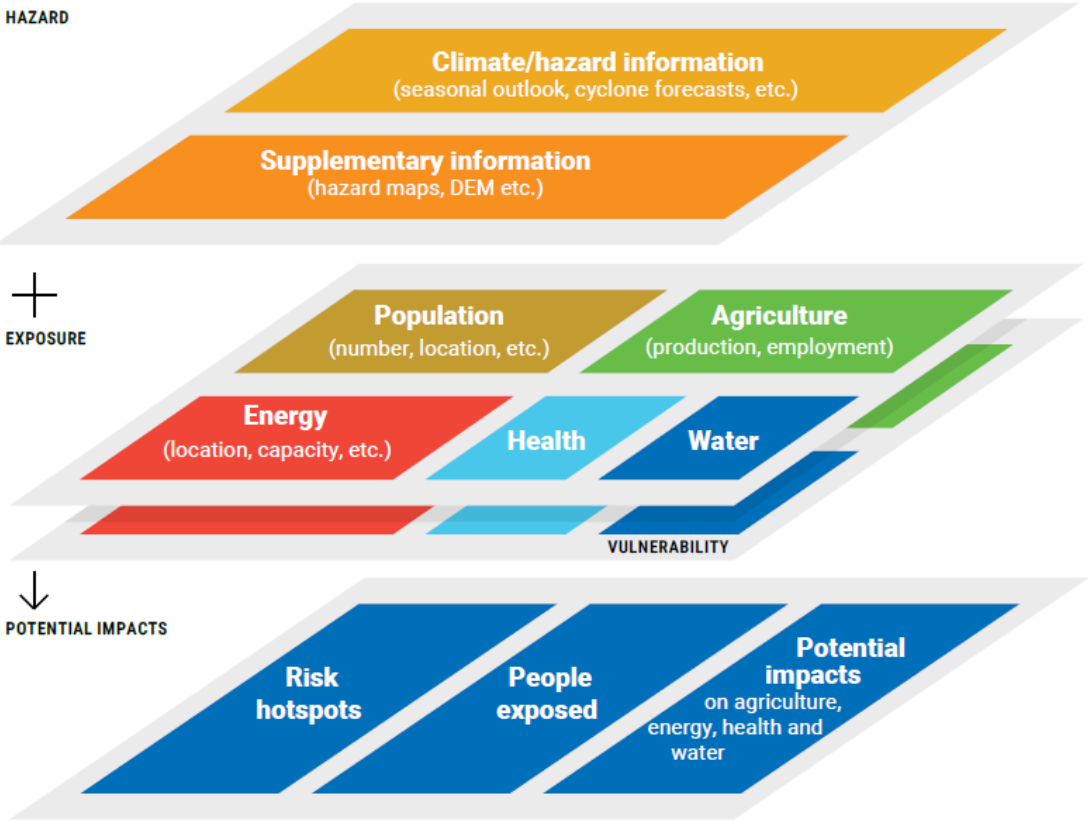
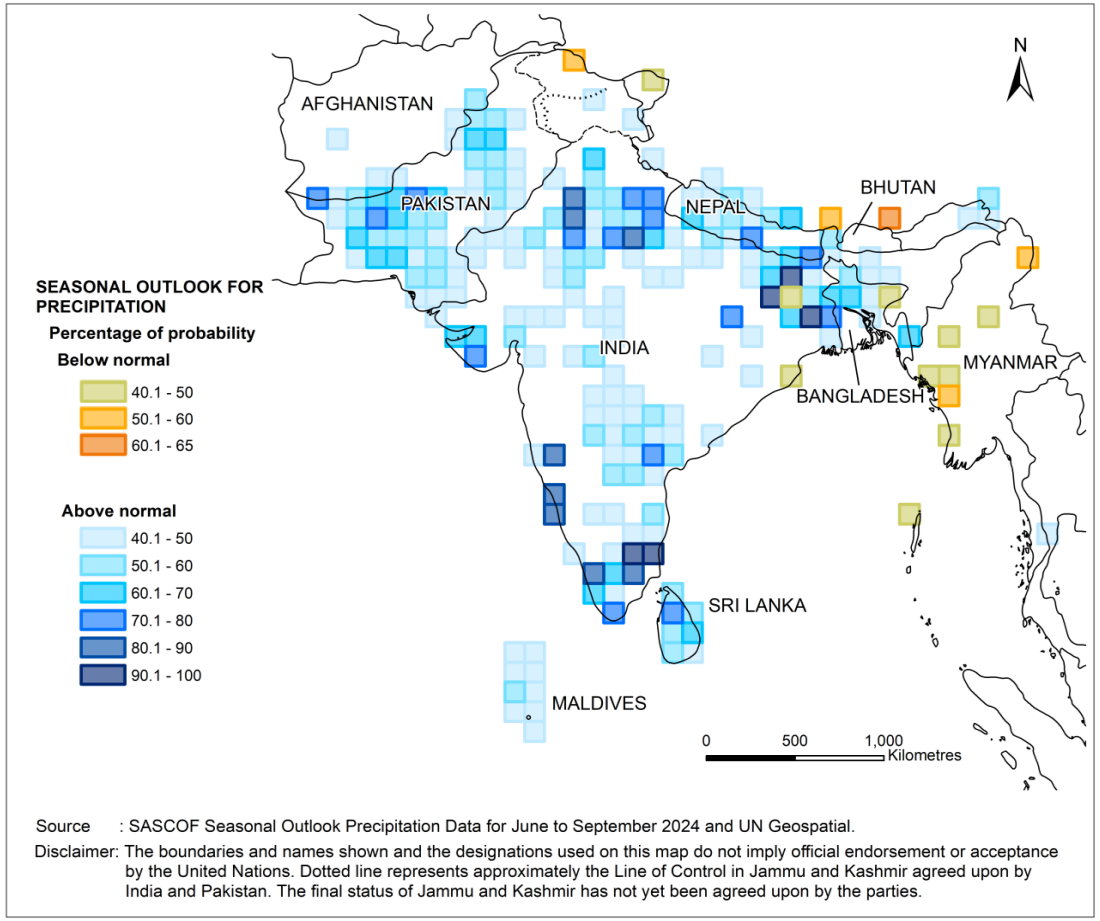
1 May 2024

To support Early Warning Systems and EWS4All, ESCAP's impact-based forecasting in outlook forums on the Portal follows WMO Global Framework for Climate Services



SSWA Seasonal Outlook for precipitation June to September 2024

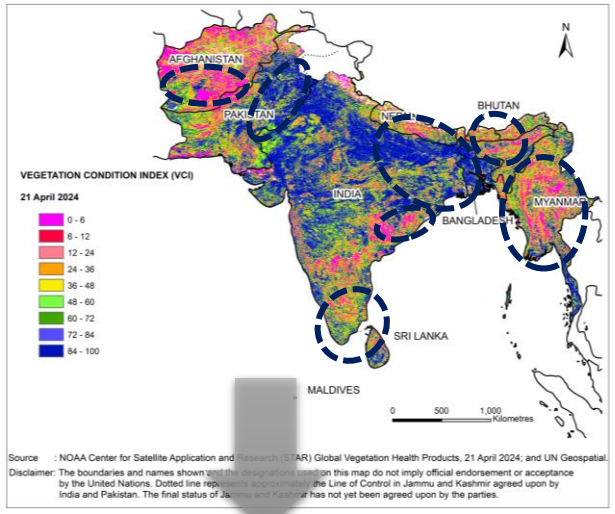


Source: ESCAP (2022) APDR – Pathways to Adaptation and Resilience in South and South-West Asia Overview of the work of secretariat and the UN system at the regional level. ESCAP/CDR/2021/INF/1

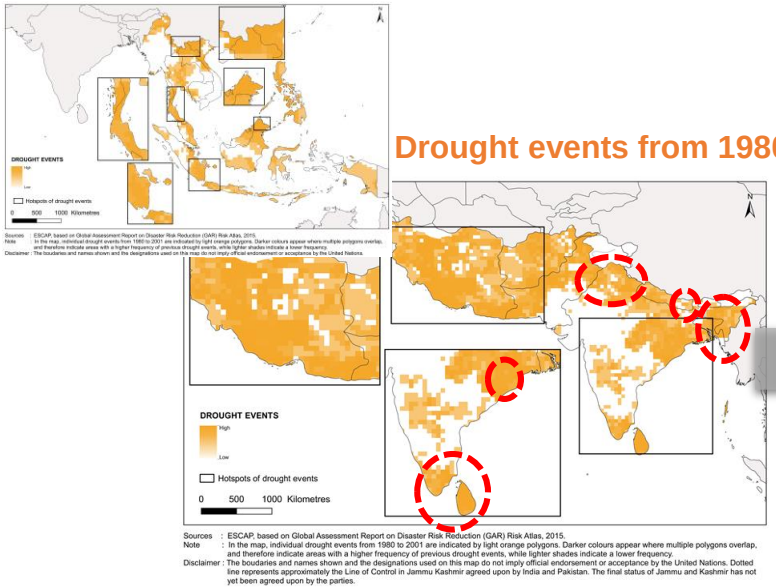
Seasonal Outlook JJAS 2024
Areas of attention for precipitation

Vegetation health during the most recent week, historical flood and drought hazard maps were used to find out the areas of attention for **above-normal** and **below-normal** precipitation.

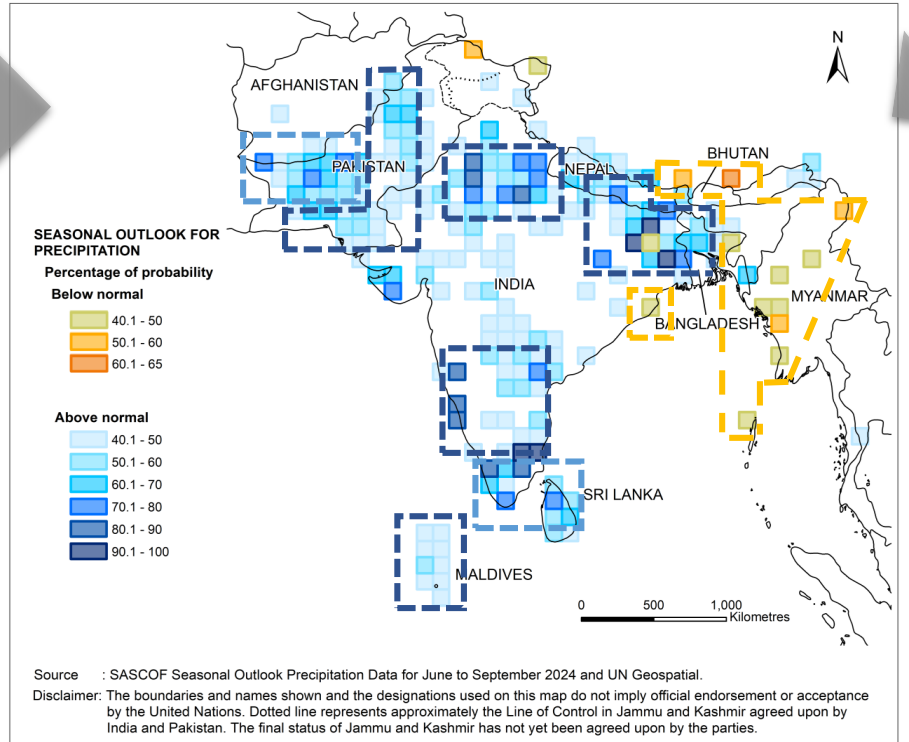
Vegetation condition index as of 21 April 2024



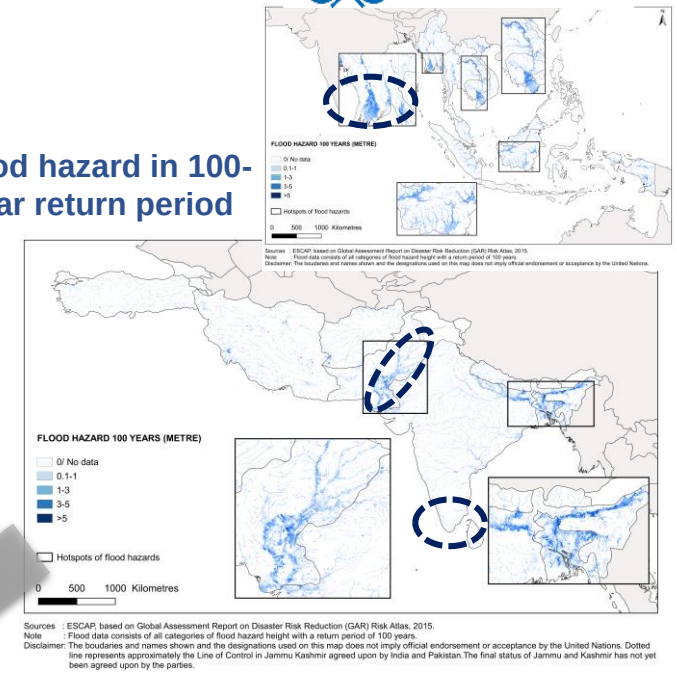
Drought events from 1980-2001



Areas for attention for above-normal and below-normal precipitation, JJAS 2024



Flood hazard in 100-year return period



Areas of attention for below-normal precipitation

1. **North-eastern parts: Myanmar**
2. **Eastern parts of Bangladesh**
3. **Eastern parts of India**
4. **Northern parts of Bhutan and Nepal**

Areas of attention for above-normal precipitation

1. **Northern parts**: north and north-east parts of India, most parts of Nepal and Bhutan. (90-100 % probability of above normal precipitation)
2. **South parts**: south and south-west parts of India and Maldives.
3. **West parts:** south-east and central parts of Pakistan

Areas with advantage - Above-normal precipitation

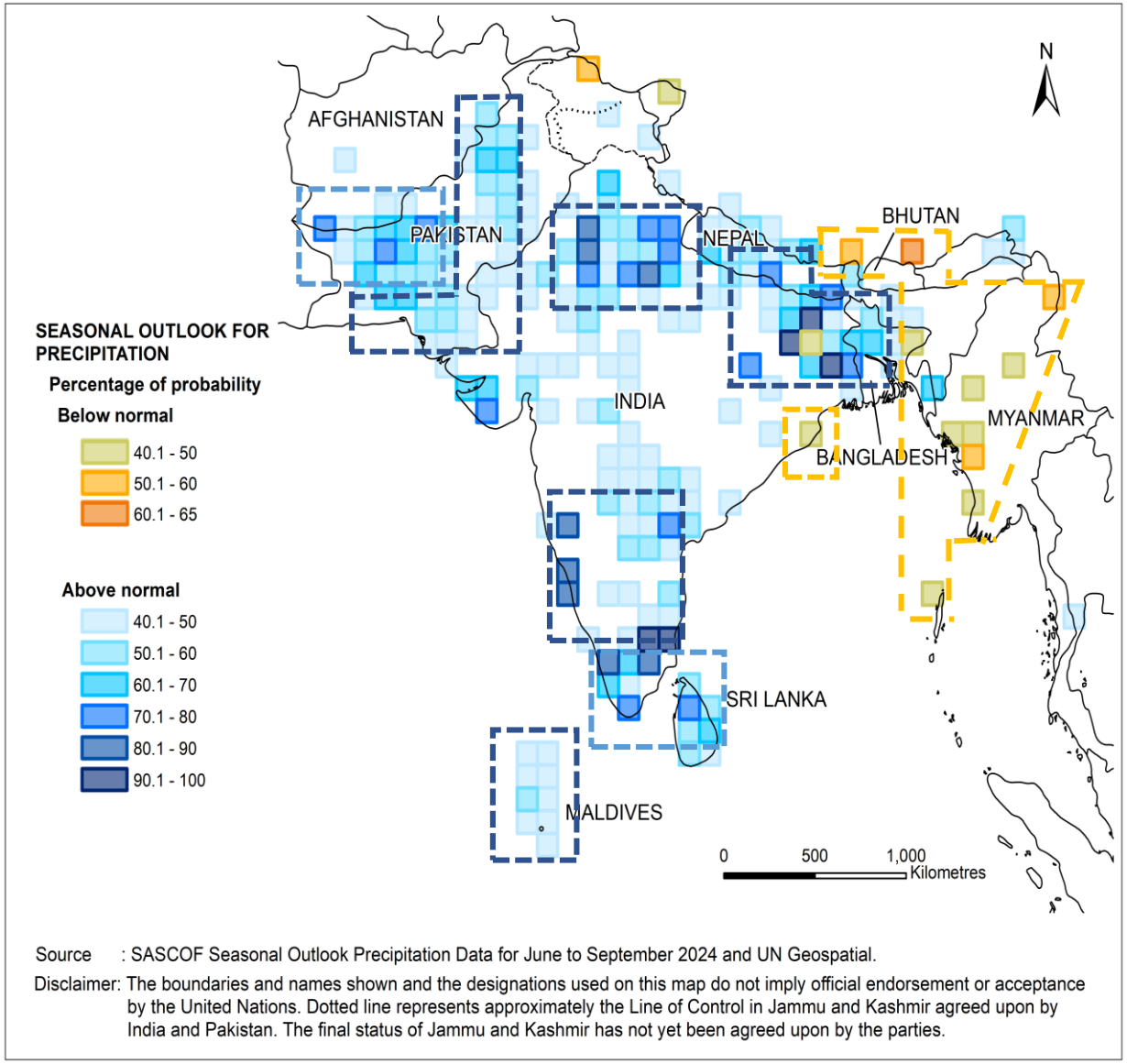
a. **north and central parts of Sri Lanka and Southern Parts of India**
b. **South-west part of Afghanistan and south-east parts of Pakistan**

Seasonal outlook for precipitation JJAS 2023

Areas of attention for below-normal precipitation

1. East parts: Entire Myanmar (upto 60% probability of below normal precipitation), Eastern parts of Bangladesh (upto 50% probability of below normal precipitation), and eastern parts of India (upto 50% probability of below normal precipitation).

2. North parts: Northern parts of Bhutan and Nepal. (upto 63% probability of below normal precipitation).



Source : SASCOF Seasonal Outlook Precipitation Data for June to September 2024 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.

Areas of attention for above-normal precipitation

1. Northern parts: north and north-east parts of India (up to 100 % probability of above normal precipitation), most parts of Nepal and Bhutan. (upto 70% probability of above normal precipitation)

2. South parts: south and south-west parts of India (up to 100% probability of above normal precipitation) and Maldives (up to 50% probability of above normal precipitation).

3. West parts: south-east, northern and central parts of Pakistan (up to 60% probability of above normal precipitation).

Areas with advantage - Above-normal precipitation

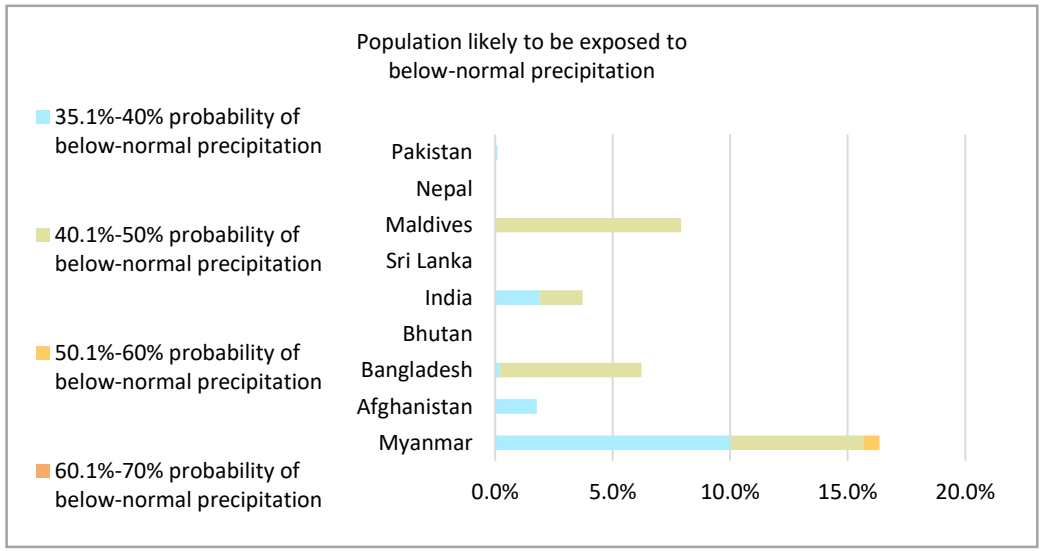
a. **South parts :** north and central parts of Sri Lanka (up to 80% probability of above normal precipitation) and Southern Parts of India (up to 100% probability of above normal precipitation).

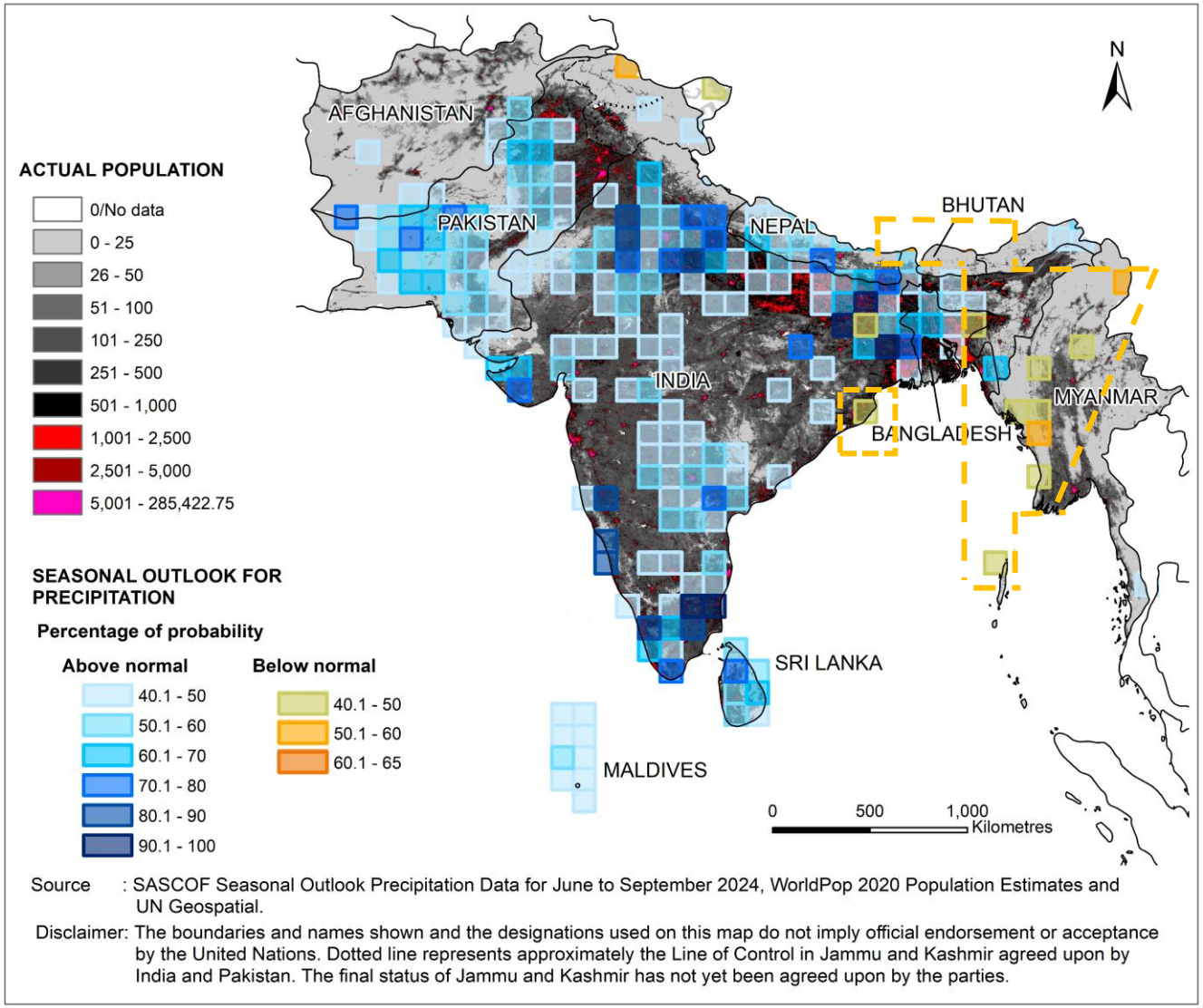
b. **West parts:** South-west part of Afghanistan (up to 70% probability of above normal precipitation) and south-east parts of Pakistan (up to 70% probability of above normal precipitation).

Estimation of population likely to be exposed to below normal precipitation

Country	Total population 2022 (thousands) ESCAP statistics	Percent of population exposure			
		35.1% - 40% probability of below normal precipitation	40.1% - 50% probability of below normal precipitation	50.1% - 63% probability of below normal precipitation	Below normal precipitation
Myanmar	53,927	10.0%	5.6%	0.70%	16.36%
Afghanistan	38,815	1.8%	0.0%	0.00%	1.77%
Bangladesh	163,304	0.2%	6.0%	0.00%	6.23%
Bhutan	782	0.0%	0.0%	0.00%	0.01%
India	1,362,261	1.9%	1.8%	0.00%	3.70%
Sri Lanka	21,002	0.0%	0.0%	0.00%	0.00%
Maldives	105	0.0%	7.9%	0.00%	7.91%
Nepal	29,422	0.0%	0.0%	0.00%	0.00%
Pakistan	216,086	0.1%	0.0%	0.00%	0.10%
Total	**1,885,705**	**1.7%**	**2.0%**	**0.02%**	**3.73%**

In total, only **3.73%** population of this region are likely to be exposed to **more than 35%** probability of below-normal precipitation.

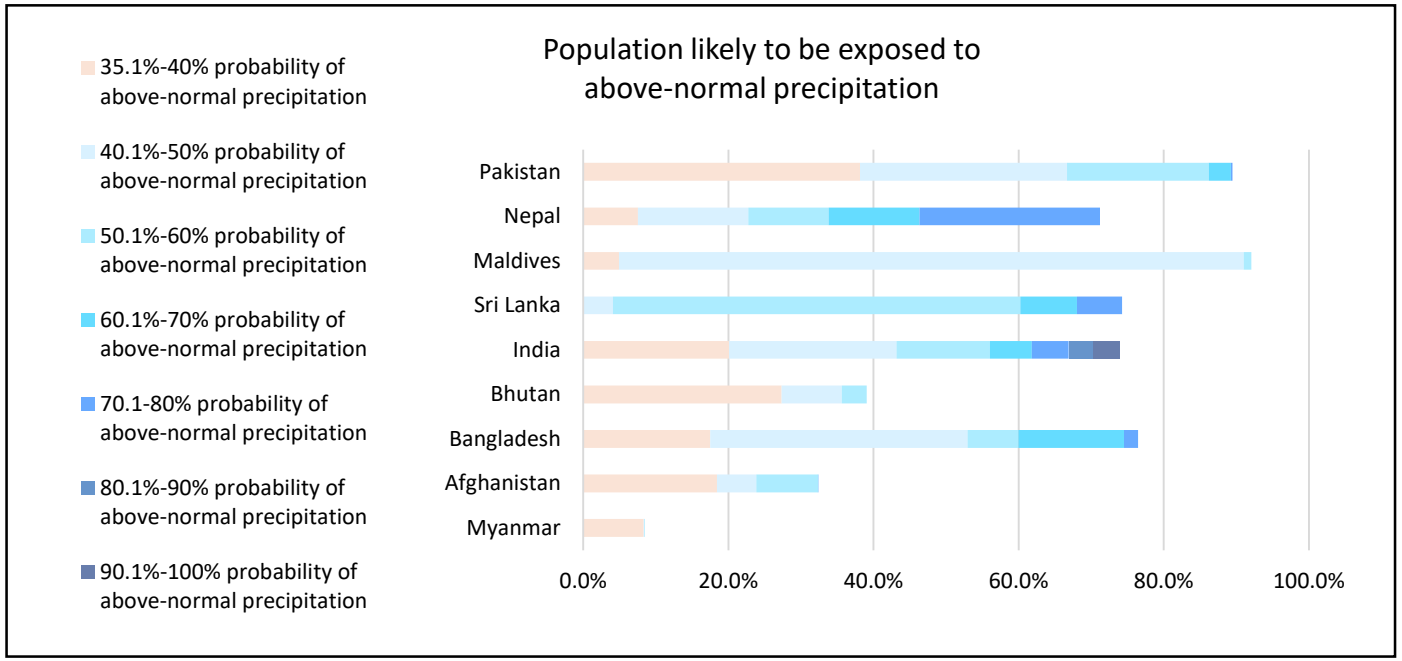


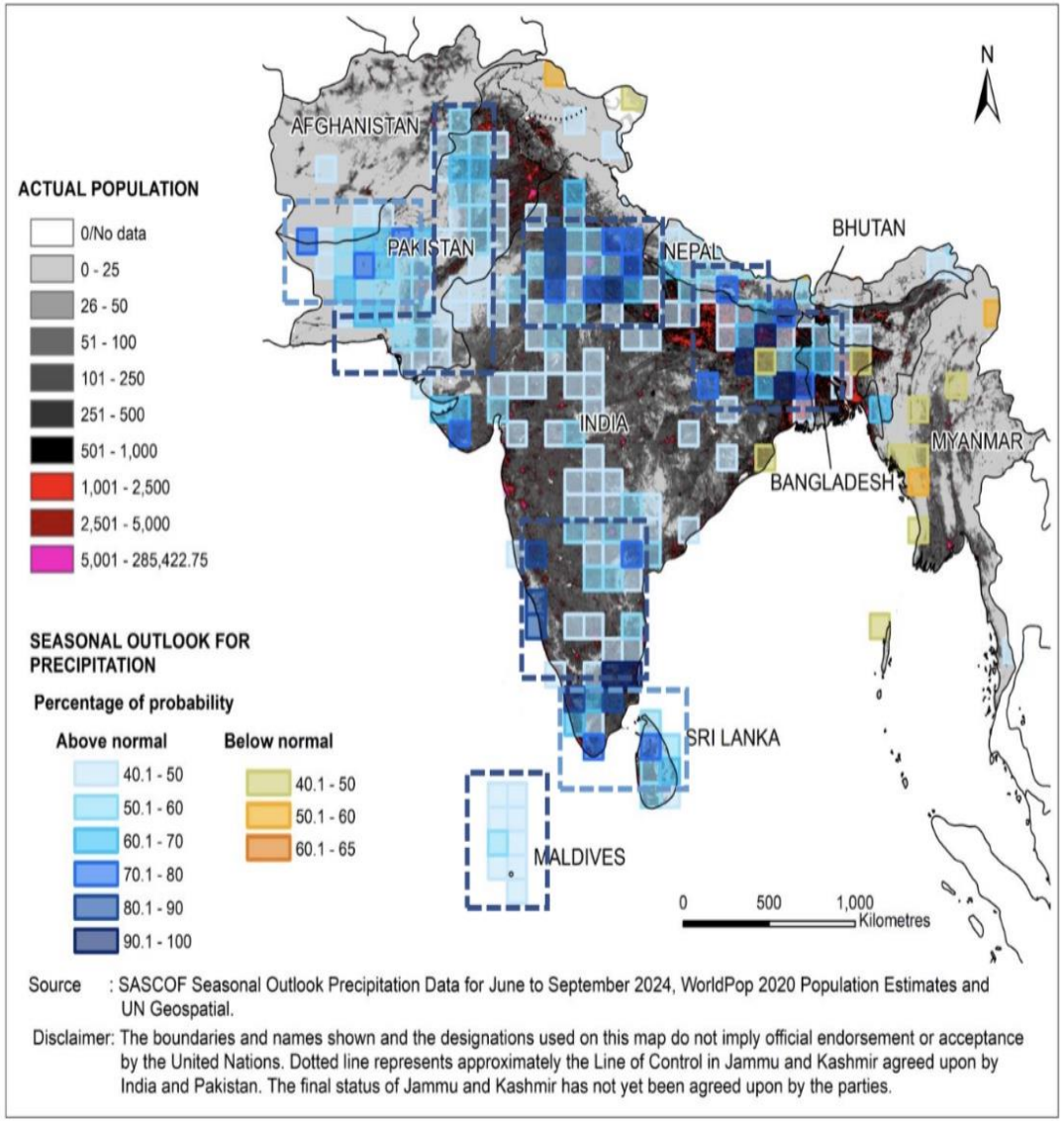


Estimation of population likely to be exposed to above normal precipitation

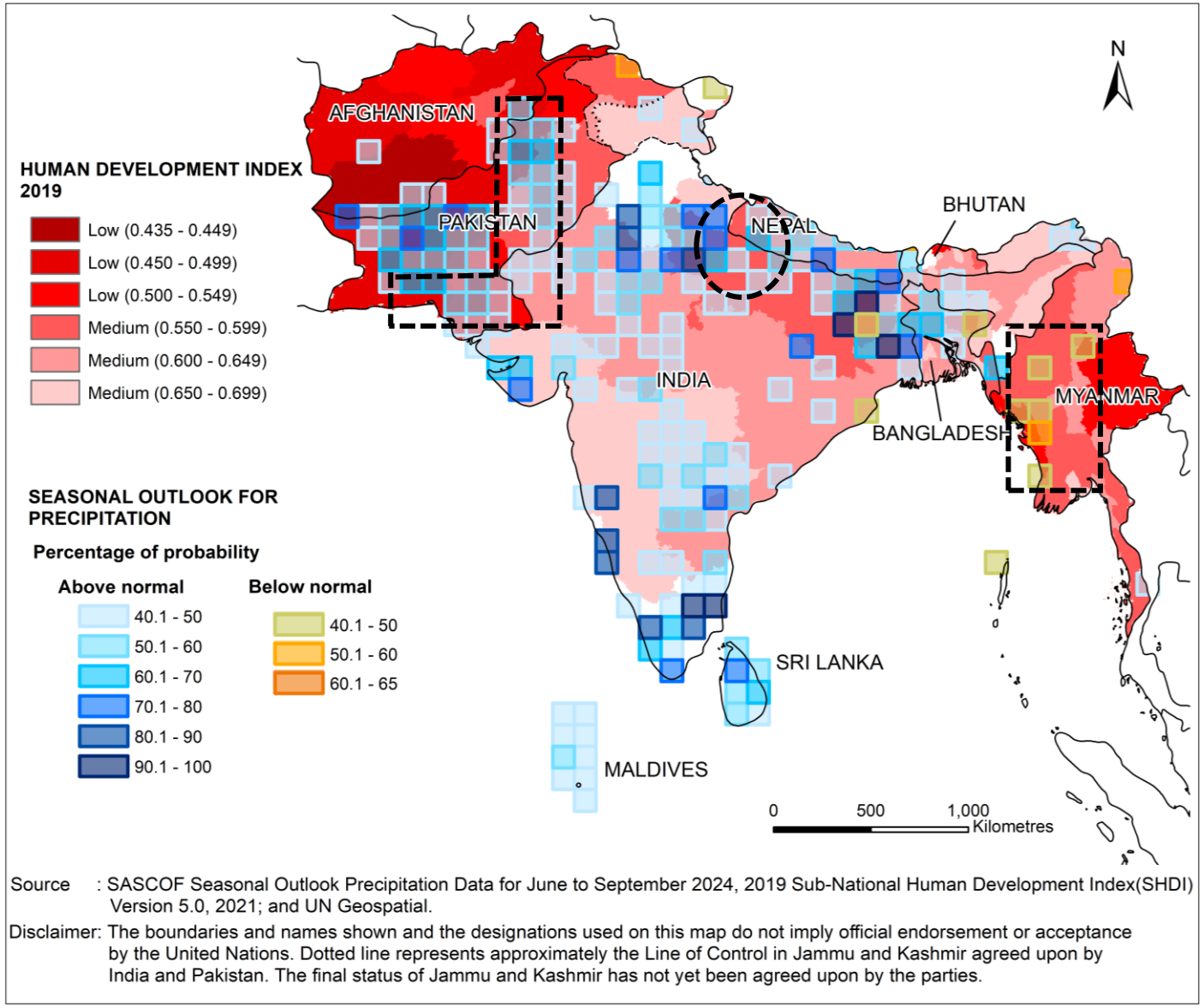
ROMNAM	Total population 2022 (thousands) ESCAP statistics	Percent of population exposure							
		35.1% - 40% probability of above normal precipitation	40.1% - 50% probability of above normal precipitation	50.1% - 60% probability of above normal precipitation	60.1% -70% probability of above normal precipitation	70.1% - 80% probability of above normal precipitation	80.1% - 90% probability of above normal precipitation	90.1% - 100% probability of above normal precipitation	Above normal precipitation
Myanmar	53,927	8.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	8.43%
Afghanistan	38,815	18.4%	5.4%	8.5%	0.0%	0.0%	0.0%	0.0%	32.38%
Bangladesh	163,304	17.5%	35.5%	7.0%	14.6%	1.9%	0.0%	0.0%	76.48%
Bhutan	782	27.3%	8.3%	3.4%	0.0%	0.0%	0.0%	0.0%	39.06%
India	1,362,261	20.1%	23.1%	12.8%	5.8%	5.1%	3.4%	3.7%	74.02%
Sri Lanka	21,002	0.0%	4.1%	56.1%	7.8%	6.2%	0.0%	0.0%	74.25%
Maldives	105	4.9%	86.1%	1.1%	0.0%	0.0%	0.0%	0.0%	92.09%
Nepal	29,422	7.5%	15.2%	11.1%	12.5%	24.9%	0.0%	0.0%	71.22%
Pakistan	216,086	38.2%	28.5%	19.6%	3.0%	0.2%	0.0%	0.0%	89.48%
Total	**1,885,705**	**21.16%**	**23.42%**	**13.11%**	**6.09%**	**4.30%**	**2.48%**	**2.66%**	73.22%

In total, **73.22%** of South Asia population are likely to be exposed to above-normal precipitation.





Vulnerability indicators can be added to understand the vulnerability of people likely to be affected.



Source : SASCOF Seasonal Outlook Precipitation Data for June to September 2024, 2019 Sub-National Human Development Index(SHDI) Version 5.0, 2021; 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.

HDI is overlaid to understand the vulnerability of people exposed.

Sub-national Human Development Index (SHDI)

Dimension	Long and healthy life	Knowledge	A decent standard of living
Indicators	Life expectancy at birth	Expected year of schooling Mean years of schooling	GNI per capita(PPP)
Dimension Index	Life expectancy index	Education index	GNI index

Human development index(HDI)

Source: UNDP, 2019.

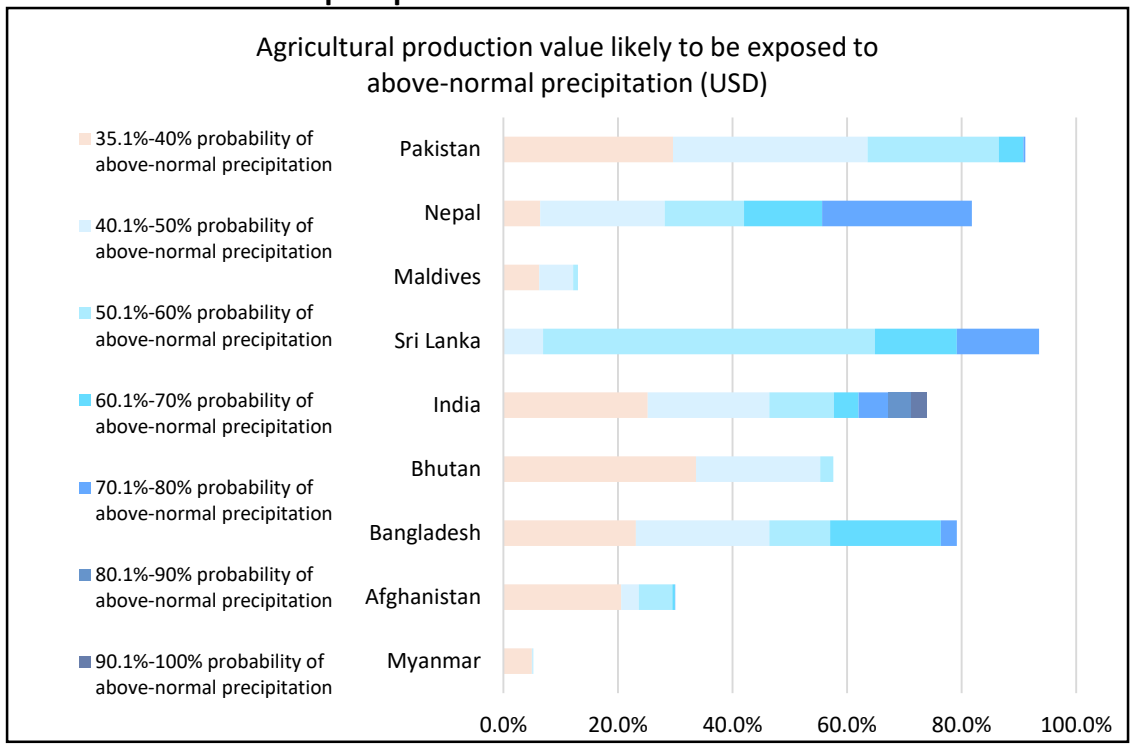
Other indicators (poverty, income, education, literacy, or other vulnerability indicators) can be used as appropriate.

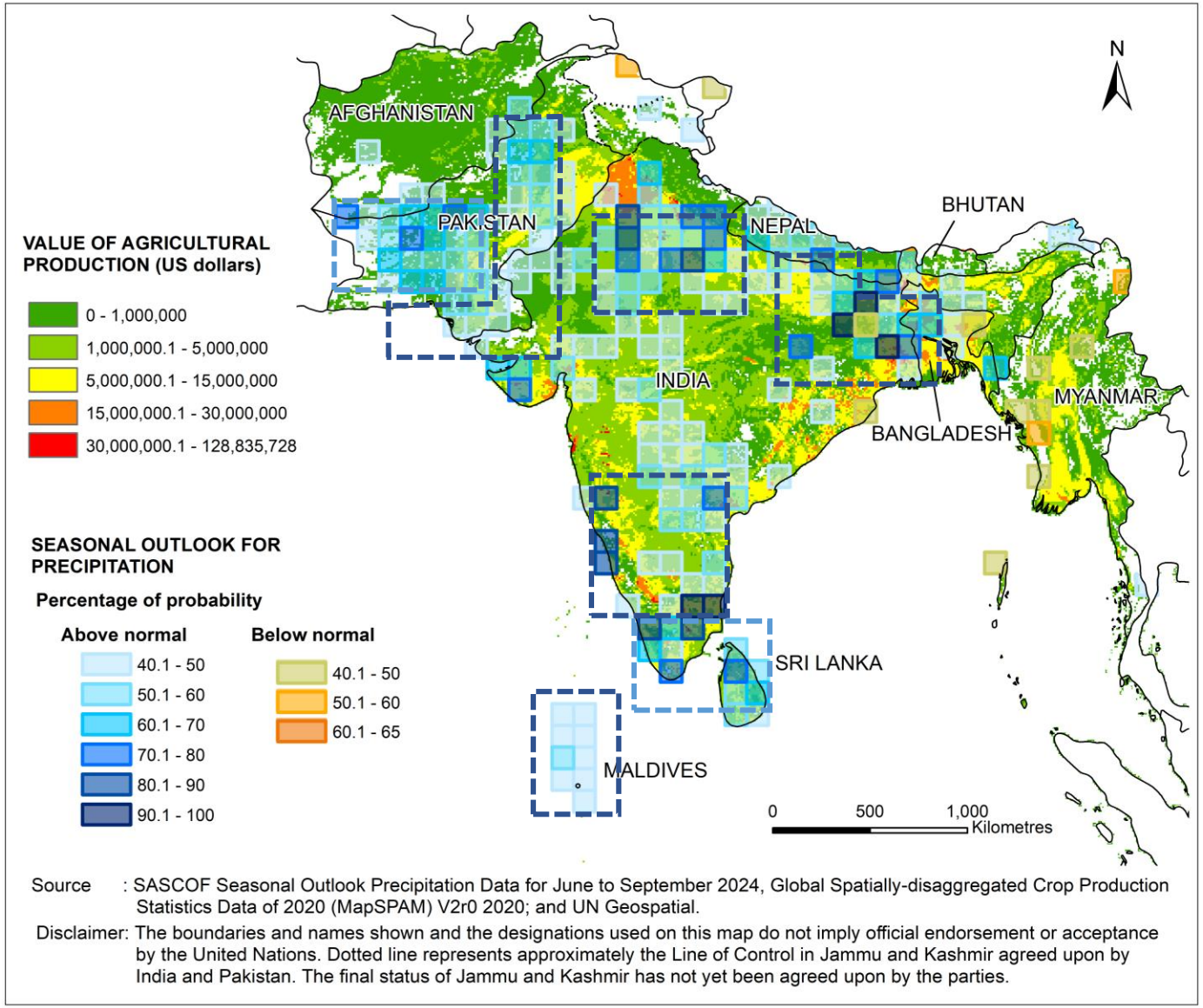
Potential exposure of Agricultural production value

- **26.9%** of South Asia agricultural value are likely to be exposed to **high probability (50%-100%) of above-normal precipitation**.
  Under this precipitation category, 27.5% of India's agricultural value are likely to be exposed, followed by Bangladesh at 32.7%, Pakistan at 27.6%, Sri Lanka at 86.6% and Nepal at 53.7%.

- **43.9%** of South Asia agricultural value are likely to be exposed to **35.1%-50% probability of above-normal precipitation**. Under this precipitation category, 46.4% of India's agricultural value are likely to be exposed, followed by Pakistan at 63.6%, Bangladesh at 46.4% and Nepal at 28.1%.

- **In total, 70.8%** of South Asia's agricultural value are likely to be exposed to **above-normal precipitation**.





Source : SASCOF Seasonal Outlook Precipitation Data for June to September 2024, Global Spatially-disaggregated Crop Production Statistics Data of 2020 (MapSPAM) V2r0 2020; and UN Geospatial.

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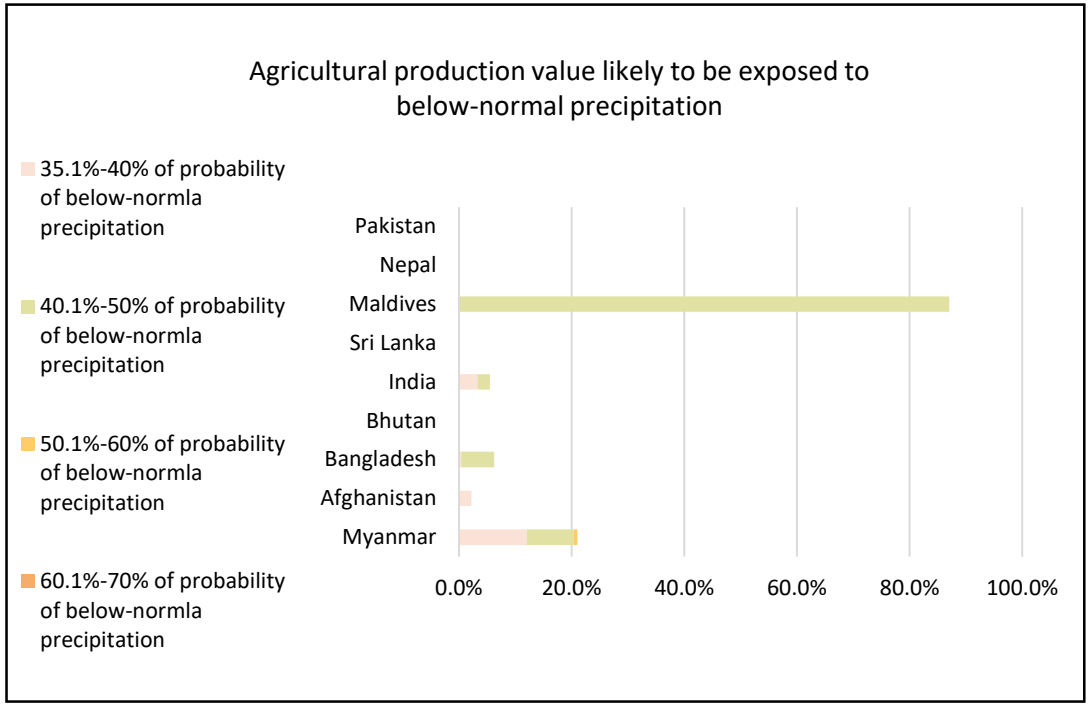
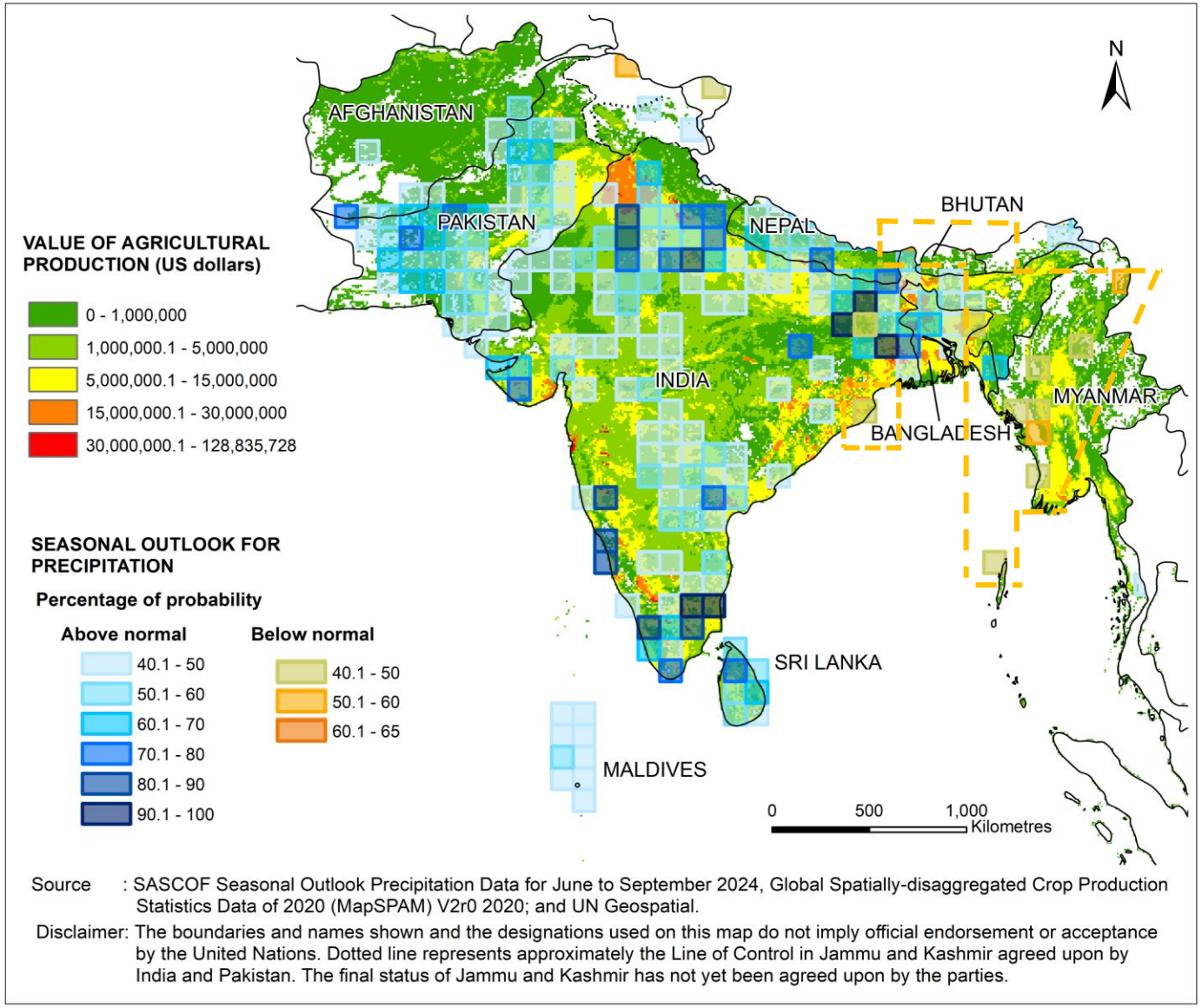
Potential exposure of Agricultural production value

- **2.7%** of South Asia agricultural value are likely to be exposed to **high (40%-63%) probability of below-normal precipitation.** Under this precipitation category, 9% of Myanmar's agricultural value are likely to be exposed, followed by Bangladesh at 5.8% and India at 2.2%

- **In total, 6.0%** of South Asia agricultural value are likely to be exposed to **below-normal precipitation**





Source : SASCOF Seasonal Outlook Precipitation Data for June to September 2024, Global Spatially-disaggregated Crop Production Statistics Data of 2020 (MapSPAM) V2r0 2020; and UN Geospatial.

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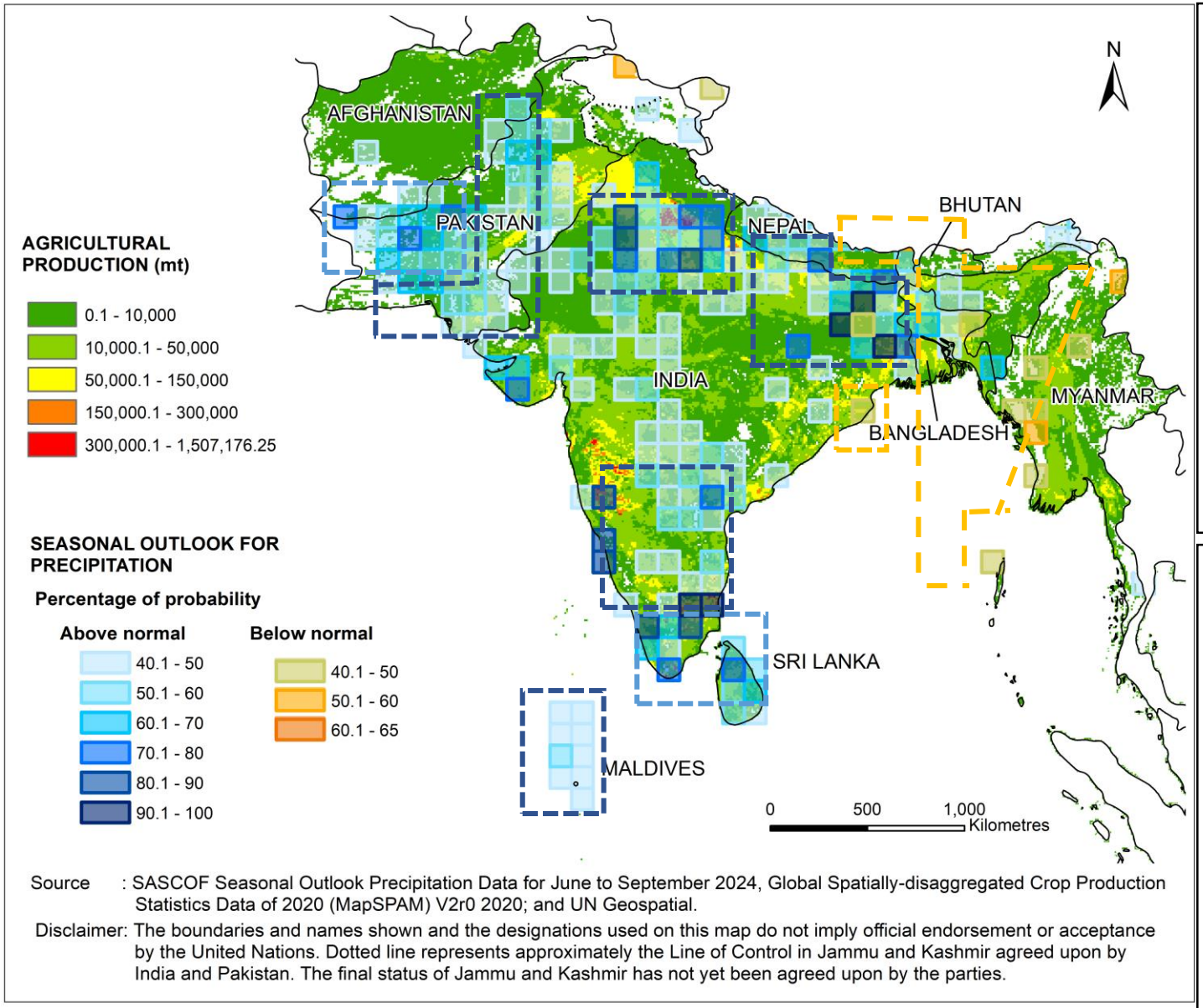
Potential exposure of Agricultural production quantity



Source : SASCOF Seasonal Outlook Precipitation Data for June to September 2024, Global Spatially-disaggregated Crop Production Statistics Data of 2020 (MapSPAM) V2r0 2020; and UN Geospatial.

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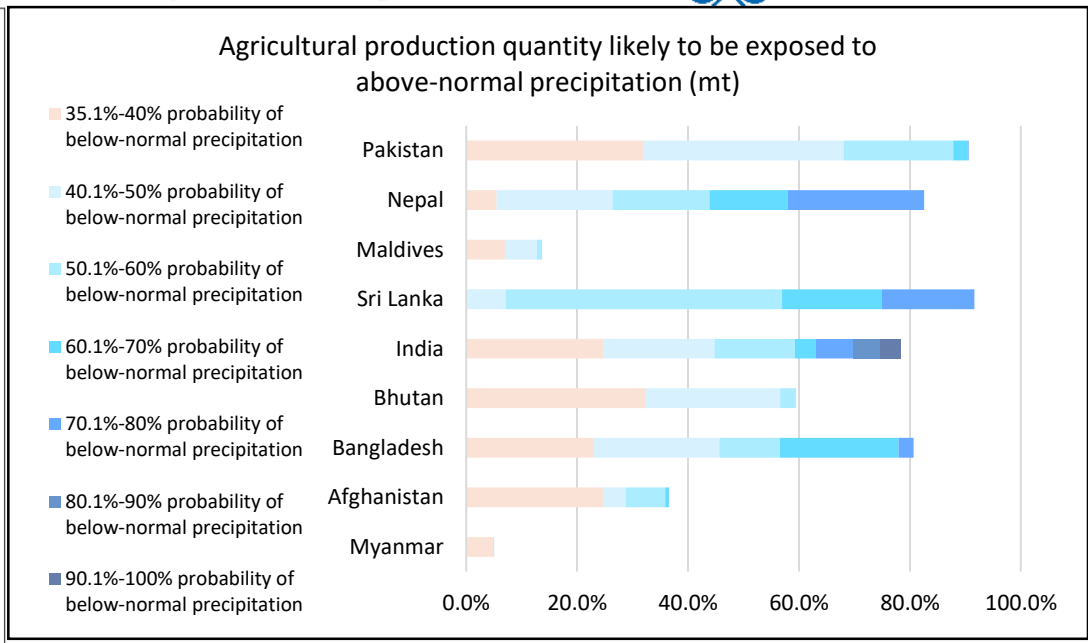
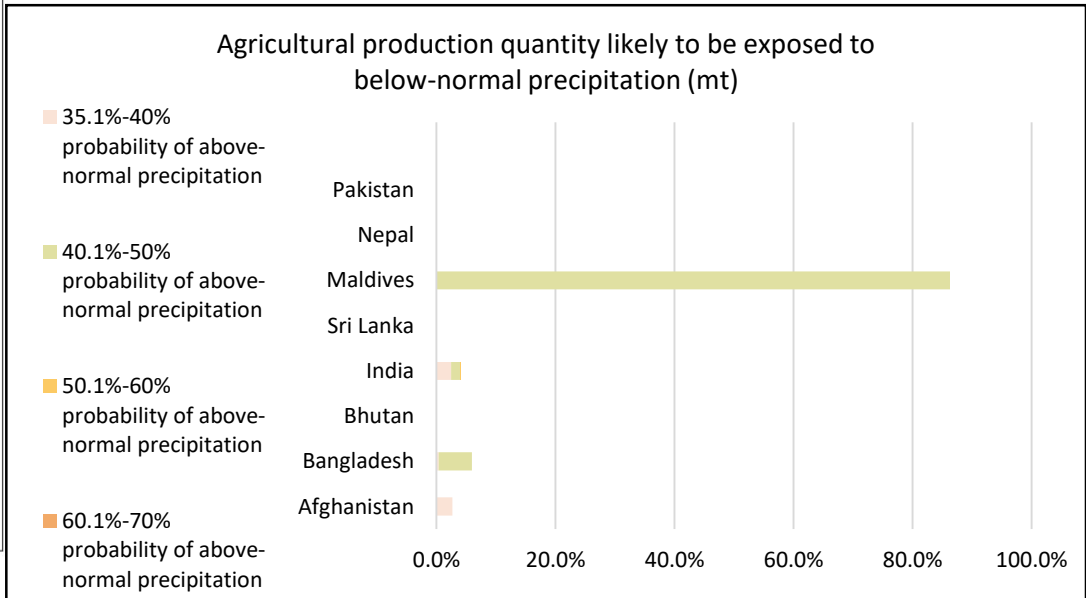




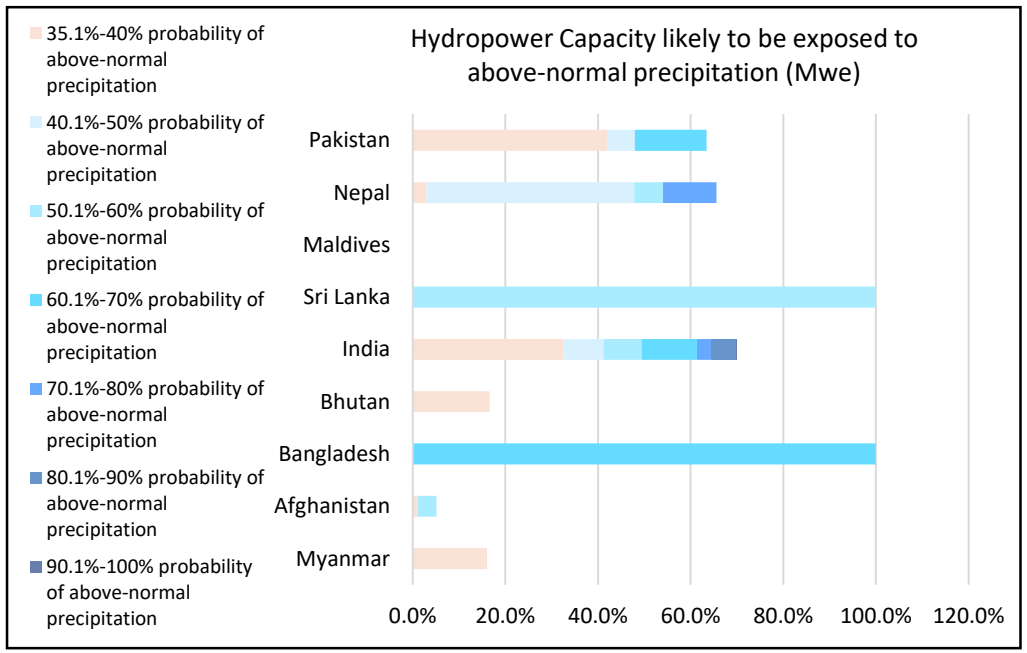
Hydropower exposure

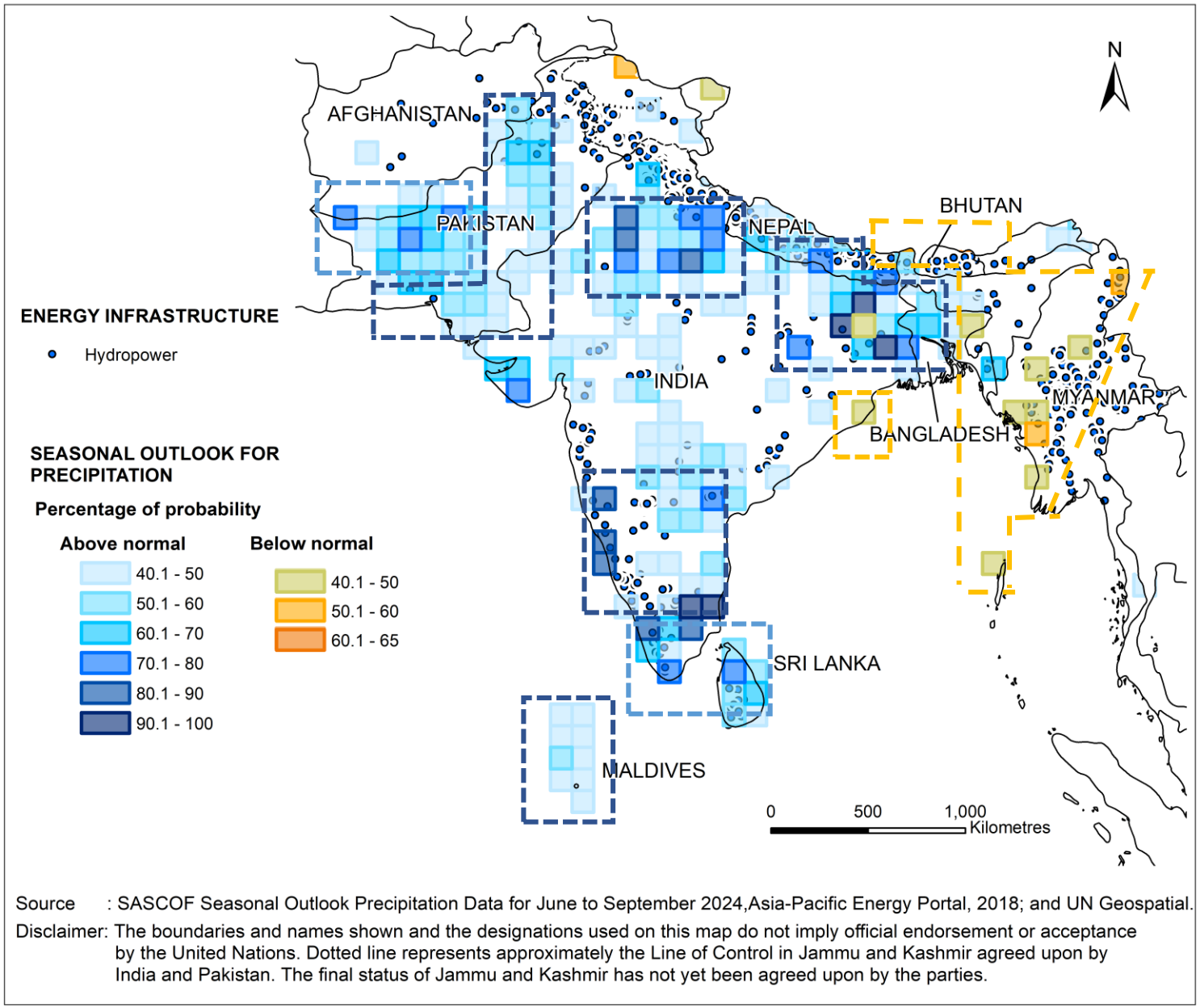
Areas of attention for below normal precipitation

- **7.6%** of total hydropower plants' capacity in South Asia will be exposed to 35.1% - 63% probability of **below-normal precipitation**.
- Those are particularly located in Myanmar, India and Pakistan.

Areas of attention for above normal precipitation

- **45.9** of total hydropower plants' capacity in South Asia will be exposed to 35.1% – 100% probability of **above normal precipitation**.
- Those are located in India, Pakistan, Myanmar, Bhutan and Sri Lanka.





Source : SASCOF Seasonal Outlook Precipitation Data for June to September 2024,Asia-Pacific Energy Portal, 2018; and UN Geospatial.

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Bridging the science policy gap for informed action

ESCAP
Economic and Social Commission for Asia and the Pacific

RISK AND RESILIENCE PORTAL
An Initiative of the Asia Pacific Disaster Resilience Network

The **Risk and Resilience Portal**, an initiative of the Asia Pacific Disaster Resilient Network (APDRN) brings together **risk analytics and policy analysis under one platform** to strengthen capacity of all stakeholders for risk informed planning and budgeting

A Science-Policy-Action Interface is key to managing climate risk

ESCAP
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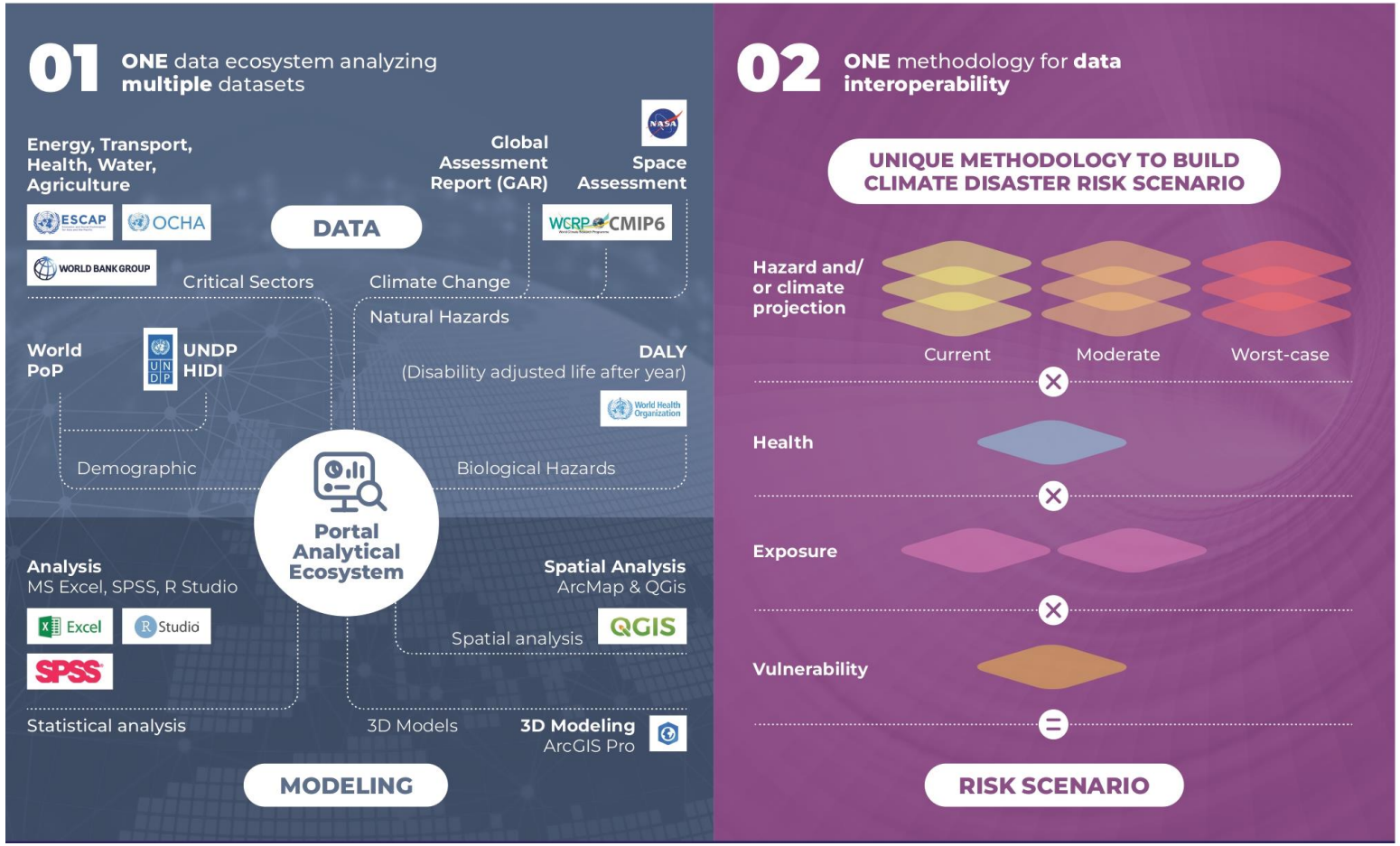
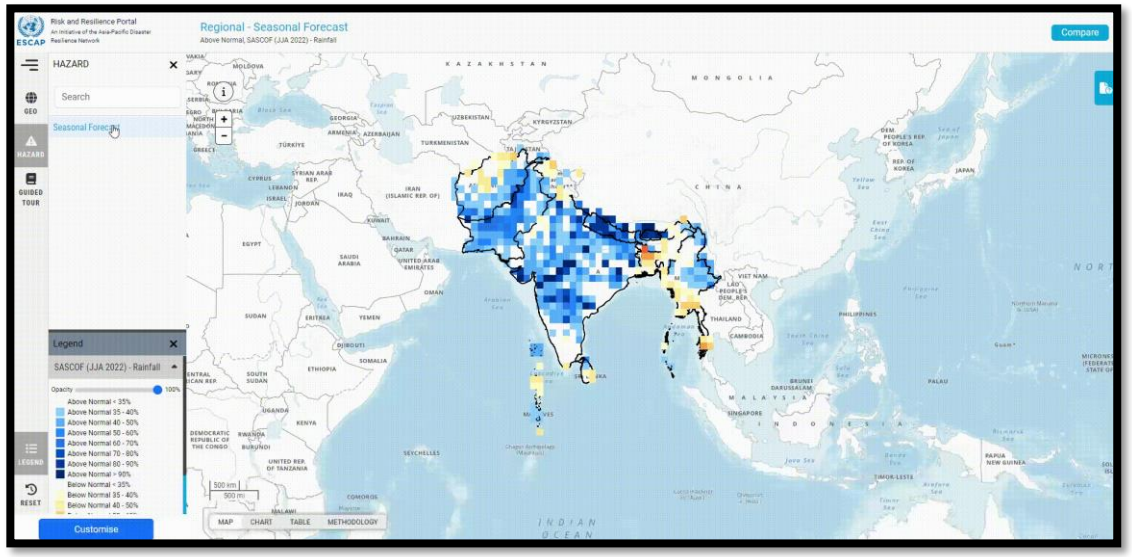


The Portal is built on a state-of-the-art data intensive and risk analytics

Automated Seasonal Impact-Based Forecasting



INPUT*

- Population data
- Infrastructure data
- Hazard data
- Boundary data

OUTPUT

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

GEOSPATIAL PYTHON AUTOMATION SCRIPT

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

Demo of IBF Automation Tool

Moving to Browser for the tool Demo

THANK YOU

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