

CAREI SOUTH ASIA



SOUTH ASIA HYDROMET FORUM CLIMATE SERVICES WORKSHOP

Country Presentation: Overview of Climate Services in South Asia

Bhutan

Ugyen Chopel

**National Center for Hydrology and Meteorology
(NCHM)**

OUTLINE OF PRESENTATION

- 1.Current Status of Climate Services
- 2.Forecast Products and Delivery
- 3.Sectoral Advisories and Applications
- 4.Tools, Platforms and Data Use
- 5.Capacity and Gaps
- 6.Expectation from SAHF CS WG



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CURRENT STATUS OF CLIMATE SERVICES

OUR SERVICES

Public weather
service



Climate and past
weather



Aviation weather
service



Data services



Early warning
services



Climate
change



River information
and monitoring



Glacier monitoring



Flood Warning
and hazard maps



GLOF and lake
monitoring



Research and
development



Education and
awareness

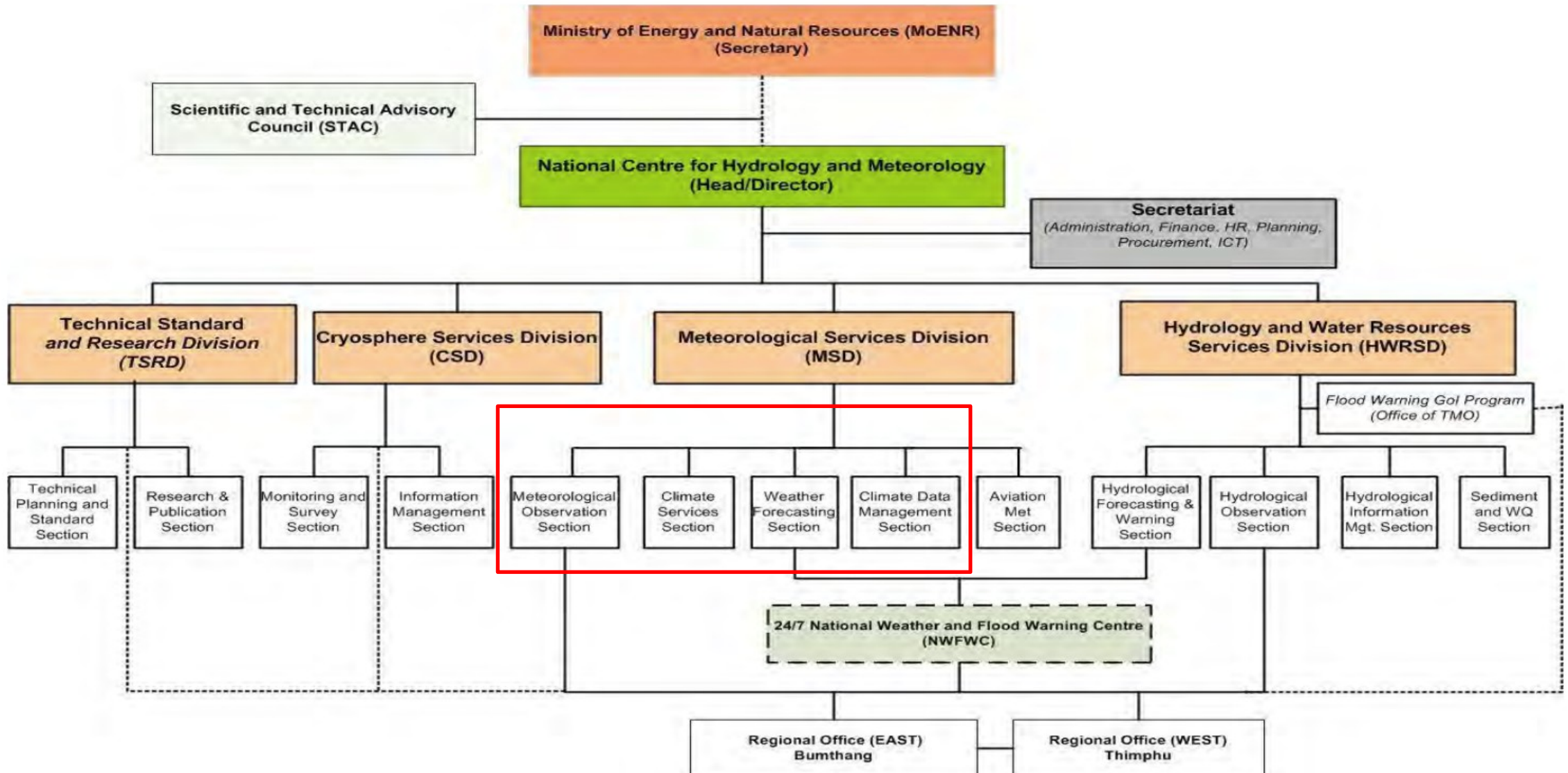


Agriculture weather
services

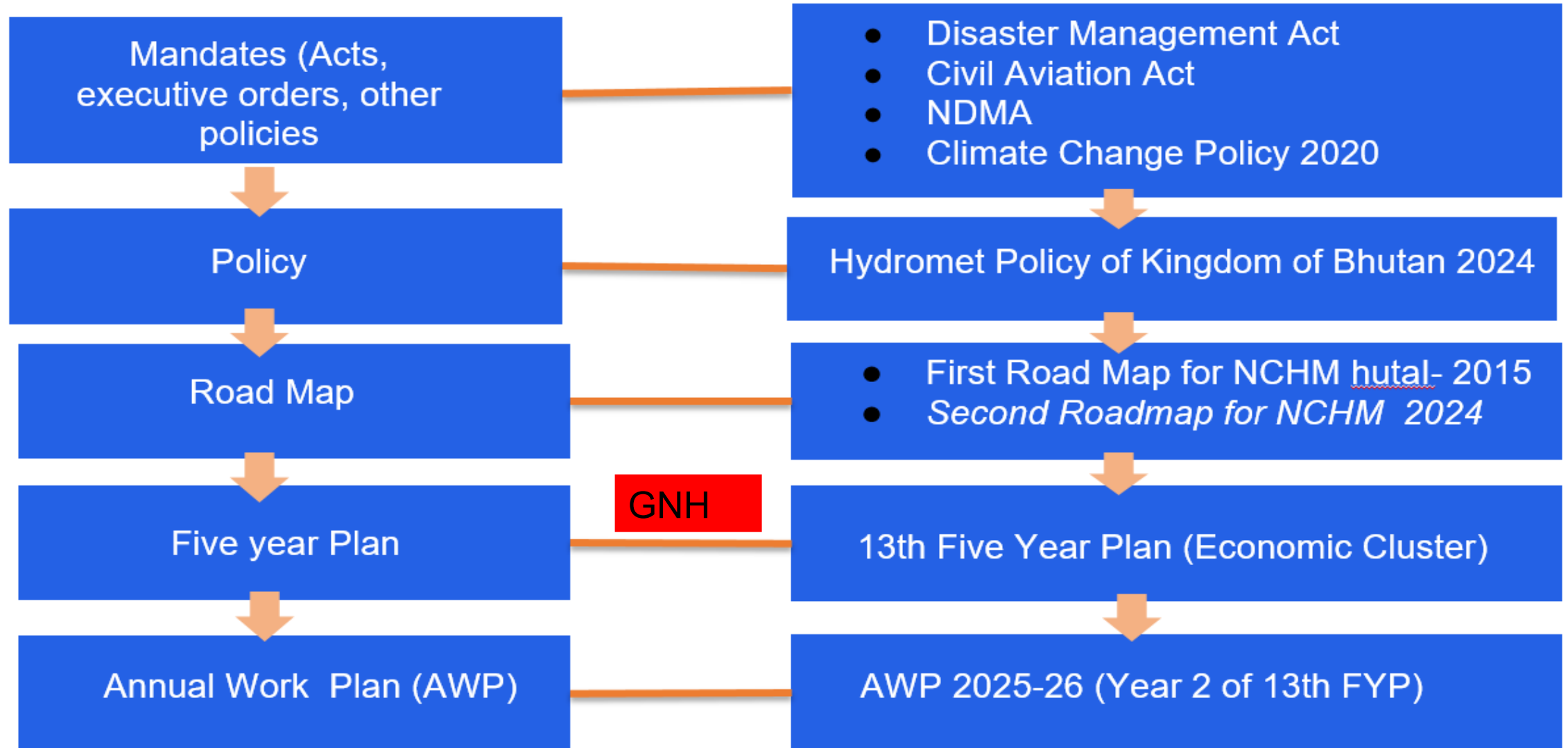


ཨ་ཁུ་ཡེངས་རྒྱ་དབྱེད་དང་གནས་གཤིས་རིག་པའི་རྩེ་བ།
NATIONAL CENTER FOR HYDROLOGY AND METEOROLOGY

Overview of institutional setup for climate services



GOVERNANCE



May 23, 2025



NATIONAL CENTRE FOR HYDROLOGY AND METEOROLOGY
THIMPHU: BHUTAN
"Centre of Excellence in Hydrology, Meteorology and Cryosphere Science and Services"



Press Release
Precipitation and Temperature Outlook for Southwest Summer Monsoon
(June – September 2024)

The National Centre for Hydrology and Meteorology (NCHM) releases the outlook for precipitation and temperature for the summer season, for the months of June - September 2024.

The national outlook is based on the consensus outlook of the South Asian Climate Outlook Forum (SASCOF-28) held from 29 April - 1 May, 2024, outlook from Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES) Forecast Customization System (FOCUS), outlook from World Meteorological Organization (WMO) Global Producing Centres (GPCs) and various other international sources. The summer monsoon outlook has to be used and interpreted along with the extended, medium, daily weather forecasts and other advisories released by the Centre. The stakeholders and users are advised to follow the NCHM website and Facebook pages for advisories and updates.

Rainfall Forecast for June - September 2024 Summer Season

The summer rainfall for Bhutan during the 2024 JJAS monsoon season is most likely to be slightly above normal. Normal is the average rainfall for the summer season (JJAS) of Bhutan from 1996 to 2023.

Temperature Forecast for June - September 2024 Summer Season

The maximum and minimum temperature in Bhutan during the 2024 JJAS monsoon season is likely to be slightly above normal. Normal is the average temperature (maximum and minimum) for the summer season (JJAS) of Bhutan from 1996 to 2023.



༣༥॥ རྒྱལ་ཡོངས་ཚུད་པུད་དང་གནམ་གཤིས་རིག་པའི་ལྟེ་བ།

NATIONAL CENTRE FOR HYDROLOGY AND METEOROLOGY
THIMPHU: BHUTAN

"Centre of Excellence in Hydrology, Meteorology and Cryosphere Science and Services"



শ্রী: ১০৭৫ শ্রী: ৫৫৫৫৫৫ ১১

གནས་ཚུལ་གསར་བེད།

ཨ་ཁོ་ལོ་༡༠༩༥༣༣་༤་ལ་པའི་བར་༽

ཕྱོད་ལ་ཁ་ལྷག་གི་ཆར་ཆུ་འུར་ཆོད་ཀྱི་དོན་ལུ། མཛོད་གསལ་བྱུང་མི། སྤྲིག་མཛོད་འབབ་ཆད་དང་ཆོད་ཀྱི་མཐོང་སྣང་།

ཀླུ་ཡོངས་རྒྱུད་པུད་དང་གནས་གཤིས་རིག་པ་ལི་ཤེ་བ་གིས་ གླིལ་ལོ་༡༠༡༥་ལྷོ་པ་ལས་འཕའི་བར་གྱི་ གནས་ལྷན་ཆར་ཁྱེད་ཀྱི་དུས་ཚོད་ལྷི་རོན་ལས་
མ་རྒྱལ་གསལ་ལྷང་མི་ ལྷི་གསལ་རོད་ཆ་ཕྱོད་ཀྱི་སྒྲིཊ་རྒྱལ་ཚུ་ གསལ་སྒྲིཊ་ལབ་དམ་ལིན།

ལྷ་ཡོངས་ཀྱི་མངོན་ལུགས་ལུང་བཟི་ཏུན་རྒྱལ་འདི་ སྤྱི་ལུང་པེ་འགོ་བཙུག་ལྷན་ཁག་གཤིས་གཉི་ཚེ་ལྷན་ལུ་ གཤི་བཞག་ཐོག་ སྤི་ལུ་འཁོར་ལུ་
 ༤ པེ་ཚེས་ ༩ པེ་ལས་ ཚེས་ ༡༠ ཏུ་དབེན་འཚོ་གསལ་ སྤི་ཚེ་ཤི་ལྷན་ཁག་གཤིས་གྲོལ་འཚོམས་ནང་(SASCO-31) མེས་མཉུན་ལུང་བཟི་མངོན་ལྷན་གསལ་
 གྲི་གྲོལ་ལུ་ཐུན་དང་། ཨེ་ཡེ་ཀ་ཏུ་ཐུན་ལུ་ ལུང་ཐོག་ལྷན་ལྷན་མེན་འཚོ་ཏེ་ཏེ་ཏེ་ རྩ་གོ་ཉེན་བདེ་མེས་ལུགས་(RIMES) དང་། ཨེ་ཤི་ལུ་
 ལྷན་ཁག་གཤིས་ཐུན་རྒྱལ་གྱི་སྤི་ལུང་མེས་ལུགས་(FOCUS) གྱི་མངོན་ལྷན་གསལ་ དེ་ལས་ འཚོམ་སྤྱི་དྲུག་ལྷན་ཁག་ཐུན་རྒྱལ་གསལ་སྤྱི་ལུ་
 (GPCS) འཚོམ་སྤྱི་དྲུག་ལྷན་ཁག་གཤིས་ཀྱི་ཤི་ལེལ་མེས་ཚོགས་(WMO)དང་། གཤན་ལུ་ ལྷན་ཁག་གཤིས་ཐུན་རྒྱལ་གྱི་ཐུན་ལུང་ལུ་ཐུན་
 ལྷན་ལུ་ གཤི་བཞག་ཐོག་ཐུན་ལུ་ཐུན་ལུང་ལུ་ཐུན་

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ཧྲི་ལོ་༡༠༩༥༣༩-༤-༧པའི་པར་ གནམ་ཕུར་ཆར་ཕྱིན་པའི་ཆོད་ཀྱི་དོན་ལུ་ ཆར་པ་གི་མྱོན་ཏགས།

གྲོལ་ལོག་པའི་གནས་བྱུང་རྒྱུ་ལྟར་ལྟུང་ཆོས་ལྟུང་། འབྲུག་ལྔ་པ་རྒྱལ་ཆོད་དེ། ཨ་ཏག་གི་གནས་ཆོད་དེ་འབྲུག་རྒྱལ་ནི་འབྲུག་ཡོད་པའི་ཕྱི་
 ཏགས་འབྲུག་ལོན་ཏེ། ཨ་ཏག་གི་གནས་ཆོད་དེ། གྲོལ་ལོག་པའི་གནས་ཆོད་དེ། གྲོལ་ལོག་པའི་གནས་ཆོད་དེ། གྲོལ་ལོག་པའི་གནས་ཆོད་དེ།
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སྤྱི་ལོ་ ༢༠༡༥ ལྷོ་ ༤-༨ པའི་ཤར་ གནམ་ཕུར་ཆར་ཆུ་འཛུགས་ཆོད་ཀྱི་དོན་ལུ་ ཆ་ནོད་ཀྱི་ཚུན་ཉམས་

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National Climate outlook forums



ASTROLOGICAL FORECAST

Green Face:

- Normal rainfall (More in northern and southern region)
- Windstorms possible

Body red:

- More intensity of Rain and heat
- Hail storm during the harvest

All four legs green

- Normal Rain

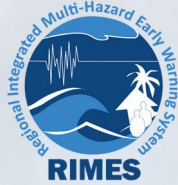


Stomach red

- More fire and heat risk

Tail toward right

- More risk to livestock



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FORECAST PRODUCTS AND DELIVERY

Climate data and Services

Data services



- Time series historical observation
- Gridded observation

Climate and past weather



- State of the climate reports
- Climate summaries
- Climatological extremes

Climate change

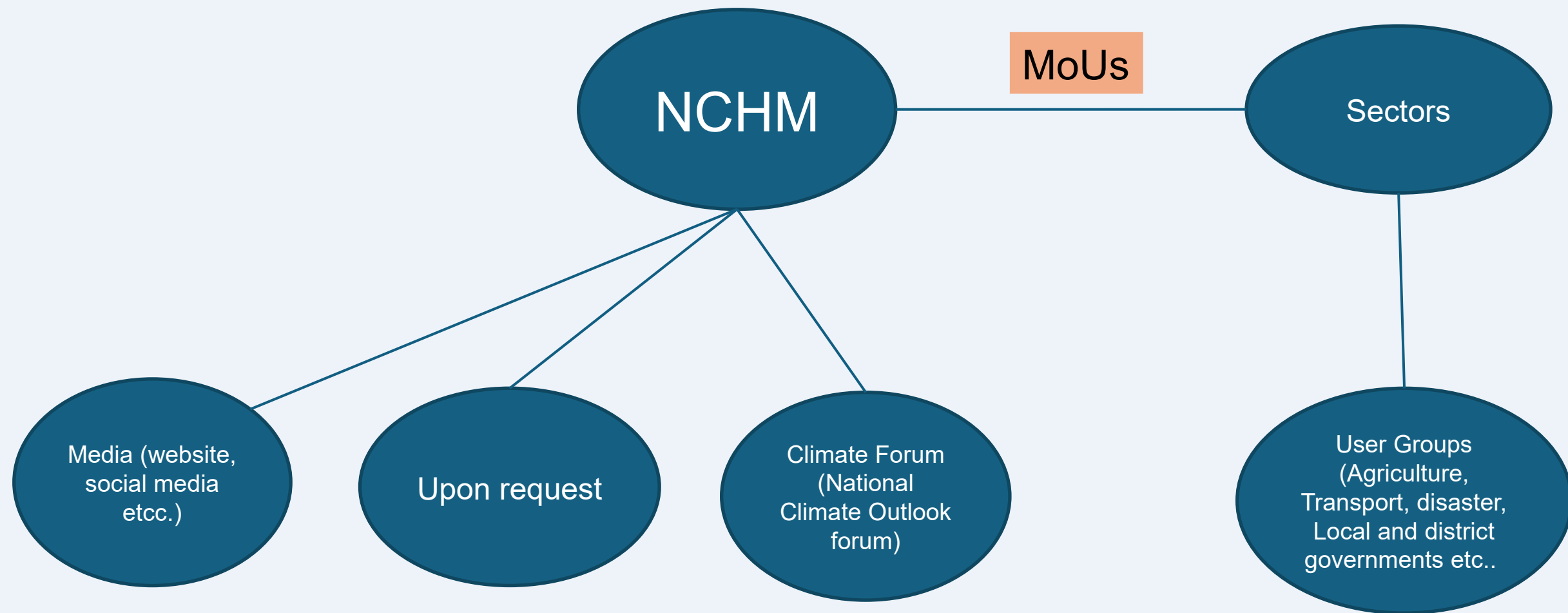


- Statistical Downscaling
- National climate reports
- Future climate Scenarios for NDCs, NAPs, NC
- Support for impact modelling

Seasonal Outlook

- NCOF
- Seasonal Outlook

Dissemination of Climate data and Services

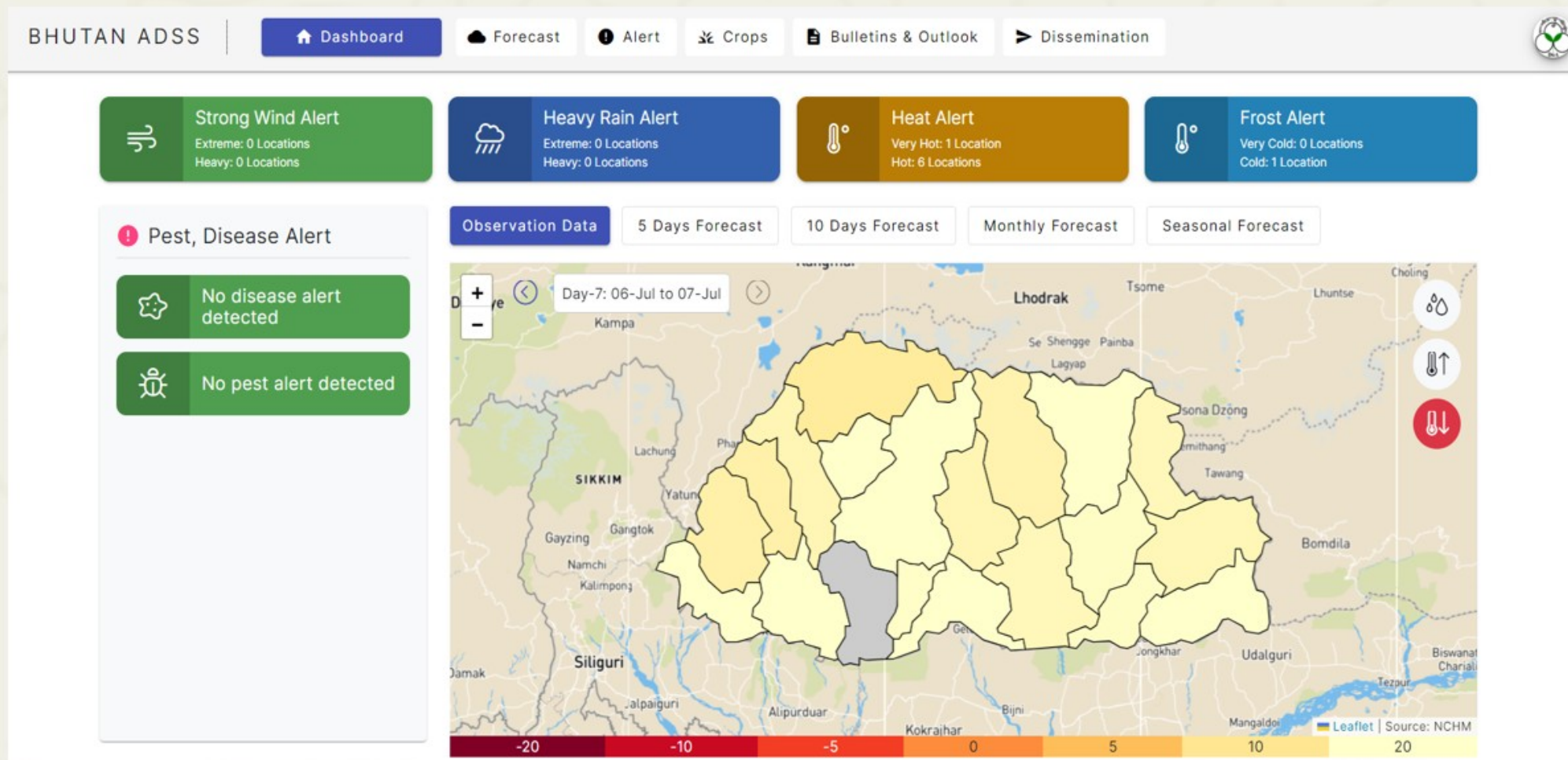




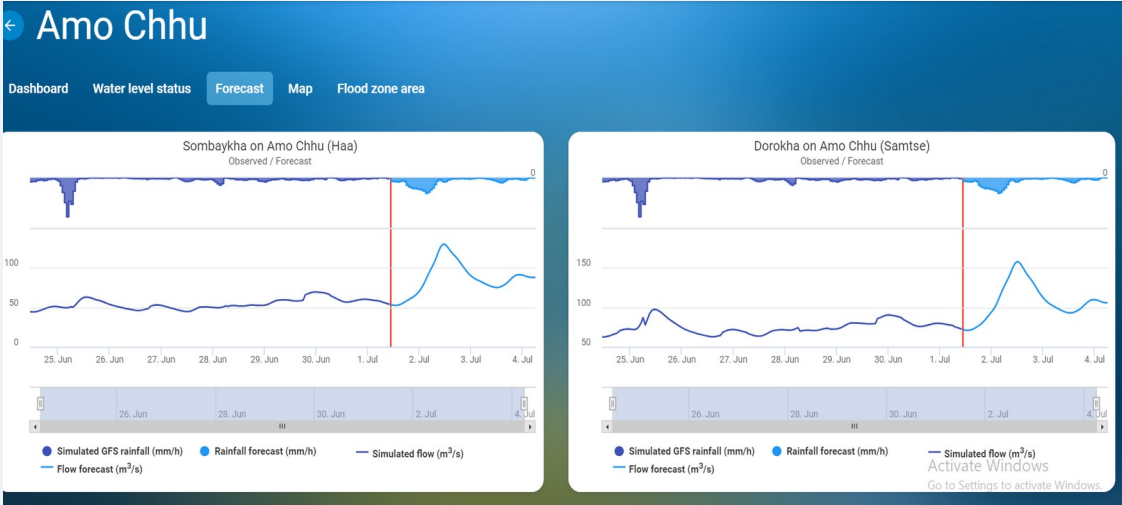
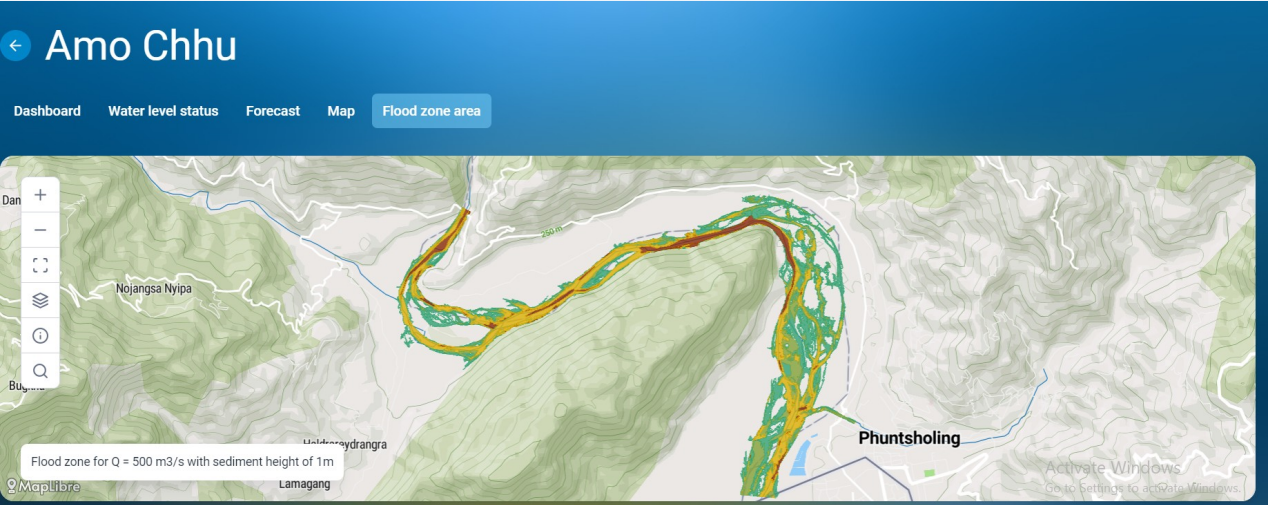
Products



a. Agromet Decision Support System (ADSS) Backend (<https://adss.systems.gov.bt/>)



FLOOD EARLY WARNING AND GLOF EWS



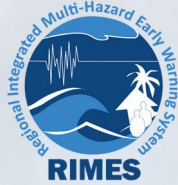
← Pho Chhu

Dashboard Water level status Map

Water level status

Name of the Station	Date of the Last observed value	Last observed value (m)	Alert (m)	Alarm (m)	Rate of change (m/h)
Tarina Wachey on Phochhu (Gasa)	05/30/2024 12:00 PM	9.00	8.5	10.5	0.00
Rabstreng Lake on Phochhu (Gasa)	05/30/2024 12:00 PM	9.00	7.39	7.4	0.00
Luggy Lake on Phochhu (Gasa)	03/18/2024 3:05 PM	6.29	7.8	10.	0.00
Thorthomi Lake on Phochhu (Gasa)	03/18/2024 4:10 PM	3.95	7.49	7.5	0.00
Bay Tsho Lake on Phochhu (Gasa)	03/18/2024 4:10 PM	6.13	7.39	7.4	0.00
Thanza on Phochhu (Gasa)	03/18/2024 4:00 PM	6.44	7.7	8.7	-0.00
Dangsa on Phochhu (Gasa)	03/18/2024 4:00 PM	3.16	5.35	7.0	0.00





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SECTORAL ADVISORIES AND APPLICATIONS

Seasonal Outlook

GENERAL ADVISORY

ALERT COMMUNITIES IN FLOOD AND LANDSLIDE PRONE AREAS

AVOID RIVER BANKS DURING PEAK RAINNY SEASON

KNOW EMERGENCY CONTACTS

PRE-MONSOON INSPECTION OF ROADS, DRAINS AND OTHER INFRA

STAY UPDATED WITH DAILY WEATHER FORECAST FOR REGULAR UPDATE

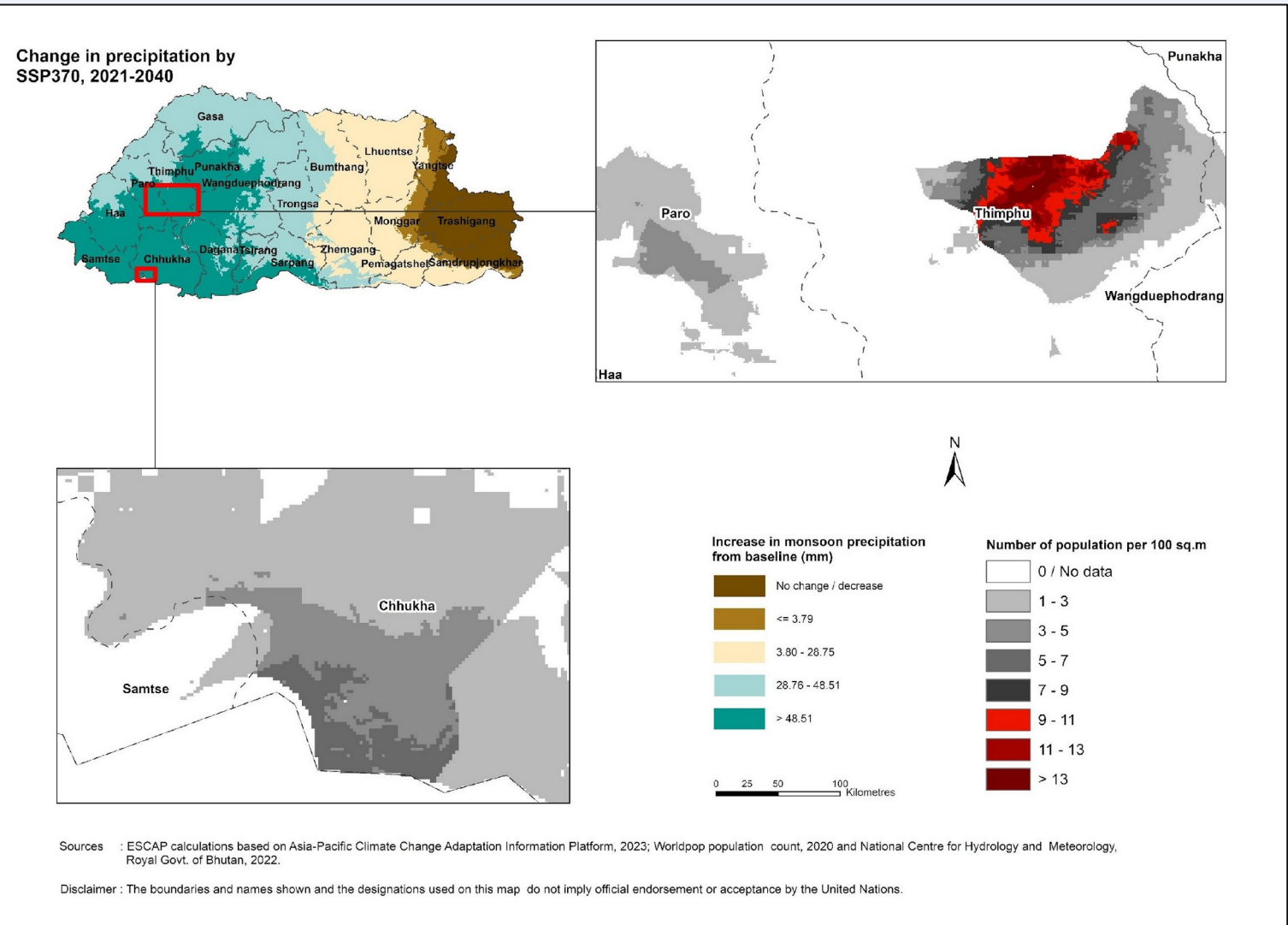


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Climate Projection

- Impact Assessment
- Impact Modelling
- Climate informed plans and programs

Impact Assessment



- Population exposure to high to very high increase in monsoon precipitation increases from 2021 to 2100 across all the scenario.
- **Around 99% of the total population are exposed to are exposed to high to very high increase in precipitation by 2100 under SSP3 scenario.**
- In the near and mid-term, the population exposure is less under SSP2 than SSP1

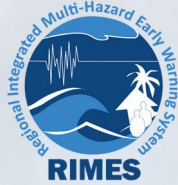


Integration of climate information into sectoral plans

Scenario	Summer temperature likely to increase by up to 1.3°C by 2040		
Actions	Current vulnerability	Current impact	Future change
Silvicultural thinning	1. Increase occurrence of forest fires 2. Outbreak of pest and diseases	1. Quality of timber deteriorated; low production (inferior quality)	1. Change in species composition/Biomes shift
Plantation	1. Low survival rate	1. Financial implication	1. Low forest coverage
Recreational fishing	1. Shift in the niche habitat	1. Species migration	1. Risk of extinction of water birds feeding on fishes

Integration of climate information into sectoral plans

	Climate impact 1. Low production of timber (timber quality deteriorated) 2. Change in species composition		
Silvicultural thinning			
Time scale	Short-term (1-2 years)	Medium (5-10 years)	Long term (10-40 ears)
Adaptation actions (thinning)	1. Post extraction sanitation (ex. Bark beetle infestation)	1. Carry out plantation of fire and drought resistant species (mono-crop not recommended)	1. Long term research to carry out resilience to CC through establishment of permanent research plots (Policy intervention)
Who is responsible	1. DoFPS 2. NRDCL/Private agency	1. DoFPS 2. GBCL	1. DoFPS/UWIFoRT 2. NCHM 3. NSSC



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TOOLS, PLATFORMS AND DATA USE

Climate Services Toolkit for Bhutan

[Home](#) [About](#) [S2S Forecast](#) [Dzongkhag](#) [DataEx](#) [Login](#)



“Developing capacities for effective climate
services in Bhutan”

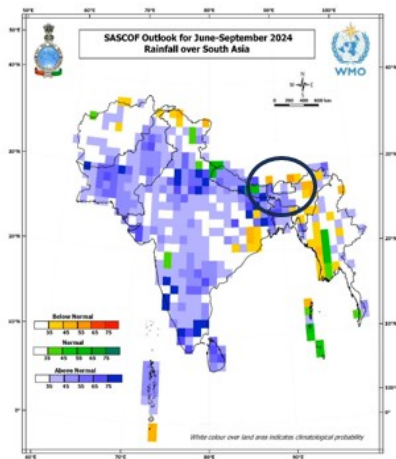
Climate Service Resources

Seasonal Outlook tool-CPT

SASCOF OUTLOOK

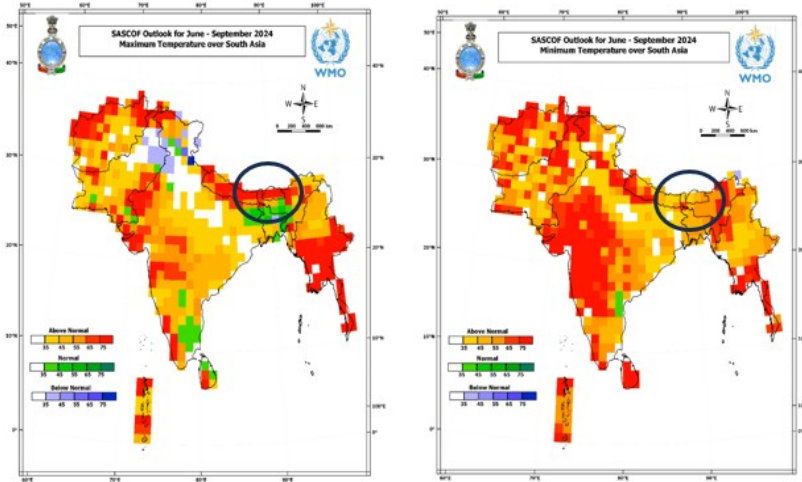
(i) Precipitation

The precipitation outlook for JJAS 2024 was issued as slightly above normal

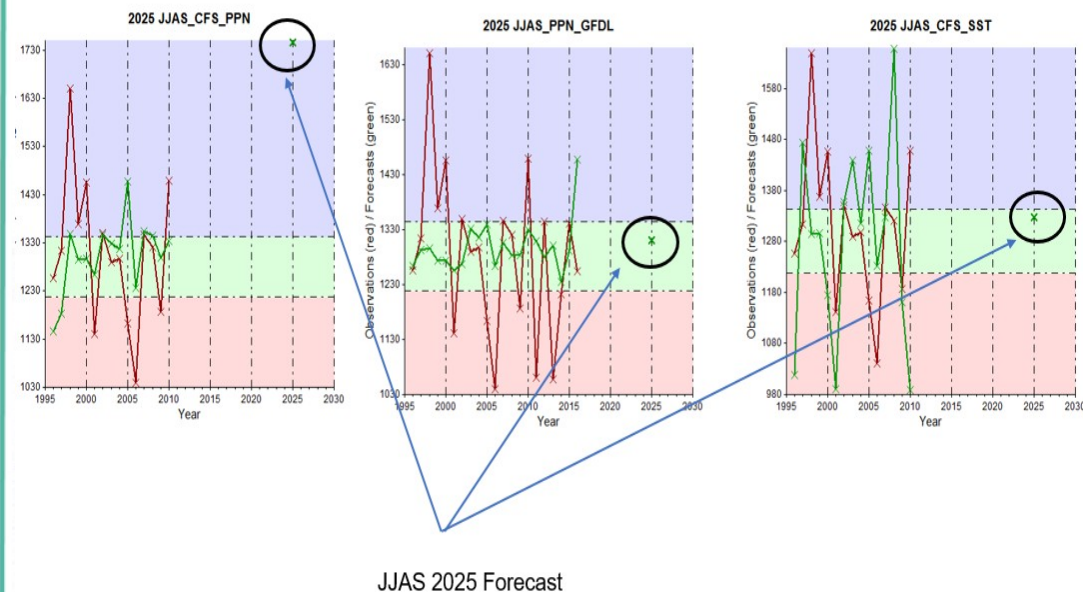


(ii) Temperature

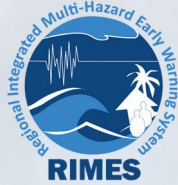
The maximum and minimum temperature outlook for JJAS 2024 was issued as above normal



(i) Precipitation



Considering CPT GCMs and station data, the forecast is slightly above normal precipitation over the region

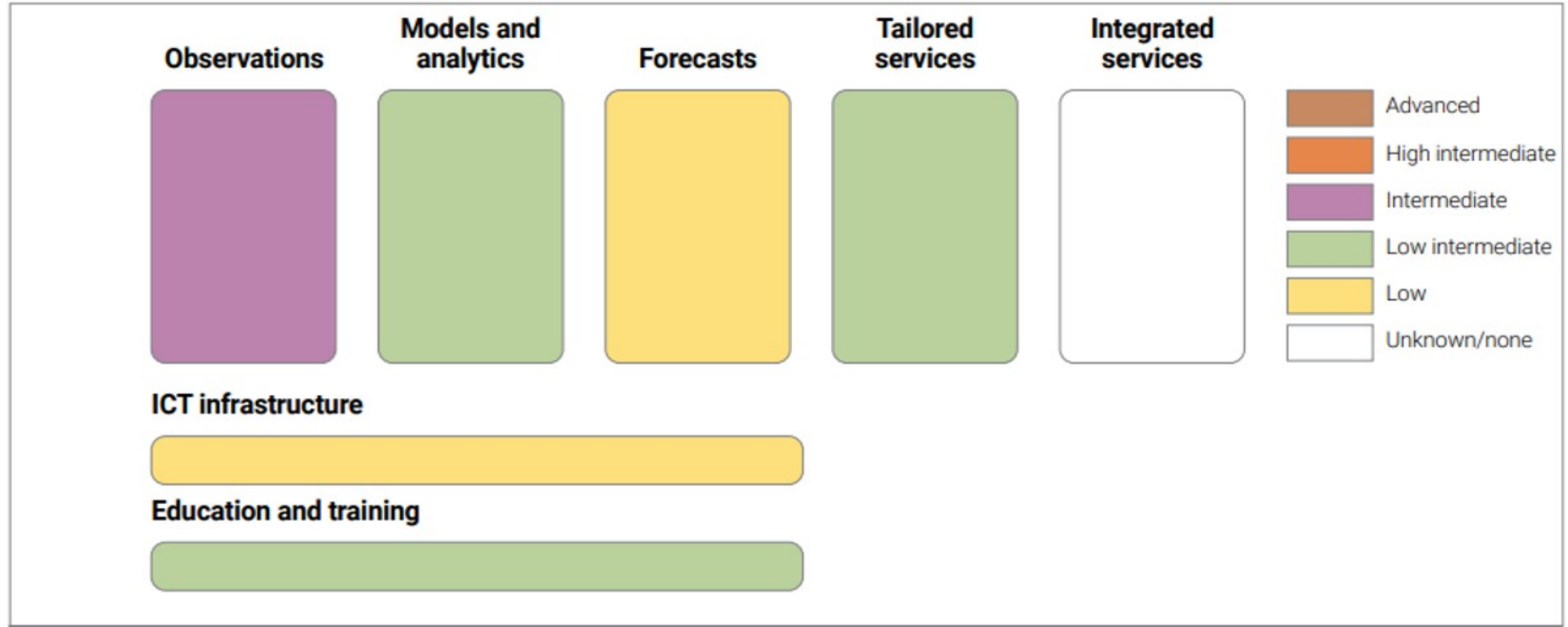


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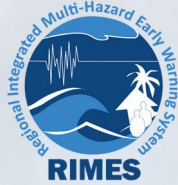
CAPACITY AND GAPS

National Framework for Climate Services (NFCS)



Key challenges and gaps

- Lack of technical capacity develop climate services
- Lack of skills for sector specific climate services
- Lack of infrastructure (Observation systems, Data management systems, ICT systems, modelling systems)
- Lack of modeling capacity



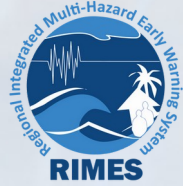
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EXPECTATIONS FOR SAHF CS WG

Key challenges and gaps

- Operationalize S2S forecasting
- Knowledge sharing
- Capacity building and trainings
- Access to regional products
- Access to data portals
- Assist to access to global funds



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THANK YOU!