NATIONAL ADAPTATION PLANS (NAPS)

BHUTAN

Wangdi Phuntsho
National Environment Commission
Bhutan
Outline

1. Assessment of climate change scenarios
2. Overview of Bhutan’s Vulnerability to Climate Change
3. Implementation of the National Adaptation Plans at the national level for various sector;
3. Best practices and challenges in implementing the assessments
Assessment of climate change scenarios

- Bhutan has limited meteorological records in terms of historical record or spatial coverage to provide adequate baseline assessment of climate.
- However an analysis of observed data from 2000-2009 shows an increasing trend for both maximum and minimum temperatures but no apparent trends in precipitation pattern.
- For the climate change impacts studies, the normal convention is to use 30 year time slices.
- The data was simulated for 3 climate scenarios viz. 1980-2009 (as baseline), 1980-2009, 2010-2039 and 2040-2069 using PRECIS (Providing Regional Climates for Impact Studies). (Second National Communication to the UNFCCC, 2011)
Contd.

• The downscaled climate change scenarios (22km resolution) prepared in PRECIS were piloted by two Global Circulation Models (GCMs) viz. German ECHAM5 A1B (European Center Hamburg Model) and the British HadCM3Q0 A1B (Hadley Centre Coupled Model) covering the period 1980-2069.
2 future climate scenarios using PRECIS models

<table>
<thead>
<tr>
<th>Projected years</th>
<th>Scenarios</th>
<th>Increase in mean annual temp. (°C)</th>
<th>Increase in mean monsoon seasonal temp. (°C)</th>
<th>Increase in mean Winter seasonal temp. (°C)</th>
<th>Mean total annual Precipitation (%)</th>
<th>Decrease in winter precipitation (%)</th>
<th>Increase in summer precipitation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010 - 2039</td>
<td>ECHAM5/A1B</td>
<td>~0.8</td>
<td>Little or no diff. between annual and seasonal temperatures</td>
<td></td>
<td>~6</td>
<td>~2</td>
<td>4-8</td>
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<tr>
<td></td>
<td>HadCM3 Q0/A1B</td>
<td>~1.0</td>
<td>~0.8</td>
<td>~1.2</td>
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<td></td>
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<tr>
<td>2040 - 2069</td>
<td>ECHAM5/A1B</td>
<td>~2.0</td>
<td>Little or no diff. between annual and seasonal temperatures</td>
<td></td>
<td>~25</td>
<td>Projects more precipitation in monsoon season compared to winter season</td>
<td></td>
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<tr>
<td></td>
<td>HadCM3 Q0/A1B</td>
<td>~2.4</td>
<td>~2.1</td>
<td>~2.8</td>
<td>~21</td>
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Bhutan’s Vulnerability to Climate Change
Fragile mountainous landscape

landlocked & least developed country
Heavy dependence on climate sensitive sectors

Low level of economic diversification

Agrarian society (69% of population)

Large investments in hydropower
Large areas of glaciers and glacial lakes (677 glaciers and 2674 glacial lakes)
Current Vulnerabilities

• Glacial Lake Outburst Floods
  – due to temperature rise

• Land Degradation
  – Landslides, erosion due changes in weather patterns, high intensity rainfall, cyclones

• Flashfloods
  – Intense rainfall periods, cyclones
Current Vulnerabilities

• Droughts
  – Drying water sources due to temperature rise, longer intervals between rains

• Wind and Thunder storms

• Pests and diseases
Potential impacts of climate change in Bhutan

Agriculture:
80% of the Bhutanese practice subsistence farming. Climate Change can cause changes in temperature and precipitation patterns and increase the vulnerability of a large group of this population.

Forests & Biodiversity:
Increasing temperatures may cause species and ecosystems to shift and species at higher elevations and other species unable to migrate to become extinct.

Water Resources:
Changes in the hydrological cycle such as lower winter flows in streams and intense monsoon rains may affect drinking water and supplies as well as hydropower generation.

Natural Disasters:
Rapidly retreating alpine glaciers is increasing the risk of 'glacial lake outburst floods' endangering life and property downstream. Increasing flash floods may also be caused by intensifying.

Human Health:
Rising temperatures may cause the spread of tropical diseases and heat stress into higher altitudes.
Implementation of the sector wise adaptation plans
• In the SNC to UNFCCC document, sector wise adaptation plans are categorized into short term, medium term and long term.

• Bhutan prepared its National Adaptation Program of Action (NAPA) in 2006 and is now implementing few of the priority actions identified as urgent and immediate needs.

• For the medium to long term, Bhutan views the process to formulate and implement National Adaptation Plans (NAPs) as an important means towards reducing vulnerability by both integrating climate change adaptation into national development planning and also implementing priority adaptation actions on the ground.
1st NAPA implementation project
Addressing Threats of GLOF from Thorthormi Tsho in Punakha - Wangdi Valley
Lunana Lake Complex

- Thin & unstable Barrier (32.5m)
- Ice core barrier
- Water level difference between Rapstreng & Thorthormi (74m)
- Sheer size of Thorthormi glacier (3.4 sq.km)
First NAPA Project funded by LDCF

Reduction Climate Change-induced Risks and Vulnerabilities from Glacial Lake Outburst Floods in the Punakha-Wangdi and Chamkhar Valleys

Three Components

1. Artificial lowering of water level in Thorthormi Lake
2. Increase capacity for disaster risk management in affected valleys
3. Installing Technical Early Warning System for glacial lake outburst floods
Lowering water level of Thorthormi Lake
Early Warning System & Disaster Preparation
24 Other potentially dangerous glacial lakes
2nd NAPA implementation Project

Addressing the Risks of Climate Induced Disasters through Enhanced National and Local Capacity for Effective Actions

$11.4m (2014-2017)

Coordinated by: NECS
Implemented by: Phuentsholing thromde, Mongar Dzongkhag,
Tarayana, WRCD/NECS, DDM/MOHCA,
FRMS/ MOAF, DHMS/MOEA
2nd NAPA implementation Project

Outcome 1:
Risk from Climate-induced floods and landslides reduced in Bhutan’s economic and industrial center, Phuentsholing and Pasakha Industrial Area.

Outcome 2:
Community resilience to climate-induced disaster risks (droughts, floods, landslides, windstorms, forest fires) strengthened in at least four Districts.

Outcome 3
Relevant information about climate-related risks and threats shared across development sectors for planning and preparedness on a timely and reliable basis.
Adaptation plans in INDC

• The Kingdom of Bhutan communicated its Intended Nationally Determined Contribution (INDC) to the UN climate change secretariat in Sept., 2015.

• Since the intended actions in the INDC apply to the post 2020 period, the priority mitigation and adaptation actions within this INDC will be considered and integrated in the preparation of the 12th Five Year Development Plan (2018-2023) and also subsequent five year plan periods.
Best practices

• All the activities under NAPA I project are successful and considered as best practices.
Challenges

• Limited climate change scenarios
• Limited Meteorological data
• No expertise on climate modeling
• Financial constraints for implementation of adaptation priorities identified in various sectors.
Some of the undergoing climate change related projects in Bhutan

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<tr>
<th>SL No.</th>
<th>Projects</th>
<th>Source</th>
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<tbody>
<tr>
<td><strong>Agriculture</strong></td>
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<tr>
<td>1</td>
<td>Climate Change Adaptation in the RNR sector -CoRRB-Secretariat</td>
<td>EU GCCA</td>
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<td>2</td>
<td>Climate change adaptation potentials of forests in Bhutan – building human capacities and knowledge base BC-CAP-Department of Forests &amp; Park Services</td>
<td>Austria (University of Natural Resource and Life Science – BOKU)</td>
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<td>3</td>
<td>Comprehensive assessment of climate change impacts on endemic plant diversity - National Biodiversity Center</td>
<td>BTFEC</td>
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<td>4</td>
<td>Climate Change Adaptation in Himalayas (HIMALICA Pilot project) - Tsirang Dzongkhag.</td>
<td>ICIMOD</td>
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<td><strong>Metrological Information</strong></td>
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<td>5</td>
<td>Institutional Strengthening &amp; Setting up of GLOF Early Warning and Rainstorm Flood Forecasting in Mangdechhu and Chamkhar Basin Project</td>
<td>JICA</td>
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<tr>
<td>6</td>
<td>Strengthening of hydro-meteorological services for Bhutan (2013-16).</td>
<td>Ministry of Foreign Affairs, Finland</td>
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<td>7</td>
<td>Cryosphere Monitoring Program (2014-2018). The project aims to increase the understanding of the climate cryosphere water nexus in Bhutan Himalaya.</td>
<td>Government of Norway/ICIMOD RGOB</td>
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<td><strong>Disaster Risk Management</strong></td>
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<td>8</td>
<td>Time Series monitoring of glaciers and glacial lakes in Bhutan Himalayas (To see changes in glacier retreat and lake expansion).</td>
<td>RGOB</td>
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<td>9</td>
<td>Local Climate Adaptive Living Facility (LoCAL) (Enhancing community resilience and adaptive capacity for climate change at the local level)</td>
<td>UN Capital Development Fund (UNCDF)</td>
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<tr>
<td><strong>Health</strong></td>
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<td>10</td>
<td>Piloting Climate Change Adaptation to protect human health.</td>
<td>SCCF</td>
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<td><strong>Cross Sector</strong></td>
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<td>11</td>
<td>National Adaptation Programme of Action (NAPA II)</td>
<td>LDCF</td>
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THANK YOU