National Adaptation Plan (NAPs)  
BHUTAN  

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Bhutan
Climate of Bhutan

Legend
- Wet Sub-tropical
- Humid Sub-tropical
- Dry Sub-tropical
- Warm Temperate
- Cool Temperate
- Alpine
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
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

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

- Wind and Thunder storms
- Pests and diseases
Potential areas 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.

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.

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.

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.
Past and ongoing Adaptation Activities

- National Adaptation Programme of Action (NAPA)
  - NAPA I project (completed in 2013)
  - NAPA 2 Project (ongoing)
  - NAPA 3 Project (PIF approved)

- Vulnerability Assessment and medium-long term adaptation needs in Second National Communication to UNFCCC

- Second Technology Needs Assessment on Adaptation

- Several climate change adaptation projects implemented by various sectors
NAP Process

• Ideas and experience from the LEG Workshop in Yangon, Myanmar in August 2015

• Bhutan’s NAP (status, plans and programmes)
1. Scoping the NAP Process
2. Stakeholder and Actor Mapping

• Stocktaking activities (NAPA, SNC, TNA, CC dialogue)
• Identifying gaps and needs
• Stakeholder Sensitization on NAP
  – Commission (high level cc committee) has been briefed
  – Wider sector/stakeholder informed through climate dialogue
• Stakeholder analysis

Sectors/ministries
Local government
NGO, CSO
Research institutions
Communities
Banks, UN, Bilateral partners
...
3.1 Policy and Institutional Arrangements

- Defining the Mandate
- Integration into planning and M&E tools
- Road map
- Challenges
  - Changing political government
  - Enforcement of the mandate
Development and Bhutan

- Middle Path Strategy
- Vision 2020
- Plans to develop a Policy/strategy on Climate change
- Adaptation & NAPs are part of Bhutan’s INDC
3.2 Development first systems approach

- Identified sectors that are main drivers of your development

**Hydropower**
- Run-of-river type
- Export of electricity: ~42% of GDP
- Export to India, winter season needs import
- 1606 MW installed capacity

**Agriculture**
- Goal: prioritize self-sufficiency
- 60% population livelihood
- Mostly rain-fed
- Crops: rice, wheat, maize...
- Livestock are important as a source of milk, meat, and draft power

**Tourism**
- Policy: “high value, low impact” tourism
- ~40% of GDP: government tax
- Peak seasons: spring & autumn
- Mostly by air

**Water**
- Glacier, river, streams
- Centralized water supply system
- Streams dry up
- GLOFs
3.3 Climate risk

- Past and current climate risks
- Future climate projects and risk
- V&A assessments
### Key vulnerabilities of the sectors & Adaptation Options

<table>
<thead>
<tr>
<th>Vulnerability</th>
<th>Adaptation options</th>
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</thead>
<tbody>
<tr>
<td>Run-off variability (input to hydro production)</td>
<td>- Build/expand reservoir capacity</td>
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<td></td>
<td>- Stepwise generation</td>
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<tr>
<td>Energy availability to local users due to competing uses when production limited</td>
<td>- Demand side management: energy efficiency</td>
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<td></td>
<td>- Diversify energy sources, e.g.: solar, biomass</td>
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<td>High maintenance costs due to siltation damage on turbines</td>
<td>- Siltation ponds/dams</td>
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<td></td>
<td>- Regular maintenance</td>
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<td>- SLM</td>
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<tr>
<td>Limited air access</td>
<td>– Increase access through more airport and flights</td>
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<tr>
<td>Vulnerable infrastructure (roads)</td>
<td>– Landslide mitigation</td>
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<td></td>
<td>– Ropeway</td>
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<td></td>
<td>– Climate resilient bridge design</td>
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<tr>
<td>Number and demographic of tourist due to increase health risk from VBDs and tele-connection</td>
<td>– Vector surveillance rapid response</td>
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<tr>
<td>Natural &amp; cultural heritage</td>
<td>– Awareness preparations</td>
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<tr>
<td></td>
<td>– EBA, conservation of biodiversity</td>
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<td></td>
<td>– Disaster risk management</td>
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<td>Farmer livelihood at risk</td>
<td>– Insurance (risk sharing)</td>
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<tr>
<td>from disrupted production</td>
<td>– Diversify livelihoods</td>
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<td></td>
<td>– Selection of crops variety</td>
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<td>– Provide Extension and services</td>
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<td></td>
<td>– R&amp;D and outreach on input factors</td>
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<td></td>
<td>– incentives</td>
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<td>Loss of production</td>
<td>EbA/CbA</td>
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<td>– Water: introduce irrigation and water storage technology</td>
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<td></td>
<td>– Cropping system: crop rotation</td>
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<td></td>
<td>– Development of drought resistant and pest resistant varieties</td>
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<tr>
<td></td>
<td>– arable land available: agroforestry, land use policy/planning (zoning and tenure)</td>
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4. Appraisal and Visioning

- Development pathways
- Multi Stakeholder consultation
- Appraisal and ranking of adaptation (eg. MCA)
- Implementation

Challenges:
- Envisioning the different development pathways
- Buy in from politicians to implement adaptation options
- Funding for implementation
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- Criteria
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- Prioritization Process Report
- Tools used (Models, Survey, Appraisal Results)
- Maps
- Case studies
- Roadmap for NAP Process
- Methodology
- Detailed analysis of the VNA
- Sources of Data

### REFERENCES

- MDC / SDC
- National Policies, Plans, Regulations
- NAPs Guideline
- VA Report
- National Communication
- INDC
- IPCC Report / Country Assessment Report
- National Climate Change Strategy
- NAPA, LAPA Document
- National Development Plan
- Other climate change [reports?] and related policy
- National plans