Bhutan's Experience on Water & Climate Change

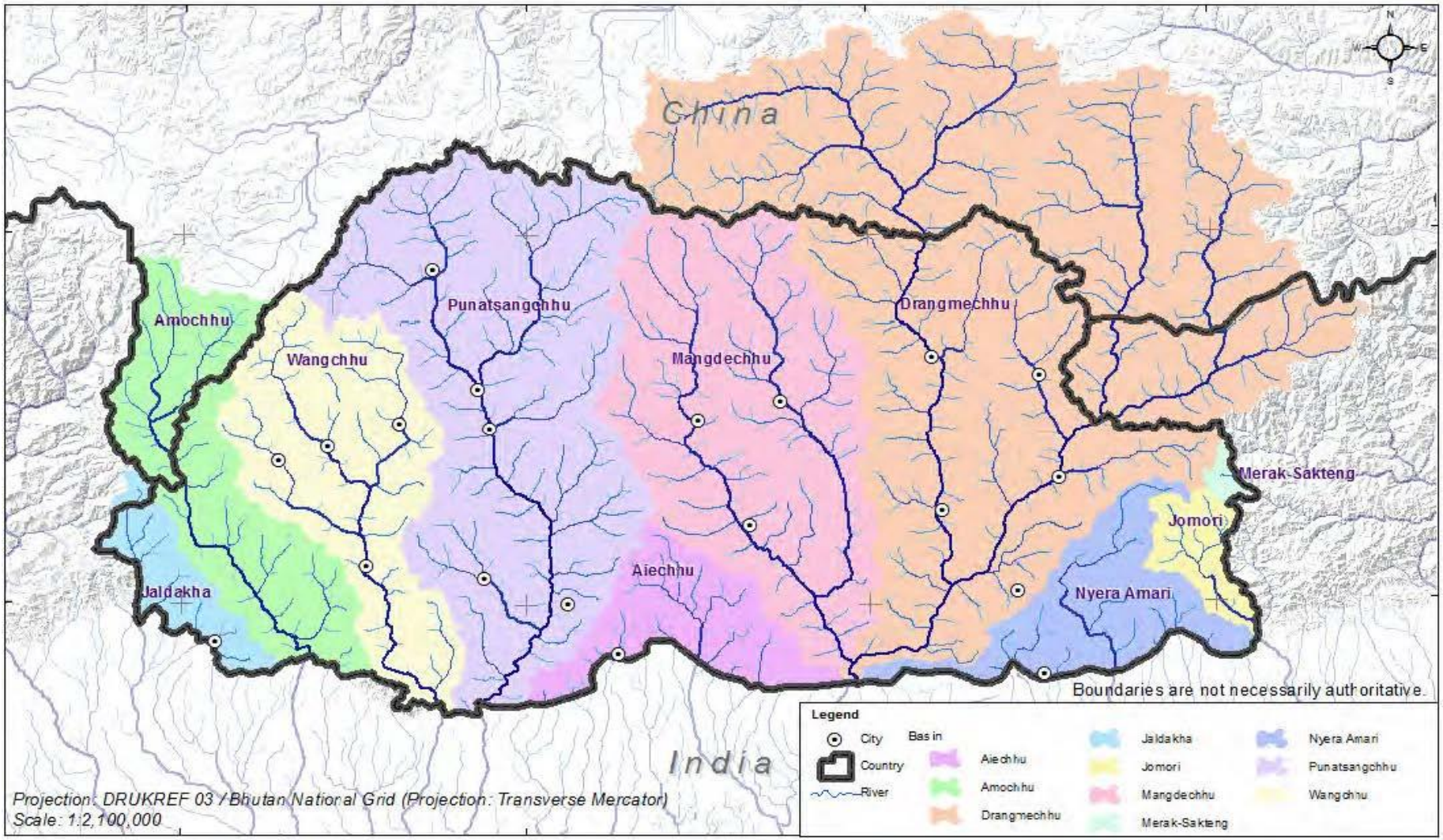
NAP Regional, EXPO

11 September, 2017

Presentation Outline

- Water System in Bhutan
- Bhutan's Vulnerability to Climate Change
- Climate Change Scenarios for Bhutan
- Adapting/Solutions to Climate Change
- Status of Bhutan's NAP
- Next steps

Water System in Bhutan



- Water resource availability per capita is 94500 m3/capita/annum
- Most of the River system is fed by glacial melt and rainfall (2-12%), snow melt 2%
- Total annual flow of Water is 70576.01 MCM

Bhutan's Vulnerability to Climate Change

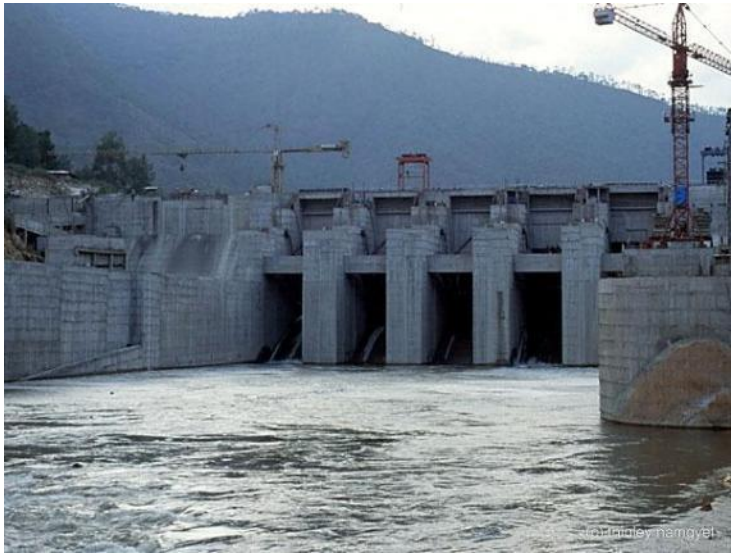
fragile mountainous landscape

landlocked & least developed country

Heavy dependence on climate sensitive sectors

Low level of economic diversification

Agrarian society
(69% of population)

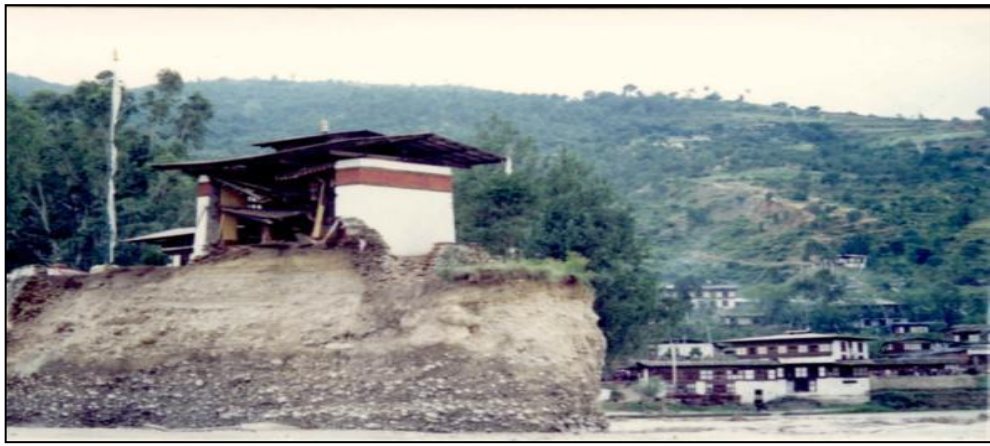


Large investments in hydropower

Large areas of glaciers and glacial lakes

Key Vulnerabilities

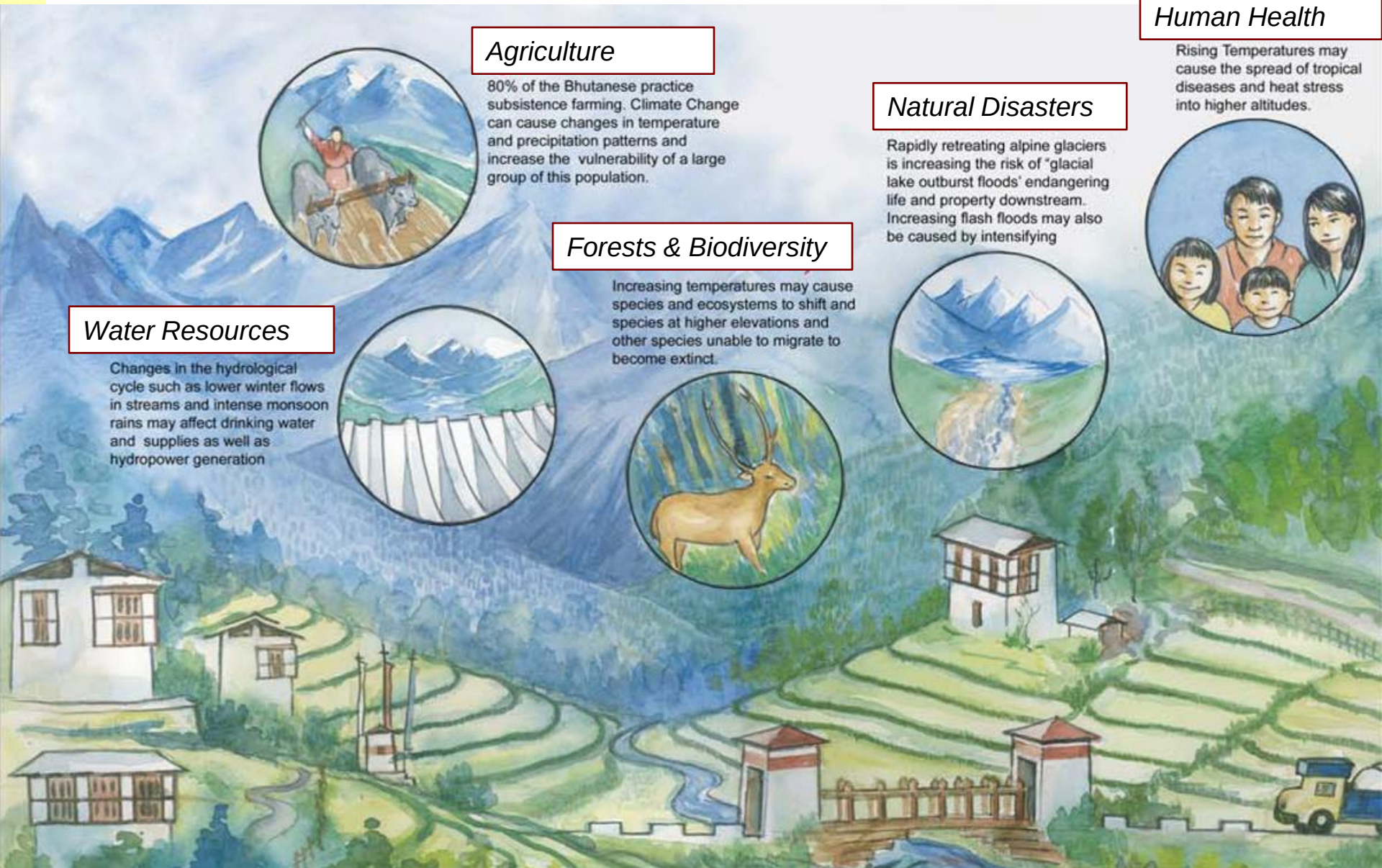
- Glacial Lake Outburst Floods
  - due to temperature rise
- Land Degradation
  - Landslides, erosion due changes in to weather patterns, high intensity rainfall, cyclones
- Flashfloods
  - Intense rainfall periods, cyclones



Current Vulnerabilities

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

Potential areas impacts of climate change in Bhutan



- Climate Change Scenarios

- Based on Chapter 4 (Vulnerability and Adaptation) of Second National Communication to UNFCCC

Generating climate change scenarios using PRECIS

- Scenarios based on:
  - A1B emissions scenario (Middle emissions projection)
  - 2 GCMs
    - ECHAM5
    - HADCM3
- Temperature and Rainfall
  - Annual mean
  - Monsoon mean
  - Winter Mean
- Time slices
    - 1980-2009 (synthetic baseline)
    - 2010-2039
    - 2040-2069

Summary of Climate Change Projections

Temperature changes compared to present (1980-2009)

- Annual Mean temperatures:
  - Increase of ~ 0.8 ^{o}C - 1.0 ^{o}C by 2010-2039
  - Increase of ~ 2.0 ^{o}C - 2.4 ^{o}C by 2040-2069

- Summer/monsoon season temperatures:
  - Increase of up to ~ 0.8 ^{o}C by 2010-2039
  - Increase of up to ~ 2.1 ^{o}C by 2040-2069

- Winter season temperatures:
  - Increase of ~ 1.2 ^{o}C by 2010-2039
  - Increase of ~ 2.8 ^{o}C by 2040-2069

Summary of Climate Change Projections

Rainfall Changes compared to present (1980-2009)

Annual Mean rainfall:

- Increase of ~ 6% by 2010-2039
- Increase of ~ 21% by 2040-2069

Seasonal changes:

- Summer are wetter for both future periods
- Winters will be drier in 2010-2039 and increasing slightly in 2040-2069

Adapting/Solutions to Climate Change

First NAPA Project funded by LDCF

Reducing 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

1st NAPA implementation project

Addressing Threats of GLOF from Thorthormi Tsho in Punakha - Wangdi Valley

Lowering water level of Thorthormi Lake

Early Warning System & Disaster Preparation

NAPA 2 Project Details

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 dzongkhags

Outcome 3:

Relevant information about climate-related risks and threats shared across development sectors for planning and preparedness on a timely and reliable basis

Other sector projects

- RNR sector support
  - Sectoral Adaptation Program of Action (SAPA) to “Enhance the resilience of Bhutan's rural households to the effects of climate change” (EU GCCA project)
- 3rd NAPA project has been approved for financing
  - Focus on market and food security and biodiversity conservation
  - From LDC Fund
- MOEA
  - Many projects to Dept of Hydromet Services to improve weather forecasting and early warning for users
  - GLOF and landslide projects with DGM and DHMS
- MOH
  - Assessment of health risks from climate change
  - Vector monitoring program
- Research institutes
- DLG
  - LoCAL (Local climate adaptive living facility) adaptation programs at the local level

Policy and Legal instruments

- **National Integrated Water Resource Management Plan 2016**

  -To ensure water resource is protected/conserved & managed in economically efficient, socially equitable and environmentally sustainable manner

- **Bhutan Water Security Index 2015**

  - **Five key dimensions :**

  1.Rural drinking water supply, sanitation and hygiene,

  2. Economic water supply for agriculture, industries and hydropower,

  3. Urban water supply, sanitation and drainage,

  4. Environmental water security,

  5. Disaster and climate change resilience.

- integration of these dimensions into the national key result areas(NKRAs) in the12th FYP and program.
- Formation of River Basin Committee

  -Wangchhu Basin Committee formed

  -Wangchhu Basin Management Plan, 2016

  - Proper management of water resources within the basin

Status of Bhutan's NAP

- NAP was launched in May 2015 during a stakeholder consultation workshop "*Dialogue on Climate Resilient and Carbon Neutral Development*"
- CCD,NECS to take the lead on NAP development as per directives from NEC meeting held in February 2016
- NAP road map was presented and discussed during the workshop on "*Advancing Action on Climate Change for National Priorities and*

- International Obligation” held on 4th March 2016.
- NAP stakeholder consultation workshop held in June 2016 to validate draft proposal for NAP preparation
- Preparation of NAP readiness proposal (USD 3 million) is ongoing with support from UNDP to access Green Climate Fund (GCF)

What Next?

Future plans

3rd National Communication from Bhutan to UNFCCC (TNC)

- More focus on vulnerability and adaptation assessment (V&A) at the community level
- Climate change scenarios + socio economic scenarios
  - "Future climate + future society"

- Expect to have better information from
  - local level vulnerability information through water inventory and district level collaborators
  - Better climate scenarios from investments in National Centre for Hydrology and Meteorology, Bhutan

Future plans

- A NAP Readiness Proposal for USD 3 million under GCF is currently under preparation.
- Four key outputs:
  1. National Mandate, strategy and mechanisms in place and gaps are addressed.
  2. Preparatory elements are in place
  3. Develop a NAP and enhance adaptation planning
  4. NAP implementation and monitoring facilitated

- Output 3 will focus on a comprehensive risk management in the water sector including preparatory work for adaptation projects in the water and water dependent sectors

THANK YOU