



# Status of Technology Needs of Bhutan

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# Presentation Outline



1. Climate Technology Status and Challenges
2. Climate Technology Needs
3. Climate Technology National Policies and Plans
4. Climate Technology Cooperation and Challenges
5. Climate Technology Desired Project (1-3)





# 1. Climate Technology Status and Challenges

- Bhutan's Technology Needs Assessment (2013)
  - Technology for Adaptation prioritized (sector)
    - Three technologies under each sector
  - Technology for Mitigation prioritized (sector)
    - Three technologies for each sector
- Bhutan's INDC
  - Technology needs identified for both Adaptation and Mitigation
- Bhutan' NAMA on Transport, Waste and Energy Efficiency in building



## Rich Biodiversity :

- 300 species of medicinal and aromatic plants including 105 endemic species;
- 46 species of Rhododendrons;
- 200 species mammals (27 species globally threatened and 8 cat species found in Bhutan)



# Iconic Species : Radio collaring.



*Snow Leopard*



*Bengal tiger*



*Takin*



*Elephant*



# High altitude birds



*Tibetan Snow Cock*



*Snow Partridge*



*Monal Pheasant*



*Blood Pheasant*



# Challenges



- Appropriate technologies
- Cost details and information
- Funding for technology development and technology transfer
- Lack of details on technology supplier and credibility
- Adaptation technologies are scarce and difficult

# Signs and Symptoms of Climate Change (threats)



- Glaciers retreat: 8-10 m/year for debris free glaciers and 30-40m/year debris covered (2674 glacial lakes, 1994 GLOF);
- Local water sources drying up ( 10 to 15 % of water from glaciers/lakes);
- Pests and diseases out break: Rice blast, northern corn blight ( 50 % of the harvest lost for mid altitude);
- Frequency of localized windstorms and hailstorms increasing ( 367 acres affected in 2015) ;
- Frequent flash floods and landslides ( 2004 flood in the east, 2016 flood south).



# Farming System : Irrigated Paddy Fields



**Pressure from Urbanization.. In harmony with nature..**



# Dry land farming constitutes around 70% of farming system

- High risk of soil erosions





## 2. Technology Needs

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- Bhutan's TNA and submitted to UNFCCC in March 2013
- Bhutan's INDC
- Bhutan TNA and Action
  - Sector prioritization
  - Technology prioritization
  - Technology Action Plans for prioritized technologies
  - Project Ideas

# Glaciers retreating at an alarming rate...



**Glaciers at the base of Jomolhari Mt.**



**Glaciers not detached from glacial lakes...**





# Air pollution

## Transboundary pollution



## Localized pollution



# Water Pollution : Sediment loads



# Waste accumulation



## Dumping of waste



## Thimphu Landfills

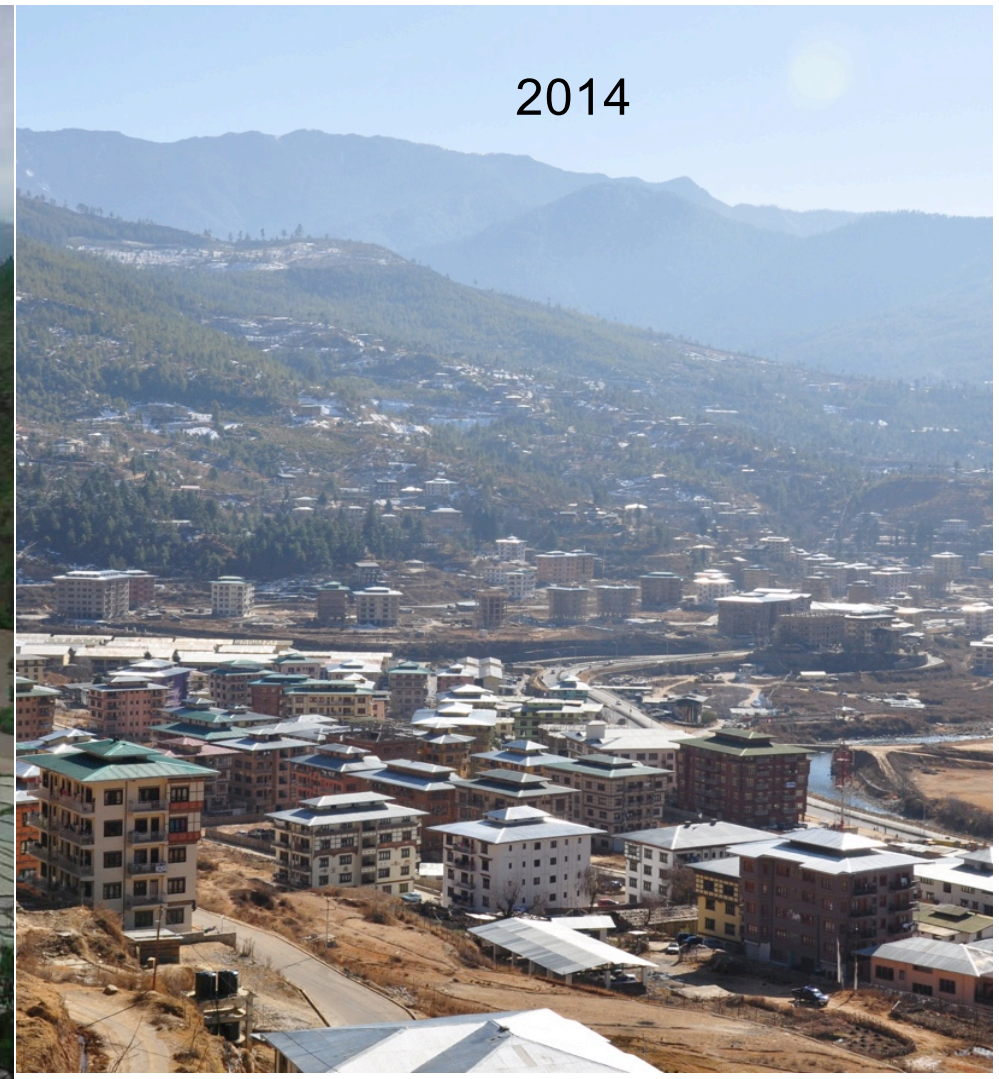


# Poor energy efficiency...heat lost..





# Thimphu, capital city: Sealing of land surfaces with concrete structures..





# Project Ideas for TAP: Adaptation

- **Technology Action Plan for Agriculture Sector**
  - Action Plan for Drought and Pest Resistant Varieties of Crops
- **Technology Action Plan for Water Resources Sector**
  - Action Plan for Drip and Sprinkler Irrigation Systems
- **Technology Action Plan for Natural Resources and Infrastructure Sector**
  - Action Plan for Climate Resilient Farm Roads



# Project Ideas for TAP: Mitigation

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- **Technology Action Plan for Solid Waste**
  - Action Plan for Composting
- **Technology Action Plan for Transport**
  - Action Plan for Intelligent Transport System
- **Technology Action Plan for Industries**
  - Action Plan for Waste Heat Recovery Technology

# 3. Climate Technology National Policies and Plans



- No Specific policies on climate technology
- Relevant Climate Change policies, plans and others
  1. Gross National Happiness philosophy
  2. National Environment Strategy, “the Middle Path”
  3. Economic Development Policy
  4. Five Year Plan
  5. Carbon Neutral Strategy
  6. Low Carbon Development Strategy (ongoing)
  7. INDC
  8. Second National Communication

# Climate Technology National Policies and Plans



- Some other sector relevant policies and laws:
  - Bhutan Sustainable Hydropower Development Policy 2008
  - Bhutan Water Policy 2003
  - Biodiversity Action Plan for Bhutan 2009
  - National Action Programme to combat Degradation 2009
  - National Adaptation Programme of Action for Climate Change
  - National Forest Policy 2011
  - National Irrigation Policy 2011
  - National Framework for Organic Farming 2007



## 4. Climate Technology Cooperation

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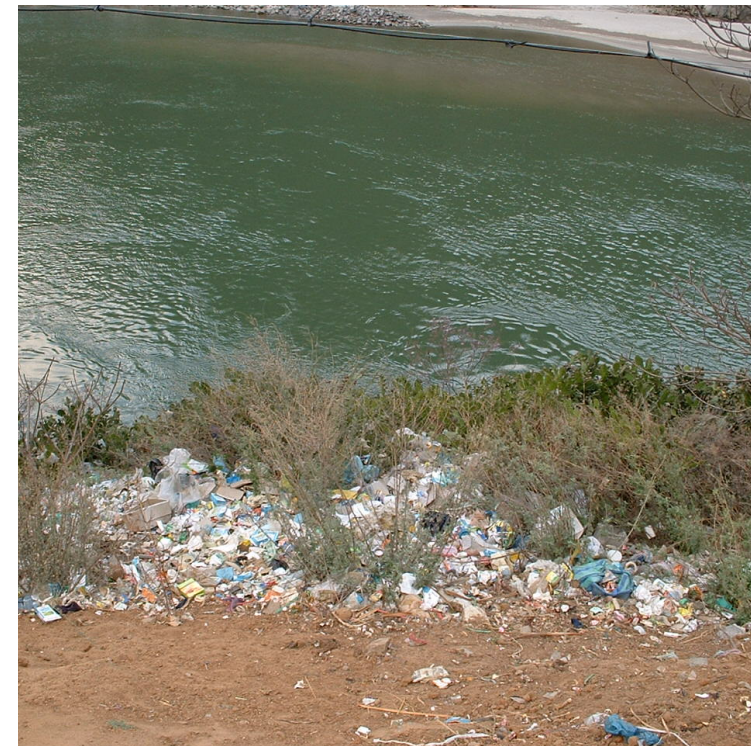
- International cooperation (UN, Bilateral, Multilateral, Regional)
- UNFCCC- CTCN
- South-South Cooperation (GTC, South Korea NDE and Thailand NDE)
- NDE to NDE
- Knowledge sharing and capacity building (key)

# 5. Climate Technology Desired Project (1-3)

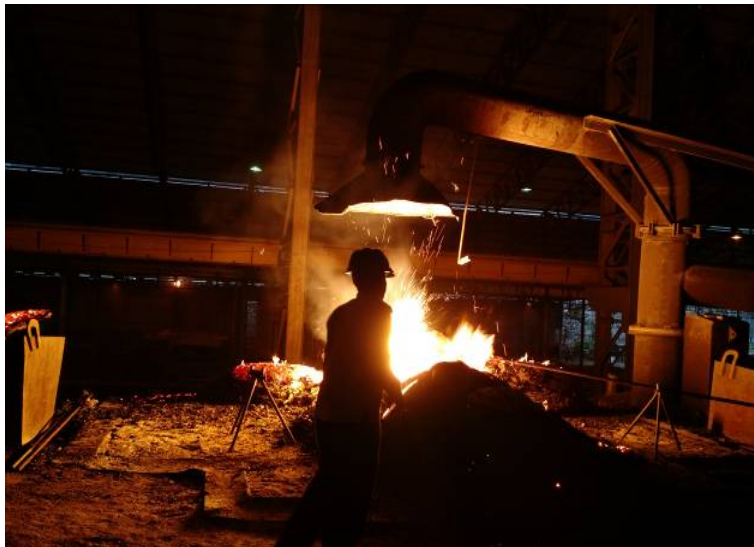


Strongly based on INDC and TNA/TAP

1. Industries
2. Waste
3. Transport
4. Energy efficiency in building



# Waste Heat Recovery in industries





# Watershed...water...landslide, soil erosion, flood protection







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# Thank you for your kind attention

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