

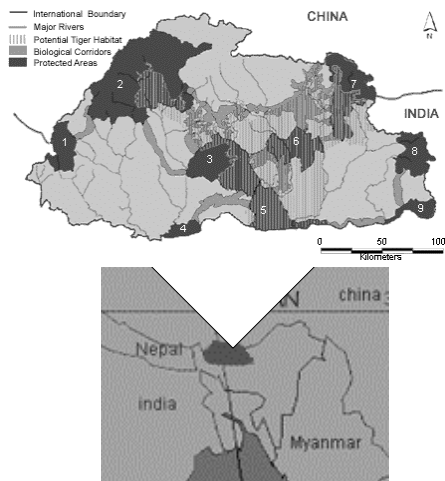
Local Coping Strategies and Technologies for Adaptation to Climate Change: Bhutan

Thinley Namgyel
National Environment Commission
Royal Government of Bhutan



Bhutan

- Located in Eastern Himalayas
- Area : 38,394 km²
- Population: 800,000 (2002 estimate)





Bhutan Vulnerability

- Agrarian population
 - 80% of population
 - 32.9 of GDP

- Water Resources
 - 10% of GDP
 - 30,000 MW potential power generation



Bhutan Vulnerability



- Forests and Biodiversity
 - 70% forest
 - high diversity - Eastern Himalayan hotspot

- Natural Disasters
 - Glacial Lake Outbursts Floods
 - Landslides

- Human Health
 - Increase in tropical diseases and heat stress



Impacts and Measures

- **Agriculture:**
 - Migration of agro-ecological zones to north and higher altitude
 - Vulnerability to increase in pests and erratic precipitation

 - *Research centers and farmer collaboration for developing and testing new varieties*
 - *Eg. High altitude rice*
 - *Forecasting and early warning for local weather*



Impacts and Measures

- **Water Resources & Forests**
 - Streams and small rivers are sources for irrigation, drinking water, hydroelectricity
 - Rivers and streams charged by monsoon rains, winter snows and glaciers.

 - *Strong policy of forest protection*
 - *Community awareness and participation in watershed management*
 - *Eg protection of communal springs and watersheds*





Impacts and Measures

- Glacial Lake Outburst Floods
 - 24 potentially dangerous lakes
 - Last flood in 1994

 - *Lowering lake levels*
 - *Early warning systems*
 - *Risk assessment & mapping*



Conclusion

- Use and support existing mechanisms
 - Farmer - researcher cooperation
 - Adopting new techniques/technologies
- Improved technologies to support existing mechanisms
 - Research funds, new techniques
 - Early warning technologies
- Awareness and ownership important for community participation
 - Forest and watershed protection



Tashi Delek



www.nec.gov.bt