



INTELLECTUAL PROPERTY DIVISION
MINISTRY OF ECONOMIC AFFAIRS
ROYAL GOVERNMENT OF BHUTAN

CLIMATE CHANGE AND TECHNOLOGY NEEDS

BHUTAN

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Content

- Background
- Impact of Climate Change
- Technology Needs Assessment
- Initiatives on Climate Change mitigation
- Constraints



BACKGROUND

- Environment preservation one of the four pillars of Gross National Happiness (GNH)
- UNFCCC, 1995
- National Environment Strategy, 1998
- National Environment Act, 2000
- Initial National Communication, 2000
- Kyoto Protocol, 2002
- National Environment Commission
- National Adaption Programme of Action
- Second National Communication, 2011



BACKGROUND

- Convention on Biological Diversity
- Sustainable Development Agreement with the Netherlands, Costa Rica and Benin
- South Asia Cooperative Environment Program (SACEP)
- Tenth Plan (2008 – 2013) identifies Environment as a cross-cutting issue



IMPACT

Sector/Communities Vulnerability

- Agriculture
 - 70% population depends on subsistence farming
 - Rural poor will be hit hardest
 - Food security
- Water Resources and Energy
 - Monsoon and temperature changes
 - 40% revenue from hydropower
 - Electricity production



IMPACT

Sector/Communities Vulnerability

- Forests and Biodiversity
 - Urbanization and industrialization
 - Population growth and consumption pattern
 - Loss of species, pests and disease
 - Forest Fire
 - Traditional Knowledge



IMPACT

Sector/Communities Vulnerability

- Health
 - Loss of life form from frequent flash floods
 - GLOF and landslides
 - Water and vector-borne tropical diseases
 - Safe drinking water
- Glaciers and GLOF
 - 677 glaciers and 2674 glacial lakes
 - Huge threat of outburst floods



Technology Needs

- Paro Workshop on technology prioritization held on 6-8 Feb, 2012
- Technology priority areas
 - **Industries**
 - Emission of GHG by industrial sector
 - 5 MT (metric tons) of carbon dioxide emitted by other countries.
 - **Meteorological observation system**
 - Scientific and Technical data
 - early warning systems for extreme weather events
 - Glacial Lake Outburst Floods (GLOF)



Technology Needs

— Agriculture

- Huge dependent on subsistence farming
- Most vulnerable to Climate Change

— Energy

- Hydropower
- Renewable energy



Technology Needs

— Top priority technologies

- Micro hydro
- Irrigation methods
- Solar energy technology
- Pest-resistant
- Livestock breeding
- Weather forecast and station



Technology Needs

- GLOF risk reduction such as artificial lowering
- Transport management and mass transit
- Wastewater treatment
- Waste recycle
- Energy efficient construction system



Initiatives

- Paro Resolution on Environment and Sustainable Development (1990)
- National Environment Commission
- Environmental Trust Fund
- National Environment Strategy (1998)
- Fiscal Incentives
 - Grant on R&D as tax-deductible
 - Expenditure on R&D as tax-deductible
 - Venture on ESTs receives income tax rebate of 15%



Mitigation Measures

- Constitutional mandate to maintain 60% of land under forest cover
- In 2009, pledge to remain carbon neutral
- Expansion of hydropower capacity (10000 MW by 2020)
- Incentives for energy saving devices and low emission vehicles



Mitigation Measures

- Use/import of Electric Vehicle – tax free
- Social Forestry Day – tree plantation program
- Cycling tracks
- Sustainable Land Management
- Organic agriculture
- Fuel wood consumption



Mitigation Measures

— Energy Sector

- Hydroelectricity
- Clearer technology
- Promotion of alternative fuels, electric and hybrid technologies

— Agriculture

- Organic and Biogas
- Sustainable Land Management



Mitigation Measures

— Forest

- Sustainable timber production
- Community forestry

— Waste

- Reduction and Recycle
- Public Private Partnership



Major Projects (NAPA)

- Disaster Management Strategy
- Food Security
- Artificial Lowering of Lakes
- Weather Forecasting System
- Landslide Management and Flood Prevention
- Rainwater Harvesting
- GLOF Hazard Zoning
- Early Warning System
- Community based Forest Fire Prevention



CONSTRAINTS

- Economic
- Technical capacity
- Climate change technology literacy
- Meteorological data analysis and infrastructure inadequate
- Awareness
- Low level private sector participation



CONSTRAINTS

Intellectual Property System

- Recent concept and in nascent stage
- Patent protection has just begun (2012)
- Patent Information System
- Licensing Mechanism
 - Transfer of Technology
 - Collaboration
 - Foreign Direct Investment
- Future is challenging and rough

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