Technology Needs Assessments
(A GEF Funded UNEP Project)

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TNA Project Highlights

- TNA Project start date - November 2009
- Selection of 15 countries for the first round – December 2009
- Completion of work by first round countries due in 18 months – June/ July 2011.
- Second round , involving 21 countries launched - October 2010 (Bhutan, part of this 21 countries)
- Submitted to UNFCCC in March 2012

TNA- Project Objectives

- To **identify** and **prioritize**, through **country-driven participatory processes**, **technologies** that can contribute to **mitigation** and **adaptation** goals of the participant countries, while meeting their national **sustainable development** goals and priorities (TNA).

- To identify **barriers** hindering the **acquisition**, **deployment**, and **diffusion** of prioritized technologies.

- To develop Technology Action Plans (TAP) specifying **prioritized technologies**, activities and **enabling frameworks** to overcome the **barriers** and facilitate the transfer, adoption, and diffusion of selected technologies in the participant countries.

Results of sector prioritization- Mitigation

		Economic development priorities	Environment development priorities	Social development priorities	GHG reduction potential	Mean
Sector	Sub-sector	Mean	Mean	Mean	Mean	
Agriculture	Enteric Fermentation	2.8	3.3	3.1	3.6	**12.8**
	Manure Management	3.4	3.5	3.6	3.4	**13.8**
	Agricultural Soils	4.1	3.8	3.7	3.1	**14.7**
Energy sector (Fuel combustion activities)	Manufacturing Industries & Construction **(3)**	4.0	3.7	3.4	4.1	**15.2**
	Transport **(1)**	4.1	3.9	3.4	4.3	**15.6**
Industrial processes	Mineral Products	3.6	3.7	3.2	3.5	**14.0**
	Metal Production	3.6	3.6	3.2	3.6	**13.9**
Waste	Solid Waste Disposal on Land **(2)**	2.9	4.5	4.1	4.0	**15.5**

Results of sector prioritization- Adaptation

	Economic development priorities	Environment development priorities	Social development priorities	Vulnerability reduction potential	Mean
Sub-sector	Mean	Mean	Mean	Mean	
Human health	3.9	3.2	4.1	3.6	**14.8**
Water resources **(1)**	4.5	4.3	4.0	4.3	**17.1**
Agriculture **(2)**	4.3	3.8	4.2	3.8	**16.0**
Forest and biodiversity	3.2	4.2	3.3	4.1	**14.8**
Natural disaster and infrastructure **(3)**	4.0	3.6	4.1	3.8	**15.4**

Technology Needs Assessment

Mitigation & Adaptation

Technology Prioritization

IDENTIFIED TECHNOLOGY OPTIONS FOR THE Transport SECTOR

- Transport Management Systems
- Mass Transit /Public Transport
- Non-motorized Transport

IDENTIFIED TECHNOLOGY OPTIONS FOR THE WASTE SECTOR

Composting

Reduce, reuse, recycle (3 Rs)

Anaerobic digestion/ biogas plants

IDENTIFIED TECHNOLOGY OPTIONS FOR THE INDUSTRIES SECTOR

Construction of energy efficient infrastructure (Energy efficiency in construction)

Improvement in process-related energy efficiency (Cement, iron and steel and ferro alloy industries)

Anaerobic digestion/ biogas plants

Technology prioritization: Adaptation

Identified Sectors		Priority Sectors
Human Health		
Water Resources	⇨	Water Resources
Agriculture	⇨	Agriculture
Forests and Biodiversity		
Natural Disasters and Infrastructure	⇨	Natural Disasters and Infrastructure

IDENTIFIED TECHNOLOGY OPTIONS FOR THE AGRICULTURE SECTOR

- **Agro-forestry**
- Greenhouse farming
- **Development of drought- and pest-resistant crop varieties**
- Climate-resistant productive livestock breeding
- Storage techniques for grains and seeds
- Seasonal weather forecasting system
- Integrated pest management
- Genetic profiling of indigenous crop varieties
- **Sloping Agriculture Land Technology**
- Index-based climate insurance

Priority TECHNOLOGIES FOR THE WATER RESOURCES SECTOR

Water use efficiency methods	Efficient irrigation methods
Rainwater harvesting (for groundwater recharge and run-off control)	Demand side management
Micro/ mini hydel	Rainwater harvesting (rooftop)
Reduction of chemical contamination	Solar (rooftop photovoltaic)
Waste to energy	Biomass
Wind	Soil erosion controls

IDENTIFIED TECHNOLOGY OPTIONS FOR Natural Disasters and Infrastructure SECTOR

- River training works
- Real-time weather stations and multi-range forecasting
- Forest fire management
- GLOF risk reduction
- Climate-resilient roads
- Community-based early warning system
- Climate-resilient engineering and construction of private houses and public buildings

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Development of technology action plan projects

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

- **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

TECHNOLOGY MECHANISM In Bhutan

- CTCN: NDE appointed (National Environment Commission: NDE)
- NDE: Structure

- TAP
  - Transport (Intelligent transport system)
    - Proposal submitted to CTCN
  - Energy: Heat Recovery (preliminary study done)
    - Specific assessment
    - Pilot

Thank you for your kind attention