F R A M E W O R K

to

Mainstream Environment, Climate Change and Poverty (ECP) concerns into the Eleventh Five Year Plan

(2013-2018)

**Gross National Happiness Commission
Royal Government of Bhutan**

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Foreword

The crucial challenges of our time are the increasing environmental issues, concerns with expansion of developmental activities related to urbanization, and climate change due to global warming; which will affect, first and foremost, the poor and vulnerable. The bearing of these issues will impact negatively the country's developmental prospects and the majority of the population, especially the poor who contributed less to these issues and those who depend mostly on environment and natural resources for their livelihood. Thus, it is imperative that environmental and climate change concerns be addressed systematically with the reduction of poverty and enhancement of people's livelihoods. One of the strategies to address these issues is to integrate environmental and climate change considerations, risks and opportunities in the government's decision-making process and developmental plans and programs.

The Constitution requires protection and preservation of our pristine environment, and mandates a minimum of 60% of Bhutan's total area be kept under forest cover for all time. Also in 2009 in the 15th Conference of Parties(CoP) to the United Nations Framework on Climate Change, Bhutan delivered a declaration titled "Declaration of the Kingdom of Bhutan – The Land of Gross National Happiness to Save our Planet" wherein we committed to remain carbon neutral at all times. Furthermore, in the preparation of 11th Five Year Plan (FYP), the Royal Government intends to make 11th FYP a 'Green' plan, and create a 'Green' mindset and attitude amongst Bhutanese to prioritise environmental management, and reduce GHG and pollution. This is to pursue development based on pro-poor, low- carbon, eco-friendly, energy and cost efficient modalities and strategies.

In this respect, the Environment, Climate Change and Poverty Mainstreaming (ECPM) Reference Group comprising of members from GNHC, NEC, MoAF, UNDP and DLG (MoHCA) have worked with the Sectors and LGs including Thromde 'A' using a *'six step process'* through various workshops and meetings to identify ECP concerns and opportunities, and mainstreaming options, alternatives and other interventions for the 11 FYP and Annual Plan preparation towards smarter development. The possible options, alternatives and interventions together with concerns, pressures and indicators with equivalent contributions to National Key Result Areas (NKRAs) and Interventions are documented in this *'mainstreaming framework to integrate environment, climate change and poverty and other cross-cutting issues in the 11 FYP'.* The framework is expected to inform and guide the Sectors, LGs and Thromde A's for formulation of an ECP integrated and 'Green' 11 FYP.

This framework is a part of the 11th FYP guidelines for both central agencies/sectors and LGs/Thromde 'A' for guidance and reference. As the framework may not be comprehensive and complete in terms of ideas and optional interventions, it is open to smarter and better ideas that will inculcate a green mindset to improve development actions and outcomes. All contributions are welcome.
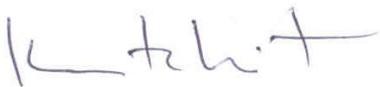
Karma Tshiteem
Secretary
Gross National Happiness Commission

Acknowledgment

The framework for mainstreaming Environment, Climate Change and Poverty (ECP) concerns and other cross-cutting issues into the development plans and programme is yet another attempt of our commitment to strengthen the process towards a GNH-based development. The development of this framework is conceived with the objective of facilitating the sectors in formulation of an ECP integrated Eleventh Five-Year Plan programme, which is a move towards pursuing a carbon neutral and climate resilient development as one of the national key result areas.

The publication of this document has been made possible through the partnership initiatives of the Joint Support Programme (JSP) involving development partners namely, the Government of Denmark, UNDP/UNEP Poverty-Environment Initiative, UN Capital Development Fund (UNCDF) and Australian Agency for International Development (AusAID).

The document would not have taken its shape without the particular initiative, dedication and commitment of the ECP Mainstreaming Reference Group (ECP-MRG) in providing technical assistance and facilitation in the process of developing this document. Therefore, all members of ECP-MRG must be especially thanked for their dedicated efforts and strength in this important endeavour.

Over and above, development of this mainstreaming framework was made possible with the active participation, cooperation and contribution of the focal officials from respective Ministries/agencies who were involved during the brainstorming and sensitization workshops. The critical role played by them is equally honoured and acknowledged. To this effect, the support extended by the following key Ministries and agencies to engage their officials in the process is nonetheless recognized: Ministry of Works & Human Settlement (MoWHS); Ministry of Agriculture & Forests (MoAF); Ministry of Labour & Human Resources (MoLHR); Ministry of Economic Affairs (MoEA); Ministry of Finance (MoF); Ministry of Information & Communication (MoIC); Ministry of Health (MoH); Ministry of Education (MoE), Ministry of Home and Cultural Affairs (MoHCA), National Environment Commission (NEC) and Department of Local Governance (DLG).

The peer reviewers, Mr. Yeshey Penjor, Climate Change Policy Specialist, UNDP Bhutan Country Office; Professor Lex Brown, Griffith University, Brisbane, Australia; Mr. Ugen P. Norbu, Norbu Samyul Consulting, Thimphu; and the UNDP/UNEP PEI Asia-Pacific Regional Team are highly acknowledged for their invaluable comments and suggestions.

Introduction

The Royal Government of Bhutan has embarked on preparation of the country's 11th Five-Year Plan (11 FYP). A series of brain storming and consultation workshops with the central Ministries/sectors in the latter part of 2011 and beginning of 2012 culminated in production of the draft Plan Preparation Guidelines.

As emphasized hitherto, the overall thrust of the 11 FYP (2013 to 2018) shall be guided by the country's development philosophy of Gross National Happiness (GNH). As done for the past Five-Year Plans, the four pillars of GNH shall form the core values of the Plan's programme. In this respect, the priorities and strategies for the 11 FYP programme shall be formulated with the ultimate aim of strengthening the four pillars of GNH: i) promotion of equitable and sustainable socio-economic development, ii) preservation and promotion of cultural values, iii) conservation of the natural environment, and iv) good governance[1].

The four GNH pillars are, however, intertwined and closely interrelated to the utmost extent that achieving one is most integral and contingent upon achieving the others. To this effect as a measure to strengthen the country's approach towards GNH-based development, the 11 FYP shall accentuate on the efforts of mainstreaming environment, climate-change and poverty (ECP) concerns, and other cross-cutting issues into all development programmes, both at the central and local levels. The process of ECP mainstreaming and other crosscutting issues is founded on the premises that it is a holistic strategy to embrace the fundamental elements of achieving the four GNH pillars.

The call for mainstreaming ECP and other crosscutting issues into development plans and programmes is also based on the current context of emerging challenges of pursuing a sustainable approach to holistic and inclusive development. The sustainable development approach strives for environmentally sustainable economic progress to foster low-carbon and a socially inclusive development. Sustainable economic development strategies in practice today are pursued through various independent means, which are, most of the time constraining to economic development or the health of the environment. As a result, the replacement of such approaches with the mainstreaming approach changes the "development versus environment" debate to one of "development that utilizes resources sustainably", placing particular emphasis on the opportunities the environment provides for development that is sustainable.

Bhutan is characterized by limited economic resources and low technological advancement, with about 69% of the country's population in the rural areas depending heavily on its limited repository of natural resources. 98% of those under poverty are rural-based and more than half of Bhutan's GDP can be attributed to sectors directly or indirectly dependent on the health of the environment. As such, the economy and society depend on the health of our environment. Environmental assets yield income, offer safety nets for the poor, maintain public health and drive economic growth.

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[1]Guidelines for preparation of the 11th FYP (2008-2013).

However, bad management of environmental assets lead to hazards (climate change, pollution, environmental damages, etc.) that threaten livelihoods (the poor are especially vulnerable) and development.

In order to make ECP mainstreaming more pragmatic in the 11 FYP than merely maintaining it as a theoretical policy proclamation, the Plan Preparation Guidelines includes a separate provision requiring all central and local agencies to formulate ECP-integrated development plans and programmes. Therefore, this ECP mainstreaming framework outlining the steps involved in the process of formulating ECP integrated development programmes, with illustrations of some of the ways of ECP integration into respective sectoral development activities, is developed and circulated to facilitate the exercise.

The Environment Climate Change and Poverty (ECP) Reference Group organized awareness workshops for the sector officials responsible for plan preparation to identify ECP mainstreaming concerns and opportunities in their 11th FYP programmes. This involved the conduct of a series of workshops with individual sectors aimed at familiarizing them with the six-step ECP mainstreaming matrix, from 4th to 10th January 2012. As part of the exercise, sectors applied the mainstreaming matrix to identify ECP concerns within their sectoral programmes, and propose relevant interventions to take on new opportunities in the 11th FYP. A similar exercise will be conducted for the Local Governments (LGs). This ECP Mainstreaming Framework comprises of the mainstreaming exercise carried out by the Sectors, and it is envisaged that the framework will be used to inform and guide the formulation of an ECP integrated 11th FYP.

Therefore, the ECP Mainstreaming Framework is an outcome of the mainstreaming exercise carried out with the Sectors and it is envisaged that the framework will serve as a good input to the formulation of ECP integrated 11th FYP programme. The framework is also aimed at guiding the Plan towards a carbon neutral development which is identified as one of the National Key Results Areas (NKRAs). The framework, however, may not be comprehensive in terms of options and alternatives. It is not intended to be a prescriptive plan, instead, it is expected to serve as a reference framework open to new and innovative interventions to promote smarter ECP mainstreamed development. The framework can also be used by LGs including Thromde 'A' as background information and guide since most of the ECP pressures and concerns identified by the sectors are similar to what LGs experience at the local level.

Overview of Environment, Climate Change and Poverty (ECP) Mainstreaming

Sustainable development is integral to the Royal Government of Bhutan's development philosophy of GNH and there exists high level of support and commitment. It is manifested profoundly in the country's constitution.

> *The Royal Government shall: … secure ecologically balanced sustainable development while promoting justifiable economic and social development ...[Article 5, Constitution of the RGOB]*

Sustainable development requires that environment and other cross-cutting issues be integrated into all policy making and planning processes of the sectors, and at all levels of government. Environment mainstreaming recognizes that the environment is the ultimate resource on which all sectoral development depends. ECP **Mainstreaming is the process of integrating environment, climate change and poverty issues into the formulation of all sectoral policies and plans** placing particular emphasis on the opportunities environment provides for sustainable and inclusive (pro-poor) development**.**

ECP Process Steps & Application Exercise

The following process steps have been recommended for mainstreaming environment, climate change and poverty issues into the Sectoral 11th FYP preparation process (applicable also when mainstreaming any other cross-cutting issues into development planning)[2].

The specific objectives of the process steps are:
- Provide a simple analytical framework that can be applied rapidly and effectively by all sectoral agencies involved in the 11 FYP process.
- Provide a minimum analytical process to identify and integrate key pro-poor environment and climate change opportunities in sector plans and programmes of the 11 FYP.
- Identify specific pro-poor environment and climate change issues to be addressed by sectors.
- Identify priority actions to address these issues that can be incorporated into sector plans and programmes.
- Propose monitoring and evaluation indicators to assess the integration of these issues in sector plans and programmes.
- Ensure a strong linkage with national objectives and priorities.

Step I
- Identify the key pro-poor/environment & climate change   pressures /issues/ (including social pressures) within the sector programmes.

Step II
- Carry out an analysis of the status, trends and impacts both in the short and long term of the identified issues (to make a strong case, wherever possible quantify).
  - o Analyze the trends of identified impacts over the period of the 10th FYP and if possible forecast its trends over the coming 5 to 10 years.
  - o Identify a time series of identified indicators based on existing sources of data and information.

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[2] Adapted from UNEP (2009), A guidance manual on integrated assessments: mainstreaming sustainability into policy making.

      o Identify the causes/factors of the evolution that has lead to the current situation analyzing current dynamics and driving forces, e.g. changes in regulatory, institutional and economic factors, policies and plans, demographic factors, market forces and changes in environment and climate.

Step III
- Identify interventions, opportunities and alternative options to overcome or mitigate the identified issues/pressures.
  - Identify opportunities for policy options to influence key pro-poor, environment and climate change issues identified in Step 1 and Step 2 by addressing several interrelated questions.
    - What are the pro-poor environment and climate change issues that needs to be addressed and why?
    - Which opportunities: What types of problems or factors have resulted in these issues? i.e. institutional and governance arrangements, market and economic incentives, social and behavioral, underinvestment in technologies, insufficient knowledge
  - Design alternative policy/programme options based on the above identified opportunities.
    - Elaborate policy/programme options that combine the best of all of the above responses which may require an integrated mix of policy measures and instruments addressing different areas of responses (reforming and strengthening institutions and governance; use of market measures, fiscal and non-fiscal incentives and regulations).

Step IV
- Assess both the short and long term impacts/benefits (wherever possible, quantify) of the identified proactive opportunities and alternative options.
  - This step is to compare proposed options by assessing positive and negative impacts based on best available knowledge.
  - Develop a simple decision matrix and analyze positive and negative impacts of proposed options.

Step V
- Develop monitoring and evaluation framework with indicators both at output and outcome levels for the identified opportunities and alternative options.
  - Define indicators: Outcome indicators for monitoring what the implementation has led to in terms of its pro-poor, environment and climate change outcomes. Output indicators for monitoring the immediate activities carried out.
  - Define a monitoring system: Frequency and methods of monitoring; How will the monitoring results feed back to decision-making and planning?

Step VI

- Link identified opportunities/alternative options with the National Key Results Areas (NKRAs) and Sector Key Result Areas (SKRAs).

  o Link the identified environment, climate change and poverty interventions and alternative options with the National and Sector Key Result Areas.

Outcomes of ECP Mainstreaming Exercise for Central Sectors

Under the technical assistance and facilitation of the ECP Mainstreaming Reference Group, series of brainstorming and sensitization workshops have been carried out for Ministries and other relevant agencies at the central level. The outcomes of these workshops are presented in the following sequences:

1. Ministry of Works & Human Settlements (MoWHS)
2. Ministry of Economic Affairs (MoEA)
3. Ministry of Health (MoH)
4. Ministry of Education (MoE)
5. Ministry of Labour & Human Resources (MoLHR)
6. Ministry of Information & Communication (MoIC)
7. Ministry of Finance (MoF)
8. Ministry of Home & Cultural Affairs (MoHCA)
9. Ministry of Agriculture & Forests (MoAF)

Framework to Mainstream Environment, Climate Change and Poverty (ECP)

1. **Ministry of Works & Human Settlement**

   1.1 **Department of Human Settlement**

Key ECP pressure/ issue within the sector.	Analysis on status, trends and impacts of the identified ECP pressure.	Alternative options & opportunities to address the identified ECP pressure (Programme/activities to be mainstreamed into 11th Plan).	Impacts/benefits of identified opportunities/ alternative options.	M&E for identified opportunities/alternative options with indicators.	Linkage of identified opportunities/ alternative options with NKRAs & SKRAs.
Development pressure on ecologically-fragile areas.	- Average gradient of the land in most settlement are more than 30% (45 degree). - Geologically fragile land features. - Rapid development of infrastructures on the ecologically- fragile areas. - Increased natural and climate induced disasters.	1. Planned (zoning and hazard mapping of settlements) and regulated infrastructure development (enforcement of standards) on ecologically-fragile area. 2. Stabilize geologically sensitive zones/areas. 3. Protection and management of river banks; and 4. Enforcement of EIA regulations (maintenance of buffer zones) 5. Develop eco-efficient, climate and disaster resilient features in the	- Planned and well managed human settlements. - Reduce risks from natural and climate induced hazards. - Reduced emissions (less carbon footprint).	1. No. of human settlements with improved planning and management features integrated. 2. % of public expenditure on improving/ stabilizing geologically sensitive areas.	NKRAs: 1. Disaster resilient 2. carbon neutral and climate resilient development SKRAs: 1. Strategic Human Settlements (Growth Centre) developed for balanced regional development. 2. Environment friendly human settlement developed.

		design & construction of buildings (eg. insulation, storm water drainage, solar powered & storage, recycle materials, passive house standards).			
Shortage of water for settlements.	- Drying of water sources (identified as key issue during the 10th FYP Mid-term Review) - Deforestation in watershed areas. - Lack of inter-agency coordination and management of watersheds.	1. Mapping and inventory of water resources; 2. Initiate Payment for Eco-system Services arrangements. 3. Water conservation and management (pricing, water recycling and rain water harvesting technologies) 4. Improve service delivery (through Public-Private Partnerships); 5. Sustainable harvesting and mgt. of natural resources; 6. Protect riparian zones in the watershed areas and along rivers and streams.	- Sustainable, adequate, and quality water (domestic, irrigation and industrial purposes) available.	1. Mapping and water resource inventory completed. 2. No. of PES mechanism initiated. 3. No. of new initiatives for water management and conservation by category (water recycling and harvesting technologies; tap water resources from multi-purpose dam where feasible)	NKRAs: 1. Integrated water resource conservation and utilization. SKRAs: 1. Environment friendly human settlement developed. 2. Improved quality of urban infrastructure facilities and services. 3. Enhanced sustainable forest, land, water and biodiversity resource management (MoAF)

1.2   Department of Roads

Key ECP pressure/ issue within the sector.	Analysis on status, trends and impacts of the identified ECP pressure.	Alternative options & opportunities to address the identified ECP pressure (Programme/activities to be mainstreamed into 11th Plan).	Impacts/benefits of identified opportunities/ alternative options.	M&E for identified opportunities/alternative options with indicators.	Linkage of identified opportunities/ alternative options with NKRAs & SKRAs.
Geo-hazard areas/landslides in critical areas.	- Disruption of mobility and access, impacting the economy negatively. - Loss of lives, property; natural habitats; vegetation and water sheds;	1. Feasibility study including geo-hazard mapping. 2. Promote bio-engineering and civil engineering interventions in design and implementation (retaining walls, check dams, french drain)	- Improved road safety and accessibility. - Reduce carbon footprint. - Positive impacts on health, environment and pro poor development. - Improved public service delivery	1. Geo-hazard feasibility study by road category; 2. Proportion of Public Expenditure on environment related interventions. 3. Number of geo-hazard events	NKRAs: 1. Sustained economic growth. 2. A carbon neutral and climate resilient development. SKRAs: 1. Environment friendly road constructed.
Environmental degradation due to road construction	- Pollution. - Loss of agricultural land, natural habitats, vegetation and water sheds.	1. Develop ECP integrated road master plan, including rural. 2. Promote EIA application and compliance (EFRC). 3. Provide additional	- Long term cost benefits (low maintenance, and environmental benefits). - Contribution to	1. ECP integrated Road Master Plan; 2. No. of roads by category with EFRC. 3. Public expenditure on EFRC roads.	NKRAs: 1. Sustained economic growth. 2. A carbon neutral and climate resilient development.

- Access to basic services and market disrupted due to landslides and soil erosion.	budget to meet the environmental cost.	environmental conservation and reduce carbon footprint. - Prevention of unnecessary fuel consumption thereby reducing vehicular emission. - Saves life and property from accidents. - Ensures re-vegetation and saves forests, biodiversity and other natural resources (soil erosion, water pollution and air pollution).		SKRAs: 1. Construction and maintenance of road network strengthened through standards, specifications and geometric improvement for all weather access. 2. Quality and gradient of roads improved (drainage systems, super-elevation, etc). 3. Environment friendly road constructed.

1.3 Thimphu Thromde

Key ECP pressure/ issue within the sector.	Analysis on status, trends and impacts of the identified ECP pressure.	Alternative options & opportunities to address the identified ECP pressure (Programme/activities to be mainstreamed into 11ᵗʰ Plan).	Impacts/benefits of identified opportunities/ alternative options.	M&E for identified opportunities/alternati ve options with indicators.	Linkage of identified opportunities/ alternative options with NKRAs & SKRAs.
Increase in Solid Waste generation & Sanitation problems	- 51 tons of Solid waste generated/day (2010) & expected to increase to 65 tons/day (2015); - Thimphu's annual population growth rate is 13.5% and the projected population by 2030 is 180,000 from about 90,000 at present. - No measures undertaken to address liquid waste/ hazardous waste.	1. Integrated solid waste management (collection & segregation; transfer station; promote 3Rs - reduce, reuse & recycle; composting). 2. Feasibility studies to trap & use Methane & other landfill gases (e.g. for power generation) and collect leachate from landfill. 3. Management of medical & hazardous waste. 4. Advocacy & awareness on waste management. 5. Encourage participation of informal sectors in waste mgt. 6. Research and development of	- Income generation for the urban poor and informal sectors. - Promoting private entrepreneurs in waste management – employment generation. - Clean and green city – reducing waste through proper management. - Contribution to carbon neutrality. - Prevents epidemic and endemic disease outbreaks and other causal/localized	1. Improved solid waste management system in place and employment created/ generated. 2. No. of waste facilities established (transfer station, landfill). 3. No. of private partners participating in waste mgt. through PPP. 4. No. of research & development initiatives.	NKRAs: 1. Carbon neutral & Climate resilient development. SKRAs: 1. Sustainability enhanced through municipal financing. 2. Environment friendly human settlement developed. 3. Improved quality of urban infrastructure facilities and services.

		innovative waste management practices.	- diseases. - Reduced health risks		
City Infrastructure - Shortage of Water Supply/ inadequate Sewerage and storm-water drainage facilities.	- Lack of watershed protection and management. - Lack of water management and distribution. - Pollution of rivers due to sewerage spill over. - Low coverage of sewerage network.	1. Outsource service delivery by category (Water, sanitation, solid waste collection) through appropriate PPP arrangements. 2. Promote and introduce efficient water distribution, quality & sewerage facility, including pricing. 3. Assessment of the cause of depletion of water resources.	- Improved sewerage & waste mgt. - Sustainable, adequate, & quality water (domestic and industrial purposes) available. - Reduced health risks	1. No. of services delivered through PPP. 2. % of households connected to sewerage networks.	NKRAs: 1. Carbon neutral & Climate resilient development. SKRAs: 1. Sustainability enhanced through municipal financing. 2. Environment friendly human settlement developed. 3. Improved quality of urban infrastructure facilities and services.
City Infrastructure - Lack of coordination & management of city infrastructur es (roads/	- Energy inefficient street lights. - Dependence on conventional on-grid energy. - Lack of proper drainage system – for	1. Promote eco & energy efficient technologies (photovoltaic roofs, LED low energy lights, etc); 2. Promote & develop safe pedestrian walk ways, cycling lanes. 3. Improve the quality of	- Contribution to carbon neutrality (low carbon footprint) - Liveable City (Safe, Clean, Green, accessibility etc.).	1. Energy efficient technologies introduced. 2. Kms. of pedestrian walk ways, cycling lanes developed. 3. Public perception of public services and pollution.	NKRAs: 1. Carbon neutral & climate resilient development. SKRAs: 1. Eco-friendly, safe, reliable and affordable surface/

drainages. Street Lighting; Parking); - Lack of eco-friendly facilities.	storm water, industrial effluent, and waste water. - Lack of coordination between implementing agencies (BPC, Telecom). - Traffic congestion. - Poorly designed and maintained road network	city infrastructure (segregation of waste water, explore alternate energy options); 4. Strengthen coordination between municipal agencies and other implementing agencies. 5. Explore and test renewable energy sources and technology for streetlights and others.	- Reduced health risks.	4. Proportion of households satisfied with public services infrastructure. 5. Liveability index.	air transport increased (together with MoIC). 2. Sustainability enhanced through municipal financing. 3. Environment friendly human settlement developed. 4. Improved quality of urban infrastructure facilities and services. 5. Quality of roads improved.
City Beautification - Lack of Greening and beautification.	- Increased air pollution & waste generation. - Lack of adequate recreational facilities for children and elderly citizen.	1. Promote greenery (Plant more trees, grass, flowers) 2. Create green spaces (parks, recreational facilities) 3. Maintain & recover wetlands/marshlands and natural storm drainage.	- Clean and green city. - Health benefits.	1. GNH index 2. Liveability index 3. No of recreational facilities/parks	NKRAs: 1. Carbon neutral & climate resilient development. SKRAs: 1. Improved quality of urban infrastructure facilities and services.

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					2. Sustainability enhanced through municipal financing.
City Transport - Traffic congestion - Lack of adequate parking spaces.	- Increasing no. of vehicles (260 cars/1000 people in Thimphu as of Nov. 2011) leading to increase traffic congestion & pollution.	1. Introduce Multi-storied parking facility. 2. Public transport expansion; introduce alternative mode of transport (Rapid Bus transport/ plug-in hybrids or electric buses and cars, trams & trains, bicycle infrastructures) 3. Decongestion pricing & improve traffic/route & city roads management 4. Incentivize energy efficient mode of transport. 5. Establish battery charging points for electric cars. 6. Improve traffic flow efficiency.	- Reduction in traffic congestion & pollution. - Low carbon foot print. - Improvement in the aesthetic character of the city. - Fewer accidents.	1. Pollution index; 2. No. of alternative mode of transport by category. 3. Livability Index. 4. Number and area of public parking facilities.	NKRAs: 1. Carbon neutral & climate resilient development. SKRAs: 1. Improved quality of urban infrastructure facilities and services. 2. Eco-friendly, safe, reliable and affordable surface/ air transport increased (Coordinate with RSTA/MoIC).

1.4   Construction Development Board

Key ECP pressure/ issue within the sector.	Analysis on status, trends and impacts of the identified ECP pressure.	Alternative options & opportunities to address the identified ECP pressure (Programme/activities to be mainstreamed into 11th Plan).	Impacts/benefits of identified opportunities/ alternative options.	M&E for identified opportunities/alternative options with indicators.	Linkage of identified opportunities/ alternative options with NKRAs & SKRAs.
Inadequate environmental standards in construction (design; Rules & regulations; & manuals).	- Construction works do not meet environmental standards & criteria. - Increased environmental and financial cost. - Developmental infrastructures less climate friendly and vulnerable to disasters.	1. Environmental concerns/ standards to be included in the rules, regulations, contract biding documents and training manuals. 2. Incorporate environmental management in the criteria for issuing certificate to contractors. 3. Introduce green award system. 4. Conduct trainings/awareness workshops on ECP mainstreaming for the contractors.	- Eco-efficient construction promoted and sustained. - Reduction in environmental, social and financial costs. - Development infrastructures are climate induced disasters resilient.	1. Rules & regulations, standard bidding documents with environmental concerns/ standards integrated. 2. No. of workshops and trainings on ECP conducted.	NKRAs: 1. Carbon neutral & climate resilient development. 2. Disaster resilient SKRAs: 1. Eco-friendly, innovative and good quality constructions promoted. 2. Capacity of construction industry enhanced. 3. Timber utilization in construction industry reduced.

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		5. Enhance R&D of construction industry (Innovation in eco efficient technologies). 6. Full enforcement of legislated environmental standards and norms.			

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2. Ministry of Economic Affairs

Key ECP pressure/ issue within the sector.	Analysis on status, trends and impacts of the identified ECP pressure.	Alternative options & opportunities to address the identified ECP pressure (Programme/activities to be mainstreamed into 11th Plan).	Impacts/benefits of identified opportunities/ alternative options.	M&E for identified opportunities/alternative options with indicators.	Linkage of identified opportunities/ alternative options with NKRAs & SKRAs.
Social and environmental issues as a result of <u>Hydro-power Infrastructure Development.</u>	- Increasing environmental impacts due to deforestation, land and biodiversity degradation, pollution etc. - Increasing social impacts such as law and order, acculturation, increased vulnerability to communicable diseases, loss of hereditary rights and social fabric etc. - Increasing corridors for transmission Right of Way.	1. Compliance with Environmental Management Plan. 2. Budgetary support for environmental & social services. 3. Mandatory Strategic Assessment of hydro power development projects. 4. Develop domestic work force and expertise for hydropower projects.	- Alternative opportunity & mitigation measures adopted & implemented to reduce cumulative environmental and social impacts. - Employment creation.	1. No. of Strategic Assessments (SA) conducted and their influence on original project design 2. Proportion of budget allocated & expenditure incurred for social and environmental services.	NKRAs: 1. Sustained economic growth. 2. Disaster resilient 3. A carbon neutral and climate resilient development. SKRAs: 1. Contribution to GDP and employment increased. 2. Eco-friendly, innovative and good quality constructions promoted.

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Energy - Erratic water flow patterns; - Increasing domestic demand for electricity. - Energy waste in distribution and use.	- Reduction in hydro-power generation. - Increasing domestic demand for electricity (energy intensive industries) – 16%. - Increasing dependence on imported electricity. - Energy inefficiency	1. Implement Integrated Water Resource Management. 2. Development of Storage Plants. 3. Captive Power Plants to address growing Industrial demands. 4. Promote and develop non conventional renewable energy (*Diversification of Energy sources*) – (wind, solar, sustainable tapping of biomass, bio-gas. 5. Develop supply (R&D, HR, financing) & Demand side (carbon pricing, regulation, market creation) policy & Promote Demand Side Management; 6. Promote energy consumption and savings in industries (manufacturing, constructions) through	- Reduce dependence on import of electricity. - Industrial consumers first hand access to electricity through captive plants. - Reduction of dependence on hydropower. - Increase in hydropower export revenue. - Cost savings & reduced GHG emissions (minimize carbon footprint). - Encourages use of energy efficient products, vehicles etc. - Efficient management of	1. No. of Storage Hydropower Plants developed. 2. No. of Captive Power Plants being developed. 3. % reduction in import of electricity. 4. No. of energy efficient initiatives and incentives in place. 5. No. of education and awareness on energy savings and efficiencies. 6. Information & data on energy consumption and price in place.	NKRAs: 1. Sustained economic growth. 2. Full Employment 3. A carbon neutral and climate resilient development. 4. Integrated Water Resource conservation and utilization. SKRAs: 1. Installed capacity enhanced. 2. Contribution to GDP and employment increased. 3. Alternate renewable energy promoted.

		reuse/ recycling of materials; and replace existing equipment with high-efficiency equipment etc. 7. Develop, implement & monitor minimum efficiency energy standards & criteria for all products that consume energy including buildings. 8. Progressively high taxation for products & cars using more energy (fossil fuels) to create demand for more efficient technologies (reduce tax for energy efficient or green appliances). 9. Promote awareness/education on benefits of efficient energy use/savings/buying energy efficient appliances (cooking	energy demand, supply and use.	7. R & D to promote private entrepreneurs to design, build and manage new energy infrastructures & RE.	

		stoves) & equipments. 10. Power authorities/ companies to develop & provide dis-aggregated information (by appliances) on energy supply & price to help manage demand & use; 11. Educate and train engineers and scientists to design, build and maintain new energy infrastructures and RE, and encourage entrepreneurs and companies to adopt clean energy technologies and practices through subsidies/ incentives.			
Pressure on limited Land resources to rrehabilitate and resettle affected communities/ settlements – as	- Government plan of developing 10,000 MW installed capacity of hydropower generation by 2020.	1. Integrated development of hydropower projects. 2. Develop common corridors with multi-circuit transmission lines in line with National Transmission	- Reduced Rehabilitation & Resettlement; - Enhance economic opportunities for the project affected	1. No. of integrated hydro-power projects. 2. Types and Nos. of Social Infrastructures built.	NKRAs: 1. Sustained economic growth. 2. Full Employment. 3. A carbon neutral and climate resilient

a result of accelerated hydro-power development.	- Increase in displacement of project affected families. - Limited land substitutes. - Inadequate compensation for private land acquired.	Grid Master Plan. 3. Reduce/ avoid acquisition of private lands. 4. Provide adequate compensations in line with Hydropower development Policy. 5. Re-assessment of 10,000 MW harnessing by 2020. 6. Establish and implement direct benefit-sharing schemes for the affected households. 7. Preferential employment of members of affected households in hydropower projects and related activities.	families. - Improved and Increased access to social infrastructures (Schools/Hospitals/ Bank/market etc). - Employment creation for affected households.	3. Nos. of jobs created by category & gender. 4. Proportion of affected households covered by direct benefit-sharing schemes.	development. SKRAs: 1. Contribution to GDP and employment increased. 2. Eco-friendly, innovative and good quality constructions promoted. 3. Installed capacity enhanced.
Geology and Mines. - Deforestatio n and major changes in	- Huge domestic demand of construction material in construction industry. - Demand of minerals	1. Capacity of local communities enhanced through training and job opportunities provided.	- Sustainable mining and mineral development. - Cost saving in long run for the companies.	1. Contribution of mining sector to national GDP. 2. Earning of hard currency and rupee.	NKRAs: 1. Sustained economic growth 2. Full Employment

land and land use features. - Pollution of air, water and soil. - Health impacts. - No proper tax verification system for companies. - Illegal/tax free trans-boundary transaction risks.	and construction material from outside country. - Booming hydropower project constructions. - Amount of domestic investment in this sector. - Increased pollution of water, air and soil due to mining. - Number of local jobs and business opportunity created in the mining industry. - Local communities have improved access to health and education services and infrastructure.	2. Environment restoration bond covering full cost of closing, cleaning and rehabilitating and re-development of the sites. 3. Restoration of mining sites to create recreation areas and local employment after closing of mines. 4. Institute Community Development Fund (CDF). 5. Community empowerment through participation in the decision making process. 6. Transparent verification system of payments and taxes from mining. 7. Legal Obligation for mining companies to follow EIA; 8. Adopt principles of	- Employment generation/business opportunity especially for local community through mining industries. - Revenue in the form of royalties, taxes, etc and hard currencies/ Rupee earnings. - Improved mgt. and adoption of ECP practices. - Transparent accounting system of mining industries. - Reduced emissions (less carbon footprint) - Encourage investment and innovation through R & D. - Trans-boundary transaction monitoring strengthened.	3. Employment & business opportunities generated to local men and women by mining companies. 4. Mining-related environmental and health issues identified and addressed. 5. CDF instituted and development activities financed. 6. Transparency in the accounting system instituted. 7. Number of restored/ rehabilitated mining sites. 8. Number of regulations and incentives put in place to promote environmental and social action plan.	3. A carbon neutral and climate resilient development SKRAs: 1. Geo-scientific investigation and mineral development sustainably conducted. 2. GDP Contribution and employment increased.

		intergenerational equity. 9. Incentivize Mineral related energy intensive industries - to encourage investment in RE, energy efficient technologies. 10. Promote R & D in green technologies & Management.			
Hydro-Met Services Vulnerability to hydro - meteorological hazards.	- Increase in mortality due to extreme Hydro-Met events. - Increasing Hydro-Met related disasters. - Increase in sediment loads over the years. - Increasing Operation &Management costs for hydro power over the years.	1. Improve technology for weather & flood/GLoF forecasting & warning. 2. Timely information to policy makers/aviation weather advisory/ agriculture /road/route outlooks and forecasts. 3. Increase & modernize Hydro-Met monitoring stations to predict climate & weather. 4. Advocacy & public awareness on the use of Hydro-Met data and information. 5. Technical &	- Increase resilience and coping capacities of communities and larger population. - Save lives & properties. - Strengthen preparedness and response measures related to Hydro-Met hazards. - Reliable data/ information, and prediction from use	1. Nos. of weather monitoring stations. 2. No. of EWS established. 3. Weather forecasting increased from 1 to 3 days. 4. Flood forecasting systems & facilities in place. 5. SOPs for forecasting and warnings developed. 6. R & D publications. 7. No. of advocacy	NKRAs: 1. Food Secure & sustainable 2. Disaster resilient 3. A carbon neutral and climate resilient development 4. Integrated Water Resource conservation and utilization. SKRAs: 1. Hydrology/Mete orology

		Professional capacity building. 6. Seek admission as member of World Meteorology Organization (WMO) to access capacity building and technological supports.	of improved technologies and capacities. - Disaster preparedness.	materials and workshops. 8. Nos. of lives lost to Hydro-Met hazards.	strengthened. 2. Risks associated with geo-hazards reduced. 3. Environmental impacts from snow and glacier melt reduced.
Increasing climate change & climate variability.	- Retreat of glaciers. - Increasing variability in natural river flows. - Reduction in snowfall. - Increasing wild fire incidences. - Erratic rainfall pattern. - increasing incidence of weather induced pests and diseases	1. Climate projection, quantification of climate parameters. 2. Research of critical issues and development of appropriate knowledge base in Hydro-Met sector.	- Informed policy formulation. - Identify effective adaptation measures.	1. Nos. of ice and snow monitoring stations established. 2. Data collection and studies on flow regime carried out. 3. Nos. of Research lab established. 4. Nos. of research papers and publications. 5. Reports on workshops and seminars held.	NKRAs: 1. Disaster resilient 2. A carbon neutral and climate resilient development 3. Integrated Water Resource conservation and utilization. SKRAs: 1. Hydrology/Meteor ology strengthened. 2. Risks associated with geo-hazards reduced.

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					3. Environmental impacts from snow and glacier melt reduced.
Lack of reliable Hydro-Met data.	- Limited contribution to user agencies. - Inefficient planning & design of infrastructure. - Inaccurate weather & flood forecasts.	1. Modernization and improved coverage of Hydro-Met network with real time station. 2. Enhance capacity of professional, technicians and Observers.	- Reliable weather and flood forecasting services. - Reliable data for climate change studies. - Experienced and skilled professional in Hydro-Met sector.	1. Comprehensive and reliable Hydro-Met Data book published. 2. Services to user agencies enhanced. 3. No. of real time weather stations established and in operation.	NKRAs: 1. Food Secure & sustainable. 2. Disaster resilient. 3. A carbon neutral and climate resilient development. 4. Improved public service delivery driven by motivated public servants and effective performance management system. SKRAs: 1. Hydrology/Meteorology strengthened. 2. Risks associated with geo-hazards reduced.

					3. Environmental impacts from snow and glacier melt reduced.
Variability in flow regime & weather pattern	- From historical data, vast difference in hydropower generation during lean season and monsoon. - Extreme meteorological events like erratic rainfall patterns, high intensity rainfall in unexpected regions, shortage of water during dry season and flooding in wet season.	1. Initiate hydrological modeling & inflow forecasting for hydropower plants. 2. Public weather services. 3. Improved weather forecasting capability. 4. Systems and facilities, R&D in Hydro-Met sector established.	- Appropriate hydropower infrastructure in place. - Improved weather & inflow forecasting and services. - Water resources management strategies in place	1. Useful and reliable information and data provided to hydropower sector, agricultural sector, health sector etc. 2. No. of research papers published and used in the design of plans, programmes and projects.	NKRAs: 1. A carbon neutral and climate resilient development. 2. Integrated water resource conservation and utilization. SKRAs: 1. Hydrology/ Meteorology strengthened. 2. Risks associated with geo-hazards reduced.
Limited professionals in the hydrology & Meteorology	- Very few Hydro-Met engineers and professionals. - Inadequate skilled technicians.	1. Long term professional training in Hydro-Meteorology. 2. Short term skills development through hands on training. 3. Recruit specialists in	- Adequate professionals & skilled technicians employed. - Responsive and appropriate	1. No. of experts in hydrometeorology employed. 2. No. of technicians trained. 3. No. of observers trained.	NKRAs: 1. A carbon neutral and climate resilient development. 2. Improved public service delivery

	- Inadequate Hydro-Met service provisions.	water and climate knowledge areas. 4. Institutional cooperation linkage at regional and international level.	technologies and services made available. - Strong cooperation with external institutions established.	4. Reduction in expenditure on expatriate experts and consultancy. 5. Report on training and workshops. 6. No. of MoU signed with other Agencies.	driven by motivated public servants and effective performance management system SKRAs: 1. Hydrology/Meteorology strengthened.
Inadequate use of ICT in Hydro-Met services	- Majority of monitoring stations are manually operated. - Data communication is unduly delayed. - Inconsistent and poor quality data. - Limited sharing, exchange & dissemination of data. - Ineffective delivery of services	1. Monitoring stations to be modernized with latest ICT facilities - use of fiber optic lines for real time data transmission. 2. Adopt ICT for improved data collection, transmission and dissemination. 3. Reduce number of manual stations. 4. Use of cellular and satellite based telemetry, interactive website launched, and	- Data collection, transmission and dissemination efficient and quick, comprehensive network of real time stations in place. - User friendly and interactive website for data access.	1. No. of real time weather stations established and in operation. 2. No. of high speed computing equipments in place. 3. Operation of website providing improved easy access to data.	NKRAs: 1. A carbon neutral and climate resilient development. 2. Improved public service delivery driven by motivated public servants and effective performance management system

		high speed computing facilities.			SKRAs: 1. Hydrology/Meteor ology strengthened.
Renewable Energy Lack of Alternative & Renewable Energies and extension of Grid.	- Insufficient power generation during lean season. - Increasing demand for power. - Increasing dependence on imported electricity. - Sustenance of RE Technologies. - Un-reliable supply of electricity.	1. Development of Alternative Energies (Solar, Wind, Biomass & mini/micro hydro) 2. 30% capital subsidy provided for RE technologies (Biogas plants and solar water heaters) to make it affordable to users. 3. Off-grid households to be electrified through grid extension, development of 'smart' electricity grids and RE options. 4. Establish Renewable Energy Development Fund (REDF) for promotion of RE. 5. Encourage and maximize use of energy for heat & electricity through RE sources, by	- Diversification of energy mix enhances energy security. - Reliable Energy Supply. - Promotion of Renewable Energy Technologies. - Increase economic opportunities for rural households. - Improve quality of services to public institutions. - Help to address the rural-urban migration. - Enhance private sector participation in the development of RE Technology	1. Master plan for RE Technologies developed. 2. RE implementation rules and regulation prepared. 3. DPR/feasibility/ reconnaissance study of RE projects carried out. 4. Promotion of carbon trading projects. 5. Use of RE options in institutional/ industrial/residenti al buildings. 6. Revenue saved. 7. No. of off-grid households electrified through grid – 2500	NKRAs: 1. A Carbon neutral and climate resilient development 2. Sustained economic growth SKRAs: 1. Alternate renewable energy promoted. 2. Contribution to GDP and employment increased.

		improving grids & reducing energy leakages & wastes, improving storage. 6. Develop & introduce feed-in tariffs (guaranteeing returns) for households, businesses, companies and organization to encourage people to invest in RE and energy saving. 7. Continue providing affordable fuel and electricity for poorer people. 8. Develop financial instruments that encourage investment in renewable energy (with MOF). 9. Renewable Energy Development Fund established through the reduction of import of power.	and services. - Saves money - Encourage investment and innovation, energy efficient and saving habits. - reduced emissions (less carbon footprint)	8. No. of households electrified through solar home systems – 300 9. No. of Renewable Energy projects developed (Wind, Biomass & Small hydropower projects). 10. Solar Power – 1 MW 11. Wind Power – 360kW 12. Biomass – 10kW 13. Small hydropower – 12.15MW 14. Biogas plant– 1700 Nos. 15. Solar Water Heater – 200 Nos.	

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Energy Efficiency (EE).	- High level of use of energy-inefficient products which are readily available in the market. - Heavy dependence of resident household and Energy intensive Industries on inefficient appliances and technology. - High level of wastage of energy.	1. Demand side management. 2. Incentives for promoting energy efficient designs, technology and habits. 3. 30% capital subsidy provided for improved Cook Stoves to make it affordable to users. 4. Encourage the use of energy efficient designs, technology and habits. 5. Rationalize electricity price (critical peak pricing, green pricing)	- Energy Saving. - Use of more Energy Efficiency fixtures/equipments and technologies. - Reduction of indoor pollution and time spent for collecting firewood in rural areas. - GHG emission reductions. - Reduced deforestation. - Access to less polluting and efficiently produced energy by rural people. - Reduction of health hazards.	1. Formulation & Adoption of Energy Efficiency (EE) Policy. 2. EE Implementation rules and regulation prepared. 3. RE & EE advocacy events initiated. 4. Est. of laboratory for standards and labeling of EE products. 5. Legislation and incentives put in place to promote energy efficiency. 6. Improved Cook Stoves – 5000 Nos.	NKRAs: 1. A carbon neutral and climate resilient development. SKRAs: 1. Promote Alternative and Renewable Energy. 2. Energy efficient technologies in industries promoted (in collaboration with Dept. of Industry).
Industries Pollution from industrial effluents and wastes.	- Generation of solid waste, pollutants and effluents by the industries.	1. Construction of sanitary landfills. 2. Promote green and eco-friendly industries. 3. Promote 3 Rs (Reduce,	- Waste management facilities developed. - Reduced generation of industrial waste.	1. Green and eco-friendly economy. 2. No. of waste management facilities developed.	NKRAS: 1. Sustained economic growth. 2. Full Employment. 3. A carbon neutral and climate

Ambient/ work place air pollution and GHG emissions.	- Contamination of air and water bodies downstream which affect human health and eco system. - Depletion of ozone layer. - Contribution to greenhouse gases.	Reuse & Recycle). 4. Promote cap and trade system for large polluters (energy intensive industries) to encourage investment in RE, energy efficient technologies and reduce emissions. 5. Enhance low-emission technologies.	- Reduced adverse effects on human health and eco system. - Reduced emissions (less carbon footprint). - Increased income over the long term. - Earn financing and saves money. - Encouragement of innovations. - Protect environment and nature. - Reduced environmental pollution	3. No. of eco friendly industries. 4. No. of research and development on green innovations.	resilient development. SKRAs: 1. Reduction in industrial pollution. 2. Energy efficient technologies in industries promoted. 3. Sustainable use and management of Natural Resources for SMEs. 4. Contribution of GDP and employment increased.
Lack of infrastructure.	- Limited designated industrial estates. - Growth of mixed industries (both chemical as well as food industries).	1. Identification and development of industrial estates for designated industries.	- Harmonized industrial growth. - Generation of employment opportunities.	1. Harmonized industrial growth. 2. Enhanced industrial infrastructure. 3. No. of industrial estates identified	NKRAs: 1. A carbon neutral & climate resilient development 2. Sustained economic growth.

				and developed. 4. Environment / eco-friendly development.	SKRAs: 1. Conducive environment for private sector development /SMEs enhanced and Green industries. 2. Reduction in industrial pollution.
Licensing procedure and formalities	- Lengthy procedures and paperwork, involving review and clearances from various agencies	1. Simplify and shorten the licensing/ approval procedures (e.g. on-line application system, one-stop facility, etc.).	- Licensing system simplified and shortened. - Easy procedure for the investors. - Favorable investment climate	1. Establishment of industries and generation of income and employment.	NKRAs: 1. Sustained economic growth. SKRAs: 1. Enabling environment created. 2. Full employment. 3. Contribution to GDP and employment increased.
Trade Pollution of air, water and land.	- Increase in use of POL products due to the increase in number of vehicles and construction	1. Improve the quality of POL products, especially fossil fuel quality.	- Lesser Pollution. - Improved the quality of POL products, especially	1. Introduce fossil fuels containing low Sulphur to reduce pollution.	NKRAs: 1. A carbon neutral and climate resilient development.

	machineries - Increase in use of Liquefied Petroleum Gas (LPG) and SKO for heating and cooking purposes. - Import of unnecessary packaging materials for waste generation and degradation of environment. - Wastes such as batteries and lubricants not properly managed. - Health related problems.	2. Policy intervention to reduce import of vehicles and introduce hybrid cars. 3. Introduce alternative source of energy for heating and cooking purposes. 4. Create awareness on environment related issues. 5. Enforce Waste Prevention and Management Act, 2009. Develop regulations to encourage waste segregation and trading for recycling. Formalize current practice of scrap dealing.	fossil fuel quality. - Cost effective from not importing unnecessary/additional packages and reducing waste management costs. - Increase income from trading recyclable items.	2. Nos. of hybrid vehicles imported. 3. Nos. of Activities carried out in line with the environment standards. 4. Introduced Renewal Energy (solar, bio-gas, solar heaters) for cooking and heating.	1. Sustained economic growth. SKRAs: 1. Reduce vehicle emission by improving fuel quality. 2. Sustainable use and management of Natural Resources for SMEs.

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| Import of Environment/ Eco- friendly equipments and products. | - Increase in development activities.

- Growing demand for consumer products. | 1. Create awareness to the importers to import environmental friendly equipments and products.

2. Review the Import rules and regulations. | - Reduced pollution (low carbon footprint). | 1. Level of awareness created amongst the importers and consumers.

2. Level of import of environmental friendly equipments. | NKRAS:

1. Sustained economic growth.
2. A carbon neutral and climate resilient development.

SKRAs:

1. Conducive environment for private sector development /SMEs enhanced and Green industries.
2. Contribution of GDP and employment increased. |

3. Ministry of Health

Key ECP pressure/ issue within the sector.	Analysis on status, trends and impacts of the identified ECP pressure.	Alternative options & opportunities to address the identified ECP pressure (Programme/activities to be mainstreamed into 11th Plan).	Impacts/benefits of identified opportunities/ alternative options.	M&E for identified opportunities/alternative options with indicators.	Linkage of identified opportunities/ alternative options with NKRAs & SKRAs.
Inadequate access to potable water.	- Water sources drying up due to impact of Climate Change. - Functionality of existing schemes). - Expansion of households (addition of new settlements) and increase of population in rural areas. - Lack of water sources in some settlements. - Quality of potable water. - Lack of community participation in operation & maintenance. - Contamination of	1. Increasing access to potable drinking water (e.g.: 150-200 litres/per day/per person) 2. Explore alternative technology to improve, reduce, reuse, and recycle waste water (Rain water harvesting, pumping, bio-sand filtration). 3. Cross-sectoral intervention – watershed protection, Payment for Ecosystem Services (PES) (collaborate with municipal authorities & MoAF). 4. Education and	- Reduce water related disease through improved _access_ to safe drinking water. - Sustainable water supply. - Improved health, livelihoods and well being in general.	1. % in reduction of diarrhoea & dysentery. 2. % of HH having _access_ to safe water. 3. % of functional water supply schemes.	NKRAs: 1. MDG + Achieved. SKRAs: 1. Incidence of communicable diseases reduced.

	surface and ground water due to waste generated from industries and disasters such as flood. - Access to safe drinking water in rural areas– 96.1% (BMIS, 2010). - While the functionality of schemes is only 69% (PHED, 2008). - Increase in water related diseases (no significant reduction in diarrhea & dysentery) –Diarrhea cases- 65,870, AHB 2011). - Dysentery cases- 22,289, AHB, 2011).	awareness for sustainability (water safety plans, tools, caretaker training, Community Development for Health (CDH) workshop); 5. On-the-ground interventions (e.g., provision of potable water supply kit to nomads). 6. Water quality monitoring & Testing. 7. Strengthening of inter-sectoral coordination at the local government level. 8. Integrated water resource management system (led by NEC, MoAF, MoWHS)			
Inadequate Access to sanitation and hygiene services & facilities.	- Access to basic sanitation – 92.5% - Low (58.4%- BMIS, 2011) access to improved toilets and	1. Improve access to low cost and environmental friendly sanitary facilities. 2. Improved sanitation	- Improve hygiene and sanitation facilities. - Incidence of water	1. % in reduction of diarrhoea & dysentery. 2. (% of households) With improved	NKRAs: 1. MDG + Achieved. SKRAs:

	usage (disposal of human faeces leading to contamination of water). - Safe disposal of child faeces- 57.5% (BMIS, 2011). - Diarrhoea and Dysentery still among the top ten diseases in the country. - Diarrhoea cases- 65,870, AHB 2011). - Dysentery cases- 22,289, AHB, 2011).	technology (eco-sanitation; provision of ventilation; pour flush). 3. Promote use of human waste as bio-fertilizer through eco-sanitation (in collaboration with MoAF, MoE, MoWHS) 4. Advocacy and awareness on hygiene and sanitation.	borne diseases such as faeco-oral infections reduced.	sanitation (Toilet).	1. Incidence of communicable diseases reduced.
Medical waste disposal.	- Problem with liquid waste management – pollution of streams, rivers, ground water etc. - Disposal of chemical/ toxic waste. - Lack of effective waste storage and disposal facility in the hospitals and BHUs. - Lack of facilities to manage chemical	1. Implementation of Waste Mgt. Rules and Regulations (2011). 2. Minimize import of hazardous substance such as mercury thermometers/BP apparatus and promote use of digital apparatus. 3. Cross-sectoral intervention (awareness on waste hazards & management.	- Control the spread of infectious and other waste related diseases. - Reduce pollution to environment by improved waste disposal technology (common incinerator). - Employment generation and	1. Hospital Acquired Infections (%). 2. ARI cases 3. Diarrhoea Cases 4. Dysentery Cases 5. Skin Infections 6. Waste Generated from health facilities • BHU II • BHU I • Hospital	NKRAs: 1. MDGs+ achieved. SKRAs: 1. Incidence of communicable diseases reduced 2. encouraged 3. Accessible, efficient and effective delivery of health service delivery enhanced.

	wastes. - Increasing volume of waste generated from hospitals (no data had been compiled). - Emerging health hazards from poor waste management. - Emergence of vector borne diseases.	4. Coordination and partnership among relevant sectors (MoAF, MoE, NEC LG, Municipality). 5. Promote use of domestic and human waste as manure for organic farming (In collaboration with MoAF, NEC, Municipal Authorities and LG). 6. Encourage suppliers to supply medicines and equipment in degradable materials.	income generation through privatization of waste management. - Prevention and control of emerging waste related health problems. - Control of spread of vector borne diseases.		4. Medical waste management improved. 5. Private participation including PPP/outsourcing in delivery of health care services.
Rise, emergence and re-emergence of climate sensitive diseases such as vector borne disease.	- Rising Temperature, humidity and changes in precipitation creates favorable conditions for disease carrying vectors to breed and alter their geographic range, potentially bringing the disease to high altitudes regions.	1. Sustained and further intensify control and preventive activities. 2. Encourage community participation & behavioral changes through advocacy & awareness. 3. Prompt diagnosis and appropriate treatment. 4. Expansion of	- Reduction in incidence & mortality of vector borne diseases. - Reduced temperature related morbidity.	1. API (Annual Parasite incidence rate) less than 1/1000 population. 2. Malaria incidence per 1000 population (by region & altitude). 3. Dengue incidence per 1000 population.	NKRAs: 1. MDG[+] Achieved. SKRAs: 1. Incidence of communicable diseases reduced. 2. Accessible, efficient and effective delivery of health service

	- Dengue, scrub typhus and Kala Azaar are emerging in the country. - Poor inter-sectoral collaboration. - About 70% of Bhutanese population in risk of malaria. - Rise in the malaria cases (972 in 2010). - Rise in Dengue cases (874 in 2010). - Outbreak of dengue (1st outbreak in 2004 in Phuntsholing, 2700 cases). - Future probability of detecting cases in non-malaria areas. - Increasing breeding sites such as dam site (Punatsang Chu).	surveillance in other suspected areas. 5. Inter-sectoral collaboration (particularly Municipal Authority and Local Government) to control the spread of vector borne diseases (R & D, for Scientific, Meteorological, climate prediction). 6. Afforestation, reforestation and management of tree coverage for heat stress control.	- Carbon sequestration/storage enhanced.	4. % HH using treated mosquito nets. 5. Incidence of mortality due to extreme temperature (cold and heat).	delivery enhanced. 3. Health resilience to climate change impact strengthened.
Acute respiratory & other respiratory infections	- Use of firewood for cooking and heating in rural areas - Percentage of HH using firewood for:	1. Advocacy & Awareness on ill-effects of air pollution & occupational safety. 2. Behavioral changes and	- Reduction of ARI. - Reduced mortality due to ARI and Pneumonia	1. % reduction in ARI. 2. % reduction mortality due to ARI and Pneumonia.	NKRAs: 1. MDG+ achieved. SKRAs: 1. Incidence of

	- Cooking 40.7%, BLSS, 2007). - Heating- 27.3%, BLSS, 2007. - % of household using kerosene/gas/candle for lighting- 27.3, BLSS, 2007. - Poor ventilation provisions in rural housing. - Increasing outdoor air pollution due to : - Vehicle emissions: 61,756 vehicles as of November 2011, growing at 10-12% annually (RSTA). - Industrialization - 27 industrial projects of various scales approved during 2010, MoEA Annual Report, 2010-11) - Urbanization. - ARI always feature in the top ten disease; ARI cases – 462,575 (AHB, 2011).	encourage best practices in coordination with other relevant sectors (MoEA, RSTA, NEC, MoLHR). 3. Introducing fuel-efficient stoves to reduce indoor air pollution. 4. Encourage improved & ventilated rural homes. 5. Bio-engineering in the compound to absorb particulate matters.	(through introduction of weekly surveillance). - Improve health seeking behavior and treatment through IMNCI approach.		communicable diseases reduced 2. Accessible, efficient and effective delivery of health service delivery enhanced.

Lack of eco-efficient & disaster resilient features in the health infrastructure.	- Low use of local materials. - Use of excess building materials like heating and cooling systems etc. - No visible models of sustainable methods of energy utilization and conservation in the country. - High use of imported materials which increases carbon footprint and increase in construction cost. - Inefficient use of electricity, water and building materials.	1. Integrate eco-efficient, climate and disaster resilient features in the design & construction of buildings (insulation, recycle materials, passive house standards). 2. Capacity enhancement to adopt sustainable design. 3. Promote sustainable use of locally available materials (rammed earth, efficient use of timber and bamboos). 4. Encourage beautification and plantation within the health premises. 5. Adopt alternative sustainable methods of energy and conservation of resource use (rain water harvesting, solar roofing, cross ventilation for cooling).	- Reduction in operation and maintenance cost. - Improved construction incorporating eco-efficient standards and Bhutanese architecture. - Reduced emissions (less carbon footprint). - Protect environment and nature. Improved state of environment.	1. Number of health facilities with eco-efficient, climate & disaster resilient features.	NKRAs: 1. MDG[+] Achieved. 2. A carbon neutral and climate resilient development. 3. Disaster resilient. SKRAs: 1. Eco-efficient and disaster resilient health infrastructure ensured.

		6. Promote 3 Rs in all health care facilities (both water and waste).			
Un-sustainable harvesting of medicinal plants for production & manufacture of traditional medicines.	- Over harvesting and collection. - Sustainability of raw materials. - Inadequate information on alternate sources/ materials. - Scarcity of raw materials that are of animal origin and their use are restricted by the international conventions and sensitivity of animal rights groups. - Traditional medicine has more than 1000 formulations and most of these formulations require multiple ingredients of both plant and animal origin. - Threat of extinction	1. Survey, Identification and inventory of alternate sources. 2. Promote community based sustainable cultivation and /or collection/harvesting for management and conservation. 3. Research and explore plant/herb substitutes for animal origin. 4. Expand and extend drying facilities (energy efficient) in the collection centers to improve quality and minimize wastage. 5. Establish semi-processing facility in the local communities (community ownership).	- Medicinal plants conserved and raw materials made available for sustainable production of Traditional Medicines. - CBNRM promoted (management by relevant community in collaboration with MoAF). - Sustainable supply of Traditional Medicines. - Generation of income through employment opportunities. - Promotion of community based entrepreneurship.	1. Distribution of traditional medicine services per 10,000 population 2. Number of commercial products produced. 3. Production of TM in tons.	NKRAs: 1. Sustained economic growth. 2. Poverty Reduced/MDG + Achieved. 3. A carbon neutral and climate resilient development. SKRAs: 1. Accessible, efficient and effective delivery of health service delivery enhanced. 2. Traditional medicine services promoted and expanded.

	of rare medicinal plants. - Seasonal dependency on Medicinal Plants. - Only 98 products can be manufactured currently. - Low capacity and inefficient drying facility to meet increased demand for medicinal plants. - High wastage of medicinal plants due to bad quality attributed to inadequate drying facility.				

Altered Nutrition	- Micro-nutrient and vitamin deficiency.
	- Arsenic and heavy metal poisoning due to ground water depletion.
	- Childhood Malnutrition (severe and moderate)
	  a. Height - for -Age
		1. Implementation of nutrition plan during emergencies.
		2. Establishment of Nutrition rehabilitation centers.
		3. Nutrition Education (in collaboration with MoAF).
		4. Hospital based
			- Improve nutritional status for below 5 years of age.
			- Reduce Anemia among children.
			- Reduce low birth weight.
			- Improve maternal nutrition.
				1. Childhood Malnutrition Reduced (severe and Moderate):
				  a. Height -for - Age
				  b. Weight -for - Age
				  c. Weight for Height
					NKRAs:
					1. MDG+ Achieved.
					SKRAs:
					1. Accessible, efficient and effective delivery of health service delivery enhanced.
					1. Under 5 years malnutrition rate

	(33.5, BMIS, 2011) b. Weight - for – Age (12.7, BMIS, 2011) c. Weight for height (5.9, BMIS, 2011) - Anemia among children between 6-36 months – 81% (National Anemia Survey, 2002). - Malnutrition due to lack of access to food and nutrition. - Sporadic outbreak of Peripheral Neuropathy (Recent Outbreak in Orong HSS).	management of malnutrition. 5. Promote appropriate Infant and Young Child Feeding Practices (IYCF). 6. Research in changes in nutrition patterns to project deficiencies.	- Healthy and productive adulthood. - Healthy & active aging.	2. Early initiation of breastfeeding. 3. Exclusive breastfeeding. 4. Complementary food for 6-9 months.	reduced. 2. Incidence of communicable diseases reduced.
Impacts on Health due to Environment and Climate-Change.	- Most population settled along the river basins. - Risk of death & injuries due to unpredictable weather events: (GLOF, flash	1. Implementation of Health Sector Preparedness & Response plan. 2. Develop SOPs. 3. Strengthening of existing Emergency	- Reduce disaster-related morbidity/ injuries. - Reduce trauma victims/ patients (both physical &	1. Implementation of health sector preparedness and response plan.	NKRAs: 1. MDG+ Achieved; 2. Disaster resilient. 3. A carbon neutral and climate resilient development.

	floods, landslides & drought). - Population displacement. - Rise in physical disability trauma cases. - Rise in mental/ psychological trauma. - Psycho-social problems (post-disaster trauma).	Medical Services through institutional capacity building. 4. Establish trauma centers with equipments and trained health staff in strategic locations. 5. Develop capacity of counselors for post-disaster mental/ psychological trauma. 6. Collaborate with relevant sectors (RSTA, Police, etc) on Centre Data Management System on trauma for uniform data maintenance. 7. Proper human settlement planning including equity in distribution.	mental). - Balanced development, less epidemic and endemic disease outbreaks.		SKRAs: 1. Accessible, efficient and effective delivery of health service delivery enhanced. 2. Incidence of communicable diseases reduced. 3. Health resilience to climate change impact strengthened.

4. **Ministry of Education**

Key ECP pressure/ issue within the sector.	Analysis on status, trends and impacts of the identified ECP pressure.	Alternative options & opportunities to address the identified ECP pressure (Programme/activities to be mainstreamed into 11th Plan).	Impacts/benefits of identified opportunities/ alternative options.	M&E for identified opportunities/alternat ive options with indicators.	Linkage of identified opportunities/ alternative options with NKRAs & SKRAs.

School infrastructure not eco-efficient & disaster resilient.	- Children's learning hampered due to in-efficient heating & cooling in schools.
	
	- Schools constructed without eco-efficient technology & disaster resilient considerations.
		1. Introduce energy-efficient technology in the design of school infrastructures:
		  a. Geo-exchange (heating of buildings using geothermal heat exchange)
		  b. Solar heating of water.
		2. Placement of School buildings (south facing to maximise heating from the sun).
		3. Building schools along the natural contours of the landscape.
		4. Sustainable use of local materials (timber)
			- Improved school attendance and enhanced learning outcomes.
			- Enhanced safety.
			- Reduced cost in the long run.
			- Savings on maintenance and operation cost.
				1. Enhanced Learning Outcomes (LO) scores.
				2. No. of schools that are eco-efficient & disaster resilient.
					NKRAs:
					1. Disaster resilient.
					2. A carbon neutral and climate resilient development.
					
					SKRAs:
					1. Students' performance outcome improved.
					2. Environment & Climate change Learning Outcome of students enhanced.
					3. Eco friendly/ disaster resilient education

		5. Hazard zoning and disaster preparedness planning. 6. Assessment of existing structures for compliance to national safety standards (e.g. Earthquake resistant).			infrastructure development.
Sanitation - Inadequate access to improved hygiene and sanitation and usage. - Lack of adequate knowledge on sanitation and hygiene. - Bad hygiene and sanitation practices.	- High level of water borne diseases (including diarrhoea and dysentery)	1. Improved technology (eco-sanitation; provision of ventilation; water-base). 2. Promote use of Water Efficient Separation Toilets. 3. Advocacy and awareness on sanitation. 4. Inter-sectoral cooperation (MoH, Education, MoWHS).	- Reduce water borne disease of children through improved _access_ to sanitation - Efficient use of water.	1. % reduction in diarrhoea & dysentery of school children. 2. % of schools with improved access to sanitation. 3. No. of schools using improved sanitation.	NKRAs: 1. MDG[+] achieved. SKRAs: 1. Students' performance outcome improved. 2. Environment & climate change Learning Outcome of students enhanced
Inefficient Water management in schools.	- Sources drying up due to impact of climate change (from rising temperature and untimely rains).	1. Promote & strengthen rain water harvesting. 2. Incorporate basic water conservation & management messages	- Optimal use and efficient management of water.	1. No. of schools practicing rain water harvesting technology. 2. School curriculum	NKRAs: 1. MDG[+] achieved. SKRAs: 1. Students'

	- Functionality of existing schemes). - Lack of water sources in some settlements. - Quality of potable water. - Lack of community participation in operation & maintenance (in community schools). - Increase in water related diseases (no data available).	in the curriculum and the teaching learning process/practices.		and activities incorporating water conservation and management.	performance outcome improved. 2. Environment & climate change Learning Outcome of students enhanced.
Solid Waste Disposal. - Disposal of bio-degradable and non-bio-degradable waste.	- Pollution of water bodies and ground water, etc. - Increased incidences of vector borne illnesses; - Inefficient SWM in the schools.	1. Use of technology and ideas to reduce and manage waste (composting, protected landfill). 2. Advocacy of the 4 Rs (Refuse, Reduce, Reuse, and Recycle) 3. Education and Awareness initiatives (design for change; education for GNH) 4. Implementation of	- Control spread of infectious diseases; - Awareness & waste management practices enhanced.	1. No. of schools with proper waste management practices (eg. Composting, segregation of waste); 2. No. of initiatives on waste management (4 Rs). 3. Reduce related diseases by (%)	NKRAs: 1. MDG+ Achieved. 2. A carbon neutral and climate resilient development. SKRAs: 1. Students' performance outcome improved. 2. Environment & Climate change

		Waste Mgt. Rules and Regulations (2011). 5. Improve Cross-sectoral intervention & coordination (MoWHS, NEC, Education and Municipality).			Learning Outcome of students enhanced.
Inadequate integration of ECP concerns in "Education for GNH" guideline.	- Lack of comprehensive understanding of ECP issues and the linkage between individual actions and the environmental impacts.	1. Mainstream ECP issues into "Education for GNH" focusing on the holistic understanding of students on ECP concerns. 2. Expand the concept of place-based education to promote learning, education for green growth & practicing green life. 3. ECP related study tour for school students (in-country) during thematic day celebrations to showcase ECP issues (for e.g. in national parks). 4. Capacity building of	- Enhanced student learning and practices on ECP concerns. - Preparedness for emerging challenges like waste management and climate change.	1. Education for GNH Guideline incorporating ECP. 2. Proportion of students with knowledge and awareness on ECP concerns.	NKRAs: 1. MDG+ Achieved. 3. A carbon neutral and climate resilient development. SKRAs: 1. Students' performance outcome improved. 2. Environment & Climate change Learning Outcome of students enhanced.

		teachers and instructors to enhance the delivery of ECP concepts (e.g. training, development and availability of learning/ teaching materials.			

5. Ministry of Labour & Human Resources

Key ECP pressure/ issue within the sector.	Analysis on status, trends and impacts of the identified ECP pressure.	Alternative options & opportunities to address the identified ECP pressure (Programme/activities to be mainstreamed into 11th Plan).	Impacts/benefits of identified opportunities/ alternative options.	M&E for identified opportunities/alternative options with indicators.	Linkage of identified opportunities/ alternative options with NKRAs & SKRAs.
Unemployment	- Maintaining full employment. - Increasing youth unemployment (9.2%). - Higher female unemployment (4.5%). - Higher urban unemployment (5.8%). - Employment of various groups of society (includes differently-abled groups, monks, nuns, villagers, retired armed force personnel, elderly citizens, etc.).	1. Making TVET mainstream choice for youth employment. 2. Promote self-employment among youth (organic farming, Green MSMEs, waste management, eco-tourism etc.). 3. Strengthening of labour market information. 4. Enhancing employment facilitation services. 5. Strengthen inter-sectoral coordination for employment generation and facilitation (*including green jobs*)	- Human Resource shortage met. - Unemployment reduced. - In the event that options such as foreign workers levy do not work as envisaged, growth in certain sectors can be impacted negatively.	1. Unemployment rate less than or equal to 2.5%. 2. 90% of trained youth employed in various sectors. 3. No. of green jobs created. 4. No. of youths availing green jobs.	NKRAs: 1. Full employment. 2. A carbon neutral and climate resilient development. SKRAs: 1. Full employment achieved. 2. Environment friendly training practices incorporated in TVET.

		6. Effective enforcement of Labour and Employment Act (*related to OHSS*, workplace harmony, etc.) 7. Introduce foreign workers levy.			
Technical and Vocational Education and Training (TVET)	- TVET not attractive to youth and society. - Inadequate training resources (human resources, infrastructure & funds). - Limited choice of courses offered as TVET Programmes. - Weak ECP concept in TVET curriculum & NOSS. - Weak industry-institute linkage. - Low quality of training (low motivation among instructors, low social standing of both	1. Integration of TVET in general education system. 2. Linkage of TVET to tertiary education. 3. Build & Retrofit institutes with green technology (energy efficient, disaster resilient, aesthetic values, 3Rs, and green campuses). 4. Introduction of courses on green technology. 5. Friendly infrastructure and training curriculum and methods for differently-able people. 6. Strengthen ECP concept in TVET	- Full capacity utilization of TVET institutes. - TVET graduates equipped with ECP knowledge & skills. - Gainful employment of TVET graduates leading to sustainable livelihood. - Reduced dependency on expatriate skilled workers. - Eco-efficient and disaster resilient	1. Employability of TVET graduates enhanced by 90%. 2. % increased enrolment in the TVET institutes/ Programmes. 3. No. of TVET institutes incorporating green technologies (construction, retrofitting). *4.* No. of TVET Institutes incorporating environment & Climate Change into the curriculum.	NKRAs: 1. Sustained socio-economic growth 2. Full employment. 3. Gender friendly environment. SKRAs: 1. Environment friendly training practices incorporated in TVET. 2. Quality of TVET improved.

	TVET instructors and trainees) - Weak quality assurance system in both public and private institutions. - Certification of skilled foreign workers (to ensure that workers are skilled).	curriculum & NOSS. 7. Strengthen industry-institute linkages (including R & D on green technologies). 8. Strengthening of labour market information. 9. Making TVET accessible to various interest groups (even semi literate or illiterate target groups). 10. Mechanisation at the workplace. 11. Strengthen quality assurance system. *12.* Promote Sustainable harvesting of raw materials (e.g. extraction of raw materials for indigenous craft making) in Zorig Chusum Institutes.	trainings & infrastructures in place. - Quality of training enhanced through accreditation.		
Private and Corporate Sector HRD.	- Lack of HRD management and plan in the private sector.	1. Provision of an enabling environment to foster private sector growth –HR	- Greater participation of private sector (PPP)	1. Un-employment rate reduced. 2. Private Sector growth promoted.	NKRAs: 1. MDG+ achieved. 2. Sustained economic growth

	- Lack of Private Sector participation in HRD of their employees. - Lack of incentives or recognition for private training entities investing in their HRD. - Dedicated HRD pool fund for private sector HRD non-existent. - Lack of local training providers in certain areas of skills requirement.	Management and planning. 2. Development and enforcement of clear regulations for HRD in the private & corporate sector. 3. Institute clear set of criteria for management of the HRD pool fund. 4. Promote and facilitate ease of doing business (services as well as institutes) in the country.	in HRD Programmes (both company-sponsored & donor sponsored, in-country/ ex-country). - Programmes diversified for different target groups in the priority sectors (gender, disadvantaged, rural, etc.). - Private Sector developed	3. Skills enhancement Programme implemented as per sectoral HR requirement. 4. Private sector role enhanced in training delivery. 5. Improved business environment through supply of qualified and skilled human resources. 6. Gender-friendly Programmes instituted. 7. Poverty reduction through skills enhancement and employment generation Programmes for the labour force.	through HRD Programmes. 3. Full employment. 4. Gender friendly environment. SKRAs: 1. Working environment in private sector improved.
Labour Administration	- Weak Occupational Health Safety (OHS) management systems in place due to poor	*1. Environment friendly OHS adopted.* 2. Development and endorsement of OHS	- Improved working environment. - Eco-friendly OHS	1. Increased number of inspections to all the enterprises. 2. Decent working	NKRAs: 1. Improved public service delivery driven by

enforcement of existing laws and standards. - Lack of awareness on OHS. - Rising OHS related (exposure to hazardous chemicals & pollutants) issues at workplace. - Lack of Social Security Policy.	manuals, policy & regulation. 3. Development & endorsement of Social security Policy. 4. Enhance compliance of existing laws and standards.	system implemented. - Social Security Policy Implemented.	conditions established. 3. Workers rights enhanced to 80%.	motivated public servants and effective performance management system. 2. Gender friendly environment. SKRAs: 1. Enhance effectiveness and efficiency in delivery of public service. 2. Working environment in private sector improved.

6. Ministry of Information & Communication

Key ECP pressure/ issue within the sector.	Analysis on status, trends and impacts of the identified ECP pressure.	Alternative options & opportunities to address the identified ECP pressure (Programme/activities to be mainstreamed into 11th Plan).	Impacts/benefits of identified opportunities/ alternative options.	M&E for identified opportunities/alternative options with indicators.	Linkage of identified opportunities/ alternative options with NKRAs & SKRAs.
Surface Transport Sector - Uncontrolled growth in vehicle numbers. - Poor urban public transport services. - Lack of eco-friendly & eco-efficient public transport systems.	- Huge dependence on fossil fuels resulting into GHG emissions. Transport sector contributes 45% of GHG emissions. - Inadequate and poor infrastructure facilities (roads, parking spaces). - Growing traffic congestion increasing road accidents and fatalities. - Rising no. of vehicles- 61,756 vehicles as of November 2011, growing at 10-12% annually. - Road fatality rate is	1. Strengthen institutional Capacity (Training, integrated database & monitoring system). 2. Effective enforcement of rules & regulations (emission test). 3. Implement system selection study carried out by JSP & ADB on eco-efficient & alternative mode of transport (such as rope ways, rail way, hybrids or electric vehicles/cars, CCTV etc.) 4. Explore/promote use of alternate fuels (CNG, Bio-ethanol, Hydrogen fuel, etc.).	- Reduced pollution, GHG emissions contributing to national objective of carbon neutral development. - Saves time and money, and enhances work efficiency. - Saves life from pollution, traffic congestion and accidents.	1. Reduce the number of vehicles to10/10,000 people, from 15/10,000. 2. Number of alternative mode of transport and vehicle (by category). 3. Reduction in ARI (acute respiratory infections). 4. Number of quality emission testing agents across the country. 5. Number of employees (inspectors) trained for quality	NKRAs: 1. Sustained economic growth. 2. A carbon neutral and climate resilient development. SKRAs: 1. Geog centres with access to Public Transport increased. 2. Eco-friendly, safe, reliable and affordable surface/ air transport increased. 3. New modes of transport explored/ introduced.

	15 deaths per 10,000 vehicles in 2010. - Fuel imports increased) petrol – from 5,834,454 litres (2009) to 7,031,386 litres (2010). Diesel from 19,262,909 litres (2009) to 28,567,135 litres (2010). - Lack of capacity and infrastructure, equipment, coverage, enforcement and monitoring (lack of system in place and capacity). - Inadequate funds, lack of professional capacities, poor research in energy efficient and alternate transport systems. (**Source:** RSTA, Second National Communication to UNFCCC, NEC; Department of Trade, PoL Division, MoEA)	5. Promote efficient (aerodynamics) long distance buses and freight trucks. 6. Improve traffic, efficient routes & roads management including weather planning, improved urban planning for better transport system. 7. Awareness & Sensitization - discourage travel (land & air) and encourage use of tele/video and other emerging virtual communication technologies for meetings/conferences.		monitoring & testing of emission. 6. Integrated monitoring & Data system amongst RSTA, RBP & Emission testing agents, DoR, DCA, and DRC in place. 7. Improved integrated urban planning and management (no. of integrated quality plans in place).	4. Contribution to GDP and employment.

Information, Communication and Technology Sector. - E-waste (electronic & electric goods). - Reducing paper waste. - Need to reduce travel. - Consolidation and centralization of ICT resources and services for efficient and effective utilization.	- Increasing e-wastes. - Lack of proper e-wastes management system (recycling facilities, disposal). - Lack of awareness & technical skills. - Low coverage/speed of Connectivity. - Lack of usage of ICT in addressing climate change.	1. Enforcement & monitoring of e-waste rules and regulations. 2. Establish e-waste management system through PPP model. 3. Deliver most commonly availed services through CCs. 4. Increase number of G2C, G2G, G2B services. 5. Deeper penetration of online services with the development of mobile application (mobile banking, mobile payment). 6. All 10 ministries and 20 dzongkhag availing and using Video Conferencing. 7. Migration from current copper wire connection to fiber connection.	- Reduced e-waste through Proper and systematic e-waste management. - Strengthen Institutional capacity. - Time saved through the use of e-services resulting into positive socio-economic impact especially for rural poor. - Reduce carbon footprint and emissions. - Improved resource sharing & reduced travel time, paper usage, e-waste through office automation & e-governance services.	1. No. of e-waste management agent established through PPP. (Baseline: 0, target: 1). 2. No. of G2C, G2G, G2B services online (target=100% of all new services that can go online, baseline=150 services). 3. No. of initiatives using mobile application. 4. No. of consolidated and shared ICT services and resources. 5. No. of offices (both government & private) using office automation (by category).	NKRAs: 1. Sustained socio-economic growth. 2. Full Employment. 3. A carbon neutral and climate resilient development. SKRAs: 1. Access to reliable and affordable ICT and media services improved. 2. Citizens empowered through effective use of media to make informed decisions. 3. Contribution to GDP and number of job created. 4. E-waste management system developed and operational. 5. Improved

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- Utilize global education and research resources.		8. Establishment of National Data Center. 9. Shared services (web and mail servers). 10. National integrated Geographical Information System as a planning tool. 11. Office Procedure Automation (printer net work; scanner) 12. E-procurement. 13. Setting up of National Research and Education Network connected to Global Research and Education Network.		6. No. of research and education network for Bhutan connected to global research and education network (baseline=0, target =1)	efficiency through consolidation and centralization of ICT services and resources. 6. Effective and efficient public service delivery.
<u>Media Sector</u> - Wastes from printing firms (Ink, toner, etc).	- Lack of proper management of waste from printing firms (paper, printing equipments, toner, ink etc.).	1. Establish Printing Park (bringing all printing firms under one location/roof). 2. Promote Public awareness/literacy/ publication on ECP Mainstreaming. 3. Promote use of re-	- Reduced GHG emissions and pollution. - Coordinated waste management system. - Optimum use & sharing of	1. Printing Park established. 2. No. of print media with column dedicated for environmental & climate issues. 3. Public awareness on environmental	NKRAs: 1. Sustained socio-economic growth. 2. Full Employment. 3. A carbon neutral and climate resilient development.

		cycled paper for print media. 4. Promote use of electronic publications (e-reports, e-newspapers, e-magazines).	resources. - Public aware of the benefits and consequences of environmental impacts (behavioral change).	and climate change issues. 4. No. of print media using re-cycled paper.	SKRAs: 1. Access to reliable and affordable ICT and media services improved. 2. Citizens empowered through effective use of media to make informed decisions. 3. E-waste management system developed and operational. 4. Improved efficiency through consolidation and centralization of ICT services and resources.
Civil Aviation Sector - Emissions from Aircraft engine.	- Increased aviation activities contribute to more GHG emissions. - Increasing use of hand- held fire fighting extinguishers	1. Promote & introduce aircraft/engines that are more fuel efficient and certified with alternate fuel (e.g. bio-ethanol). 2. Introduction of fire	- Reduce GHG Emissions, pollution (waste reduced) and carbon footprint.	1. GHG emission from aviation sector. 2. Waste management system in place.	NKRAs: 1. A Carbon neutral and climate resilient development. 2. Sustained economic growth.

- Airport Fire fighting hand- held extinguisher. - Greenfield airports.	at the airports (will deplete Ozone layer) - Increased in aviation activities results into generation of bio-degradable and non-degradable waste at the airports.	extinguishers without Ozone Depleting Substances. 3. Strengthen waste management & 3Rs in the aviation sector (on board and airports).	- Efficient (service delivery and cost) aviation service.		SKRAs: 1. Safe, reliable and affordable surface/ air transport increased.

7. Ministry of Finance

Key ECP pressure/ issue within the sector.	Analysis on status, trends and impacts of the identified ECP pressure.	Alternative options & opportunities to address the identified ECP pressure (Programme/activities to be mainstreamed into 11th Plan).	Impacts/benefits of identified opportunities/ alternative options.	M&E for identified opportunities/alternative options with indicators.	Linkage of identified opportunities/ alternative options with NKRAs & SKRAs.
Lack of Green element in Procurement Rules and Regulation. - Office Equipment (Paper, computer & peripherals etc.) - Medical equipment. - Vehicles.	- Procurement Rules & regulations does not take into account green standards resulting into procurement of materials/equipments etc which are not eco-efficient & environment friendly. - Procurement of office equipment – does not consider green labeling/ standards leading to intensive use of energy & pollution from disposal.	1. Incorporate green standards in procurement rules & regulations. 2. Promote introduction of green labeling of goods& products. 3. Energy efficient office equipments and code of conduct. 4. Promote procurement of recycled/ environmental friendly products and equipments. 5. Disposal of obsolete equipment through PPP/outsourcing. 6. Institute electronic system to improve	- Reduced impact on environment & climate. - Energy and cost savings. - Improved waste mgt through efficient use of office resources. - Adaptation/mitigation/ contributing to carbon neutrality. - Streamlined procurement system to facilitate rational procurement and distribution of drugs, vaccines and	1. Procurement rules and regulations incorporating green standards. 2. No. of good and products green labeled (certification). 3. % Reduction in expenditure of office stationeries and equipment across government offices. 4. % of drugs wastage. 5. % of Medical Equipment wastage	NKRAs: 1. A carbon neutral and climate resilient development. 2. Improved public service delivery driven by motivated public servants and effective performance management system. SKRAs: 1. Enhance effectiveness and efficiency in delivery of public

	- Inaccurate forecasting of the requirements of medicines & medical equipment leading to wastage and disposal issues.	efficiency in procurement of drugs, vaccines and equipment.	equipments (reduce wastage and disposal).		service. 2. Adequate availability of medical supplies in all health facilities ensured (MoH).
ECP concerns not integrated into annual budget.	- ECP considerations not taken into account during annual planning and budgeting.	1. Notify agencies through annual budget call to integrate ECP considerations into annual plans & budgets.	- ECP concerns mainstreamed in annual plans, budget & implementation.	1. Annual budget call notification incorporating ECP concerns.	NKRAs: 1. A carbon neutral and climate resilient development.
Sectors & LGs request fund to meet additional cost incurred due to ECP consideration.	1. MOF & agencies perceive need of additional resource for ECP mainstreaming & implementation.	1. Encourage ECP budgeting within the resources provided, and improve planning and budgeting. 2. Awareness and capacity building of sectors on the ECPM and best practices. 3. Wherever possible provide additional resources for ECPM supported by research and recommendation (e.g. farm road cost	- Promote environment & climate friendly construction. - Reduction in recurrent expenditure.	1. Annual plans and budgets. 2. Public expenditure on ECPM.	NKRAs: 1. A carbon neutral and climate resilient development. 2. Sustained economic growth. SKRAs: 1. Eco-efficient and disaster resilient health infrastructure ensured (MoH).

		benefit analysis - while the upfront cost is high, the overall cost in the long run is low due to reduced recurrent cost).			2. Eco-efficient/disaster resilient education infrastructure developed (MoE). 3. Environment friendly road constructed (MoWHS). 4. Environment friendly human settlement developed (MoWHS) 5. Alternate renewable energy promoted (MoEA). 6. Energy efficient technologies in industries promoted (MoEA).
Inadequate fiscal incentives for greening of plans and Programme.	- No performance based incentive system for undertaking green initiatives.	1. Need assessment & research (cost benefit analysis). 2. Provision of fiscal incentives for green initiatives & investment.	- Fiscal incentives promoted and implemented. - Eco-friendly (Green initiatives) practices.	1. Need assessment conducted. 2. No. & types of fiscal incentives.	NKRAs: 1. A carbon neutral and climate resilient development.

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					2. Sustained economic growth.
Public Environmental Expenditure Review (PEER) – not very comprehensive.	- PEER does not include expenditure on environment by private/ corporate/CSOs. - PERR does not illustrate linkages between environmental expenditures and environmental outcomes. Ideally, higher environmental expenditures should result in better environmental outcomes. If that's not the case, PEER should analyze the reasons.	1. Conduct comprehensive Environmental Expenditure Review (public/ CSOs/Private and Corporate). 2. Classify & Create green budget codes (e.g. waste mgt, climate change etc.)	- Analysis & trends of expenditure on environment & CC by Public/CSOs/ Private and corporate sectors. - Availability of quality data on a regular basis to influence decision making & investments. - Ease in tracking of budget & expenditure related to environment & CC.	1. No. of Comprehensive PEER conducted. 2. Green budget codes created in MYRB & PEMS. 3. No. of EER recommendations implemented.	NKRAs: 1. A carbon neutral and climate resilient development. 2. Sustained economic growth.

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Absence of domestic revenue accounting on environmental services (e.g. PES, polluter pay instrument). Lack of Climate Financing initiative.	- Lack of Revenue collection and accounting system for environmental goods and services. - While the international financial resources are strongly linking to combating climate change and its adaptation, the national fund accessing mechanisms remain conventional development oriented approach.	1. Revenue generation and accounting system streamlined and reviewed – to track revenue generated from environmental goods and services. 2. Introduce pro-poor Environmental Fiscal Reforms (e.g. Timber pricing, PES, Energy pricing, Polluters pay instrument; Carbon tax; increased taxation on vehicles with higher actual power output or engine displacement). 3. Developing climate change strategies/Low Emission, Climate Resilient Development Strategy and accessing global climate funds (enhancing the approach made in the 1-2 September 2011 RTM).	- Reduce carbon emissions and environment degradation. - Optimize and increase revenue generation. - Promoting and incentivizing sustainable use of natural resources. - Supplementing /sustaining national financial resources.	1. Revenue accounting system - to track revenue generated from environmental goods and services. 2. Data on revenue generated from environmental services available. 3. Proportion of government revenue generated through fiscal reforms, and ploughed back to environment & climate change management. 4. No. of fiscal reforms introduced. 5. Institutionalization of a National Climate Fund is an option.	NKRAs: 1. A carbon neutral and climate resilient development. 2. Sustained economic growth.

8. Ministry of Home & Cultural Affairs

Key ECP pressure/ issue within the sector.	Analysis on status, trends and impacts of the identified ECP pressure.	Alternative options & opportunities to address the identified ECP pressure (Programme/activities to be mainstreamed into 11th Plan).	Impacts/benefits of identified opportunities/ alternative options.	M&E for identified opportunities/alternative options with indicators.	Linkage of identified opportunities/ alternative options with NKRAs & SKRAs.
Lack of eco-efficient and disaster resilient standards in construction & /renovation/ re-construction of Dzong/ lhakhangs/ other cultural infrastructures.	- High consumption of timber in the construction of dzongs and other cultural monuments. - Increased GHG emissions. - Increased risks/vulnerability to lives and properties due to natural and climate induced disasters. - Wastage and unsustainable use of energy/water.	1. Reforestation to be built into the project cost. 2. Efficient use of timber through adoption of efficient and appropriate technologies. 3. Incorporate eco-efficient & disaster resilient standards (including water, sewerage, sanitation and waste). 4. Institutional capacity building on eco-efficient & disaster resilient construction. 5. Include concerns of gender, senior citizens	- Sustainable & efficient use of timber. - Disaster resilient and eco-efficient infrastructures. - Proper water, sanitation waste management 3Rs). - Enhance knowledge and skills on DRR and eco-efficient construction.	1. Acreage of afforestation to replenish timbers extracted for construction (dzongs, Lhakhangs); 2. No. of dzongs/ lhakhangs/other cultural infrastructures constructed with disaster resilient, eco-efficient, water and sewerage mgt. standards (including incorporation of gender, senior citizens and	NKRAs: 1. Disaster resilient. 2. A carbon neutral and climate resilient development. SKRAs: 1. Disaster resilience, preparedness and responsiveness strengthened. 2. Utilization of natural resources reduced through efficiency and effectiveness in restoration/ conservation.

		and differently-abled people in the design and construction of infrastructures.		differently-abled people concerns).	
Inadequate incorporation of Disaster Risk Reduction (DRR) & preparedness in sectoral plans/ programme.	- Poor coordination amongst stakeholders in addressing DRR and preparedness. - Lack of studies and research (Vulnerability Assessment).	1. Implementation of Disaster Risk Management (DRM) Framework. 2. Implementation of Community Based Disaster Risk Management (CBDRM) plan. 3. Develop hazard mapping & zonation. 4. Awareness and sensitization of sectors on DRR mainstreaming into sectoral policies, plans and programme. 5. Enhance institutional capacity building and coordination mechanisms.	- DRR integrated into policies and sectoral plans & programme. - Reduce disaster risk and strengthened preparedness at all levels. - Disaster vulnerable areas safe evacuation sites identified.	1. No. of policies, plans and programme integrating DRR and preparedness. 2. Disaster Response Time. 3. No. of sector officials/ communities/ CSOs trained on DRR and preparedness. 4. No. of sensitization workshops conducted. 5. No. of casualties and loss of property. 6. Proportion of Public Expenditure on DRR and preparedness.	NKRAs: 1. Disaster resilient. 2. A carbon neutral and climate resilient development. SKRAs: 1. Disaster resilience, preparedness and responsiveness strengthened. 2. Environmental impacts from snow and glacier melt reduced. 3. Geo-hazard risk to historical and cultural sites reduced.

<u>Rural Infrastructures</u> Farm roads, irrigation channels affected by monsoon.	- Many farm roads & irrigation channels rendered non-functional. - Most farm roads lack proper side- and cross-drainage and slope stabilization structures. - Most irrigation systems are built without considering the volume of surface run-off, soil conditions, and tail water management needs.	1. Carry out proper maintenance of the infrastructure. 2. Invest in climate-proofing works.	- Durability and serviceability of farm roads and irrigation channels enhanced. - Reduced community labour contribution. - Contribution to economic well-being of communities.	1. No. of farm roads & irrigation channels renovated. 2. No. of Gewogs/ Dzongkhags allocated with climate change adaptive fund.	NKRAs: 1. Sustained economic growth. 2. Disaster resilient. 3. A carbon neutral and climate resilient development. SKRAs: 1. Local Governments' capacity enhanced. 2. Disaster resilience, preparedness and responsiveness strengthened.
Consumption of firewood in the rural areas.	- Most farmers use firewood for cooking and heating purposes leading to respiratory infection as a result of indoor air pollution. - Excessive collection of fuel wood leading to deforestation.	1. Promote bio-gas technology in rural areas through inter-sectoral collaboration (with Department of Renewable Energy – MoEA). 2. Promote improved wood-based stoves/	- Reduced consumption of firewood. - Maintenance of good & healthy forest cover, meeting the	1. No. of bio-gas technologies introduced. 2. No. of CBNRM initiated. 3. No. of institutions/ rural community using improved wood-based &	NKRAs: 1. Sustained economic growth. 2. Poverty+ Reduced/ MDG+ Achieved. 3. A carbon neutral and climate resilient development.

		electric cookers to institutions (Monastic, community schools etc.). 3. Promote & facilitate community-based natural resource management in collaboration with Department of Forest & Park Services – MoAF.	constitutional mandate of a minimum of 60% forest cover.	electric stoves/ cookers.	SKRAs: 1. Local Governments' capacity enhanced. 2. Utilization of natural resources reduced through efficiency and effectiveness in restoration/conservation. 3. Enhanced sustainable forest, land, water and biodiversity resource management (MoAF).
Lack of climate change awareness.	- Local plans do not integrate climate change concerns. - Local community lack or have limited awareness about the emergence/ impacts of climate change issues.	1. Initiate awareness on the impacts and opportunities related to climate change for the rural community. 2. Strategize support to develop capacities of local government and rural population in	- Rural community educated on climate change concerns. - Local Government plans incorporate climate change concerns. - Rural communities	1. Proportion of LG budget allocated to address CC adaptation/ mitigation measures.	NKRAs: 1. Disaster Resilient. 2. A carbon neutral and climate resilient development. SKRAs: 1. Local

	- Dearth of research, documentation, and data on climate change and related impacts in the country to support awareness and education.	preparedness for CC and climate induced disasters. 3. Strengthen research and data on climate change, and develop case studies to demonstrate the impacts of climate change in the country.	sustain their livelihood.		Governments' capacity enhanced. 2. Disaster resilience, preparedness and responsiveness strengthened.

9. Ministry of Agriculture & Forests

9.1 Department of Forests & Park Services

Key ECP pressure/ issue within the sector.	Analysis on status, trends and impacts of the identified ECP pressure.	Alternative options & opportunities to address the identified ECP pressure (Programme/activities to be mainstreamed into 11th Plan).	Impacts/benefits of identified opportunities/ alternative options.	M&E for identified opportunities/alternative options with indicators.	Linkage of identified opportunities/ alternative options with NKRAs & SKRAs.
Deforestation due to infrastructure Development *(road/ transmission line, mega project, urbanization; mining)*	- Increasing road construction; urban boundary expansion; transmission line; mining permit; and development of HEP project. - Forest degradation/loss *(forest area with less than 10% crown density in a contiguous area not less than a half hectare including scrub forest and open scrubs).*	1. Restricting/ re-locating development on/from eco-fragile areas. 2. Development projects should undertake EIA/SEA and comply with the alternative options and mitigations measures. 3. Land use planning/ implementation of various legal provisions. 4. Management plans for forest utilization and conservation. 5. Management of watersheds through	- Reduced forest & biodiversity loss. - Improved soil & water conservation. - Agro-biodiversity conservation enhanced.	1. % of forest cover. 2. Proportion of areas under Protected Area Mgt. 3. % reduction in forest degradation. 4. % reduction in soil erosion. 5. Kms. of farm roads constructed with EFRC techniques. 6. Nos. of EIA/SEA conducted for development projects/ programme. 7. No. of CBNRM initiated.	NKRAs: 1. Sustained economic growth. 2. Poverty[+] Reduced/MDG[+] Achieved 3. A carbon neutral and climate resilient development 4. Integrated Water Resource conservation and utilization. SKRAs: 1. Enhanced sustainable forest,

	- Landslide/Soil erosion. - Water source damage. - Biodiversity loss.	proper management plans (PES opportunities for up-stream and down-stream communities). 6. Reforestation/ sustainable forest management (e.g. CBNRM – community & private forestry). 7. Biodiversity: enhance ex-situ and in-situ conservation.		8. No. of PES schemes identified in potential watershed and river basins.	land, water and biodiversity resource management. 2. Enhanced plant and animal genetic resource conservation & sustainable utilization. 3. Commercial Farming and Agriculture, livestock and Forestry enterprises promoted for accelerated RNR sector growth. 4. Sustainable use and management of Natural Resources for SMEs (Industrial Sector – MoEA). 5. Environment conservation promoted and well

					being of rural communities improved through eco-tourism (in collaboration with Tourism Council – TCB).
Timber harvesting - (Extraction of timber/ fuel wood from forests areas outside Forest Management Units.	- Excessive extraction of timber causing forest degradation and making the land vulnerable to soil and water erosion.	1. Promote improved technology to minimize timber wastage by wood industries. 2. Promote ecological forest harvesting and increase areas brought under Sustainable Forest Management (Forest Management Units & Community forest). 3. Import of timber to meet domestic demand. 4. Promote alternative timber substitute in construction (bamboo/metal shuttering etc). 5. Reforestation/planting fast growing	- Improved conditions of forests and biodiversity. - Soil & water conservation. - Reduced timber wastage. - Increased carbon sequestration capacity of the forest. - Revenue generation Protect environment and nature. - Revenue generation through REDD+ Mechanisms. - Community-based	1. Proportion of forest areas brought under sustainable forest management. 2. % increase in recovery rate during harvesting and processing. 3. Proportion of forest areas and private land brought under community & private forestry management. 4. Research & Development initiated to reduce timber waste and timber substitutes.	NKRA: 1. Sustained economic growth. 2. Poverty[+] Reduced/MDG[+] Achieved. 3. A carbon neutral and climate resilient development. SKRAs: 1. Enhanced sustainable forest, land, water and biodiversity resource management. 1. Timber utilization in construction industry reduced

		trees/adopt sustainable complementary felling. 6. Apply for REDD+ (Reducing Emissions from Deforestation & Forest Degradation) schemes to promote sustainable forest management and carbon trading. 7. Promote Sustainable wood processing and logging residues and wood waste. 8. Sustainable harvesting and use of biomass for energy (wood chips, crop residues & animal dung) and gradual phasing out of use of traditional biomass.	natural resource management (CBNRM) enhanced, and improved availability of natural resources to the local communities.	5. Quantity of timber imported to meet demands.	(Construction Sector).
Forest Fire	- Forest degradation and biodiversity loss making the land vulnerable to soil and water erosion.	1. Advocacy/campaign. 2. Rehabilitation of degraded forests. 3. Improve Forest Fire Monitoring and control system. 4. Strengthen forest fire	- Reduced forest & biodiversity loss. - Improved soil & water conservation.	1. % reduction in forest fire Incidences. 2. Forest fire monitoring and control system developed and	NKRA: 1. Sustained economic growth. 2. A carbon neutral and climate resilient development.

		volunteerism. 5. Enforcement of Forestry Rules & Regulations. 6. Research to improve forest fire management.		operational. 3. Coverage of forest areas with research-based forest fire management schemes.	SKRAs: 1. Enhanced sustainable forest, land, water and biodiversity resource management.

9.2 Department of Agriculture

Key ECP pressure/ issue within the sector.	Analysis on status, trends and impacts of the identified ECP pressure.	Alternative options & opportunities to address the identified ECP pressure (Programme/activities to be mainstreamed into 11th Plan).	Impacts/benefits of identified opportunities/ alternative options.	M&E for identified opportunities/alternative options with indicators.	Linkage of identified opportunities/ alternative options with NKRAs & SKRAs.
Soil erosion through dry-land farming (*29.4% of agricultural cultivation occurred on lands between 50-100% (27-45^0) slope*).	- Loss of fertile soil, and reduced crop productivity. - Increased siltation of Hydro-power dams. - Continuous food dependency on other countries. - More carbon footprint through transportation.	1. Bio-engineering and civil engineering structures. 2. Sloping Agriculture Land Technology (SALT). 3. Up-scale sustainable land management initiatives throughout the country. 4. Crop management. 5. Recuperation and fertility improvement. 6. Strengthen Research & Development in sustainable agriculture. 7. Increase food production & environment protection through proper land use, also making more land and water available. 8. Sustainable use of water	- Increased crop productivity and enhanced food security. - Reduced proportion of population living below national food poverty line. - Reduced soil erosion and siltation of dams. - Improved rural livelihoods. - Achieve food sustainability through sustainable use of environment and sustainable agriculture. - Higher resilience	1. Increased investment in SALT / forest plantation/agro-forestry. 2. Land use planning (catchment protection plan). 3. Proportion of arable land brought under sustainable land management.	NKRAs: 1. Sustained economic growth. 2. Poverty $^+$ Reduced/MDG$^+$ Achieved. 3. Food Secure & sustainable. 4. A carbon neutral and climate resilient development. SKRAs: 1. Commercial Farming and Agriculture, livestock and Forestry enterprises promoted for accelerated RNR sector growth.

		and nutrient in agriculture and minimise additional need. 9. Reduce wastage of food, improve cold storage and supply chain system 10. Restaurants and retailers to source more locally or regionally produced foods that is in season and reduce need for refrigerated storage 11. encourage production and consumption of certified sustainable food products (e.g. Organic or Fair Trade) 12. Undertake review of seasonal climate change projections with farmers, assess impacts of climate variability and change on livelihood and productions for decisions and responses. 13. Develop early warning system and weather forecasting tools for agriculture and food shortages.	of farming systems to climate change. - Adoption of sustainable agriculture technologies and practices.		2. Food and nutrition security enhanced. 3. Additional employment opportunities created and mean annual rural household cash income increased.

9.3 Department of Livestock

Key ECP pressure/ issue within the sector.	Analysis on status, trends and impacts of the identified ECP pressure.	Alternative options & opportunities to address the identified ECP pressure (Programme/activities to be mainstreamed into 11th Plan).	Impacts/benefits of identified opportunities/ alternative options.	M&E for identified opportunities/altern ative options with indicators.	Linkage of identified opportunities/ alternative options with NKRAs & SKRAs.
Degraded pasture (Free-range grazing in forest and open meadows is a common practice in Bhutan).	- Decline in land productivity and exacerbation of soil erosion thereby leading to soil loss and land degradation. - Attrition of forest species and degradation of biodiversity.	1. Improved pasture management with soil conservation technology and rotation grazing 2. Increased feed and fodder processing on farm 3. Promotion of pasture silvicultural practices. 4. Promotion of fodder tree 5. Livestock feed modification 6. Promotion of improved breed.	- Increased pasture production. - Reduction in soil loss. - Increased fodder diversity. - Increased milk productivity. - Reduction in methane emission from livestock.	1. Increased pasture productivity & diary products. 2. Increased area under pasture development 3. Climate smart farming.	NKRAs: 1. Sustained economic growth. 2. Poverty + Reduced/MDG+ Achieved. 3. Food Secure & sustainable. 4. A carbon neutral and climate resilient development. SKRAs: 1. Commercial Farming and Agriculture, livestock and Forestry enterprises promoted for accelerated RNR sector growth. 2. Food and nutrition security enhanced.

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Framework to Mainstream Environment, Climate Change and Poverty (ECP)

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