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Ministry of Environment and Forests
GOVERNMENT OF INDIA

United Nations Development Programme

Country: INDIA

PROJECT DOCUMENT[1]

Project Title: Preparation of Third National Communication (TNC) and other new information to the UNFCCC

UNDAF Outcome(s): Government, industry and other relevant stakeholders actively promote more environmentally sustainable development and resilience of communities is enhanced in the face of challenges of climate change, disaster risk and natural resource depletion.

UNDP Strategic Plan Environment and Sustainable Development Primary Outcome: Strengthened national capacities to mainstream environment and energy concerns in to national development plans.

UNDP Strategic Plan Secondary Outcome: Countries develop and use market mechanisms to support environmental management.

Expected CP Outcome(s): Government, industry and other relevant stakeholders actively promote more environmentally sustainable development and resilience of communities is enhanced in the face of challenges of climate change, disaster risk and natural resource depletion.

Expected CPAP Output (s): Management and preparation for climate change and disasters.

Executing Entity/Implementing Partner: Ministry of Environment and Forests

Implementing Entity/Responsible Partners: Ministry of Environment and Forests/Project Management Unit.

Brief Description

The proposed project is in line with India's commitments to the United Nations Framework Convention on Climate Change (UNFCCC). It aims to enable India undertake activities to prepare its Third National Communication to the UNFCCC according to the guidelines provided by the Conference of Parties (COP) for non-Annex 1 countries (17/CP.8). Based on the experience and lessons learned from the Initial National Communication (INC) and the Second National Communication (SNC), as well as the recommendations from the final evaluation of INC and SNC, the TNC will broaden and consolidate the network of stakeholders, including the researchers, industry, NGOs and the private sector to create a platform for policy interface in key climate change sectors. The activities proposed in the TNC are envisaged to make climate change assessments more policy relevant and enhance India's capacity to incorporate climate change in its development processes which is in line with the GEF's climate change mitigation focal area objective (CCM-6) under GEF-5: Enabling Activities: Support enabling activities and capacity building under the Convention. The outcome is: "Adequate resources allocated to support enabling activities under the Convention" and the Outputs are "Countries receiving GEF support for national communication, etc."& "National communications, etc. completed and submitted to the UNFCCC as appropriate". In inventory analysis, the TNC will increase the reliability of emission data and put in place a more sustainable inventory process, through a national inventory management system. The project would specifically address the gaps identified in the INC and SNC, particularly on capacity building needs, sector-specific data, developing and refining country specific emission/sequestration factors, and developing integrated vulnerability and adaptation frameworks for identified hotspots that are vulnerable to climate change.

[1]For UNDP supported GEF funded projects as this includes GEF-specific requirements

Programme Period:	2012-2017
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Start date:	01 February 2013
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Management Arrangements:	National Implementation
PAC Meeting Date	_____

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• GEF (grant)	US$ 9,010,604
• Government (grant)	US$ 10,302,200
• Government (In-kind)	US$ 15,787,800
• UNDP	US$ 150,000

Agreed by (Government):

Date/Month/Year

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Date/Month/Year

Agreed by (UNDP):

Date/Month/Year

ACRONYMS AND ABBREVIATIONS

AFOLU	Agriculture, Forest and Other Land Uses
APR	Annual Project Review
BTOR	Back To Office Report
BUR	Biennial Update Report
CCCTA	Comprehensive, Complete, Comparable, Transparent, and Accurate
CDM	Clean Development Mechanism
CO	Country Office
COP	Conference of Parties
CORDEX	Coordinated Regional Downscaling Experiment
CPAP	Country Programme Action Plan
CS	Country Specific
EF	Emission Factors
ERC	Evaluation Resource Center
FSP	Full Size Project
GCM	Global Climate Model
GEF	Global Environment Facility
GHG	Greenhouse Gas
GPG	Good Practice Guideline
GWP	Global Warming Potential
INC	Initial National Communication
INCCA	Indian Network for Climate Change Assessment
IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial Processes and Product Use
IVA	Impact, Vulnerability and Adaptation
LULUCF	Land Use, Land Use Change and Forestry
M&E	Monitoring and Evaluation
MNRE	Ministry of New and Renewable Energy
MoEF	Ministry of Environment and Forests
MSME	Medium, Small and Micro Enterprises
MSW	Municipal Solid Waste
NAMA	Nationally Appropriate Mitigation Action
NAPCC	National Action Plan for Climate Change
NATCOM	National Communication
NC	National Communication
NCV	Net Calorific Value
NGO	Non-Governmental Organizations
NIMS	National Inventory Management System
NPD	National Project Advisor
NPD	National Project Director
NSC	National Steering Committee
PAT	Perform Achieve and Trade

PCA	Principal Component analysis
PIR	Project Implementation Reports
PMU	Project Management Unit
PPR	Project Progress Reports
PSC	Project Steering Committee
QA/QC	Quality Assurance / Quality Control
R&D	Research and Development
RCM	Regional Climate Model
RCP	Representative Concentration Pathways
RCU	Regional Coordination Unit
REDD	Reducing Emissions from Deforestation and Forest Degradation
SAPCC	State Action Plans on Climate Change
SBAA	Standard Basic Assistance Agreement
SNC	Second National Communication
SRES	Special Report on Emissions Scenarios
SSP	Shared Socio-economic Pathway
TAC	Technical Advisory Committee
TNA	Technology Needs Assessment
TNC	Third National Communication
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
V&A	Vulnerability and Adaptation

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A. SITUATION ANALYSIS

1. Context and global significance: Environmental, policy and institutional

Climate variability and climate change are serious threats to poverty eradication. Such development challenges posed by the climate change are being grappled at national as well as international levels. India's vulnerability to climate change manifests into greater challenges due to its size, diversity, variability and developmental requirements. India's steady progress towards the goals of human development has been captured in Human Development Index, which has increased from 0.461 in 2000 to 0.547 in 2011. However, regional and inter-state disparities and the increasing extreme events such as floods, earthquakes, and droughts reverse the development process to a great extent and worsen the situation of the disadvantaged and vulnerable groups. The need to integrate climate change concerns into development programmes would be a key to achieving the Millennium Development Goals and implementing National Action Plan on Climate Change (NAPCC).

The United Nations Framework Convention on Climate Change (UNFCCC) recognizes common but differentiated responsibilities and respective capabilities of parties to the Convention towards achieving the sustainable development goals. Being a Party to the UNFCCC, India submitted its Initial National Communication (INC) to the UNFCCC on June 22, 2004 and Second National Communication (SNC) on May 04, 2012, within three and five years respectively of receipt of agreed full costs availed through GEF. Both INC and SNC were prepared, as per capacities permitted; according to the guidelines provided by the Conference of Parties for non-Annex 1 countries (10/CP.2 and 17/CP.8).Both INC and SNC had identified many technical, scientific, financial and policy-related capacity constraints. Also the process of preparation of India's SNC was an opportunity to enrich and enhance India's capabilities in identifying constraints, gaps, and related financial, technical and capacity needs to adequately fulfill our obligations under the UNFCCC. However, the constraints and gaps in these National Communications (NCs), and the related financial and capacity building needs were identified. It is required to further improve upon this effort in future NCs; so as to ensure continuous reporting on a consistent basis and in accordance with the extant guidelines. In India, UNDP supports a large portfolio of climate change programmes. The two previous NCs of India were prepared with the support of UNDP-GEF in partnership with the Ministry of Environment and Forests (MoEF), Government of India. UNDP India has been working collaboratively with many ministries of the Government of India (e.g. National Bureau of Energy Efficiency, Ministry of New and Renewable Energy, Ministry of Environment and Forests), state governments, research organization and civil society organizations in implementing a number of projects. UNDP also supports the Government of India in strengthening the capacity of ten state governments in preparation of their State Action Plans on Climate Change (SAPCC). Synergies between the SAPCC and the TNC will contribute to improved capacities and better coordination among different stakeholders at the national and state levels.

The MoEF is the nodal ministry in India for all international, bilateral and multilateral environmental Conventions and Protocols. The Ministry has the primary role to coordinate with other Ministries. Currently 14 Ministries come under direct purview of the coordinating mechanism set up for Climate Change (www.envfor.nic.in). The developmental goals set by the Planning Commission (www.planningcommission.nic.in) along with the different policies/programmes and projects initiated by the different ministries address various climate change issues. The National Environment Policy and other legislations (forestry act, wildlife act) provide a framework for incorporating environmental considerations into their areas of interventions.

Correspondingly, the sectoral policies, namely, urban transport, water, land use, etc. though now address environmental issues, but also in an indirect way address climate change issues as well. The Ministry of Environment and Forests is the Operational Focal Point for Global Environment Facility in India. UNDP, India partners with the ministry for various GEF and environmental programmes. Synergies will be

maintained with the ongoing GEF supported initiatives such as the National Capacity Needs Self Assessment and other GEF supported projects.

2. Baseline Analysis

The commitments[2] of developing countries, including India, as Parties to the UNFCCC establish common obligations for all Parties taking into account the common but differentiated responsibilities of countries and their specific national and regional development priorities, objectives and circumstances. Developing country Parties will provide the UNFCCC with adequate information on the status of implementation of such obligations[3]. National communications are required to include an inventory of net anthropogenic emissions of GHGs not included in the Montreal Protocol, and a general description of the steps taken or envisaged to implement the Convention in the country. The present proposal is to request resources from GEF for the implementation of Third National Communication (TNC) of India, prepare TNC report and submit it to the UNFCCC as appropriate within the described context and in accordance with UNFCCC guidance.

The preparation and submission of National Communications (NCs) is an obligation and contribution of India to the UNFCCC. As with the other Parties to the Convention, India has actively undertaken, and will continue to do, the task of sharing information on its implementation efforts as well as on the constraints, problems and gaps the country faces in implementing the Convention. For India, the NCs will not only continue to be the main reporting instrument of the UNFCCC but will also be an important strategic tool to help align its interests and priorities to the overall goals of the UNFCCC.

India has successfully prepared its First and the Second National Communications, and through this proposed full size project (FSP) intends to prepare its TNC as well as strengthen institutional and analytical capacities at decentralized level with the financial assistance from the GEF. Since the preparation of its first NC (INC), the process of development of national communications has triggered large scale networking, capacity building and involvement of research organizations and various government departments. The preparation of the 2 previous NCs has led to the development of expert teams for preparation of GHG inventories as well as assessment of impacts, vulnerability, and adaptation. India is a large country with diverse climatic, socioeconomic systems and natural ecosystems. In India, there is a large dependence of population on climate sensitive resources such as water resources, food production, forests and fisheries. Despite the activities implemented during the preparation of the 2 previous NCs, there are still many limitations with respect to estimation of GHG inventories, projection of climate change at regional level, development and adoption of appropriate climate impact models and development of vulnerability profiles, at the state level. This is due to the large diversity of industries, settlements, natural and socioeconomic systems. Given the size of the country and diversity of complex socio-economic and natural systems, there is still a need for involving more local institutions, building technical and infrastructural capacities and stakeholder participation in climate change related activities relevant to NC preparation.

India has announced its National Action Plan for Climate Change (NAPCC) in 2008, which also includes 8 national missions namely: Green India Mission; Enhanced Energy Efficiency; Solar Mission; Sustainable Habitat Mission; Sustaining the Himalayan Ecosystems; Sustainable Agriculture; Water Mission; and Strategic Knowledge Mission. State Action Plan on Climate Change (SAPCC) are being prepared and completed actions plans are currently under implementation. The focus of SAPCC is largely on assessment of climate change projections and related impacts and vulnerability assessment at the state level and development and implementation of adaptation projects. Inventory estimation is not a part of

[2]As described under paragraph 1 of Article 4 of the Convention. One of the main commitments is to develop, periodically update, publish and make available to the Conference of the Parties, inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases (GHGs) not controlled by the Montreal Protocol.

[3]As called for under Article 12.1.

SAPCC goals. The information and knowledge developed, capacity built and institutional network developed during the preparation of first and second national communications has assisted the preparation of climate action plans and missions. The institutions and networks established during the preparation of the INC have been further strengthened during the preparation of the SNC.

However, there are still many scientific, technical and institutional limitations in the: (i) adoption of tier-II and tier-III methods for enhancing the quality of GHG inventory, including disaggregated state/regional level to be aggregated at the national level; (ii) development of region-specific emission factors for different sectors and reducing activity data uncertainty in key sources; (iii) adoption of multiple Global Climate Models (GCMs) and Regional Climate Models (RCMs) for impact assessment and downscaling of climate change projections for disaggregated sub-regional level, and cropping systems scales; (iv) adoption of impact assessment models at disaggregated levels such as disaggregated sub-regions, different cropping systems, watershed levels, different forest types and species level assessment; (v) carrying out impact assessment for short term periods such as up to 2030; (vi) data limitations for inventory and impact assessment models; (vii) absence of models to suit Indian forest types, cropping systems and mountainous regions; (viii) absence of information, data, maps for preparation of vulnerability profiles to enable mainstreaming of adaptation in developmental programmes; (ix) estimation of climate risk related economic damages and costs; (x) climate impact assessment on infrastructure; (xi) integrating climate change adaptation actions with national, state and sub-regional level planning processes, (xii) integrated impact assessment duly integrating sectoral impacts over specific sub-regions, and, (xiii) involvement of stakeholders at decentralized levels, creation of education, awareness and building capacities to enable adaptation decision making at decentralized levels.

The salient features of the proposed Third National Communications (TNC) when compared with the previous NCs are: (i) improvement in the National GHG inventory estimates and reduced uncertainty by shifting to higher tier methodologies for main sources, while adopting the relevant scientific elements of IPCC GHG Inventory Guidelines of 2006 (ii) reliable climate projections at regional level using multiple climate models (iii) reliable assessment of climate change impacts using multiple GCM scenarios and multiple impact assessment models at sub-regional level; different cropping systems, forest types, watersheds, coastal settlements, etc. (iv) spatial vulnerability indices and profiles for different sectors and regions and at decentralized levels, (v) development of adaptation frameworks, practices to enable mainstreaming of adaptation into developmental programmes, estimate the costs and benefits of adaptation and mitigation programmes (vi) development of sustained institutional and technical capacities for continued preparation of National Communications, and other new information required under the aegis of the Convention.

3. Barrier analysis

Based on the experiences from the preparation of the 2 previous NCs, no major risks are anticipated. Further, the Government of India is fully committed to addressing climate change concerns at the national and global levels as evidenced by the NAPCC and its missions. Some of the potential minor risks could be as follows:

(a) **Access to multiple climate change models:** In the TNC preparation, multiple downscaled GCMs at finer grid scales would be adopted to assess the impacts at micro levels. There could be delays in accessing the models and modeled outputs. This risk could be mitigated by forming expert teams involving multiple institutions in India to develop downscaling methods using GCM outputs available at the IPCC data centre.

(b) **Lack of technical capacity:** This risk is minimal since there are a large number of institutions in India which are capable of conducting field studies and modeling required for the TNC preparation. India has also set up a National Climate Change Research Centre as well as several scientific centers to promote research on climate change. The Government of India has also initiated the process of Indian Network for Climate Change Assessment (INCCA), which would complement and augment the

TNC process, as well as other new information required under the aegis of the Convention as it emerges.

(c) **Coordination with stakeholders at National and State levels:** India is a large country with 28 states and 7 Union territories and thus coordination could be a challenge. However, with the preparation of the SAPCC and establishment of state level climate change coordinating committees, the coordination may be facilitated to a certain degree. Finally, the Prime Minister's Climate Change Advisory Council would enable overcoming any coordination barriers.

(d) **Non-availability of finance:** The nature and quantum of tasks is contingent upon the timely and adequate availability of finance, particularly grant for preparation of the NC. These attributes of financial arrangement would be a significant barrier in achieving the desired outcomes/objectives of the various elements.

4. Key Stakeholders

The stakeholders of the project are the Government of India and the Indian people whom it represents, the policymakers at central, state and district levels, the scientific community, industry, and all those who could be affected by climate change and actions to mitigate and adapt to climate change. Various components of the project would address concerns of these key myriad stakeholders to diverse level and extents. Involvement of these key stakeholders in designing and implementing this project would depend upon their capabilities and practical involvement. Efforts have been made in INC and SNC to involve large number of stakeholders and existing networks are a testimony of fruitful efforts. Involvement will be sought from research institutions such as universities, the institutions of the ministry of earth sciences, science and technology institutes such as the Council of Scientific and Industrial Research, Indian Council for Agricultural Research of the Ministry of Agriculture, Indian Institutes of Management and Technology. In addition, the line ministries and government departments relevant for climate change mitigation and adaptation at the state, and local level decision making bodies (Panchayati raj institutions) will be involved in the process. Participation will also be sought from other stakeholders including civil society groups, community based organizations and other policymakers as appropriate. Annexure 2 provides the list of stakeholder institutions for TNC and Biennial Update Report (BUR).

The impacts of climate change are expected to be on natural systems that will in turn affect the human population. Therefore, the results presented through the TNC will be of immediate use to the policymakers for developing and implementing adaptation strategies for coping with the adverse impacts on, say, agriculture, forests and forest products, other natural ecosystems including water resources, human health and on accessibility to energy through renewable and new energy sources. Further, NGOs and the private sector to an extent can be involved in the delivery of the technologies and techniques of adaptation. Also the mitigation strategies to be implemented to reduce the intensities will be directly implemented by the public sector and the private sectors.

B. PROJECT STRATEGY

The proposed enabling activity aims at assisting the Government of India to carry out all the necessary activities to prepare the Third National Communication (TNC) to comply with its commitments to the UNFCCC in agreement with the Conventions' Articles 4.1 and 12.1. The project comprises of seven components and the main components are:

i. India's National Circumstances
ii. National GHG Inventory

iii. Impacts and vulnerability assessment and adaptation measures
iv. Measures to mitigate climate change
v. Other information relevant for the preparation of TNC
vi. Third National Communication report preparation
vii. Other new information required under the aegis of the Convention

The TNC project advances the findings of the First and Second National Communication project outputs and also builds on the technical and institutional capacity that exists in India. The TNC will be based on the latest scientific knowledge, modelling and methods. The following strategies will be adopted for the development of TNC.

a) ***Expand and strengthen the wide institutional network*** established during the INC and SNC from different parts of India, to enable their participation and contribution to the preparation of TNC
b) ***Conduct periodic stakeholder consultations*** to ensure broader participation of scientific institutions, industrial organizations, civil society, government departments and so on
c) ***Adopt the best methods and models*** for climate projections, impact and vulnerability assessments, GHG inventory and Biennial Update Reports (BURs)
d) ***Promote the participation of state governments*** in the preparation of TNC as well as in addressing climate change, since so far the National Communication process was largely a national level exercise
e) ***Assist decision-makers at the national and state level*** in the development of policies and measures to address climate change

5. Project rationale, design principles and strategic considerations

The preparation of the TNC and other new information required to meet the obligations under Convention is consistent with the commitment of Government of India to fulfill its obligations under the UNFCCC. India has been in the forefront of international efforts in developing a solid scientific understanding of climate change. The country has recognized the importance of climate change as evidenced by the adoption of the NAPCC in 2008. Many of its state governments are also committed to address the impacts of climate change and have initiated the process of preparing their respective SAPCC incorporating GHG inventory, mitigation, impacts, and vulnerability and adaptation components. India has also announced post-Copenhagen a plan for reducing the energy intensity of GDP. The Government of India has already prepared and is in the process of finalizing several missions to be incorporated in the NAPCC, e.g. National Solar Mission, National Energy Efficiency Mission and Green India Mission. Activities leading to the preparation of TNC, in particular the data, model outputs, mitigation-adaptation strategies, etc. would also contribute to strengthening the implementation of the NAPCC. Thus the proposed TNC project from India is fully consistent with the national plans and priorities. Also, the proposed project is consistent with the aims and objectives as well as the provisions of the UNFCCC.

As an improvement to the previous NC formulations (i.e., INC and SNC), the scope of the TNC will be expanded to cover the districts in each state. Thus the data and information gathering will be carried out down to the district level. The expansion of the coverage will help in shaping up and strengthening the sub-national i.e. state level action plans. This project will also facilitate in the preparation of the Biennial Update Report 2014.

6. Policy conformity and country ownership

This project will conform to the GEF operational program on “Enabling Activity (EA)” which pertains to the GEF Focal Area on “Climate Change”. The priority areas that the project will focus on will be drawn from the tenets of the Convention to which India is a Party and the latest guidelines for preparation of National Communication for non-Annex 1 Parties (17/CP.8) enabling India to report National Communication to the UNFCCC on a continuous basis.

7. Project objectives, outcomes and outputs

The project titled "**Preparation of Third National Communication (TNC) and other new information to the UNFCCC**" aims to prepare the Third National Communication and other information required to meet the obligations under the UNFCCC. This project will strengthen institutional and technical capacities related to climate change science, policy and developmental aspects in India. The project aims to improve GHG inventory through reduced uncertainty with respect to emission factors and activity data, develop climate projections using the latest CMIP-5 (Coupled Model Inter-comparison Project 5) and RCP (Representative Concentration Pathways) scenarios, assess impacts and vulnerability using multiple impact assessment models, develop vulnerability profiles at state and regional levels, develop adaptation strategies, and assist policy-making related to climate change. The scale of assessment will be determined by the scale of available GCM and RCM climate models. All these activities would enable India to meet the obligations under the UNFCCC as well as addressing global climate change concerns in particular mitigation, adaptation and technology transfer. This will ultimately enable India to shift to a low carbon and sustainable development path keeping in mind the primary goals of economic development and conservation of environment and natural resources.

Beneficiaries
Being an enabling activity, beneficiaries within the target group are not directly relevant. The Government of India, including the Ministry of Environment and Forests, research institutions, and civil society organizations will directly benefit through the proposed technical assistance activities, proposed in the project.

Environmental benefits
No direct environmental benefits are associated since the proposed project is an enabling activity. However, the project activities will generate indirect local, national and global environmental benefits by generating information and knowledge on climate change, in particular on GHG emissions to assist in developing mitigation and adaptation strategies that enhance the resilience of natural and socio-economic systems.

Project components

Component 1: India's National Circumstances

Outcome 1.1: Updated report on India's National Circumstances

This component would involve the updating of the information on the prevailing conditions and situations at the national and state levels regarding development priorities and objectives that serve as the basis for addressing issues relating to climate change. Such information provided on national circumstances is critical for understanding India's vulnerability, its capacity and options for adapting to the adverse effects of climate change, as well as options for addressing its GHG emissions within the broader context of sustainable development. Among the information that would be provided under this component are the following:

- Demographic and socioeconomic features, such as occupation patterns, rural-urban population
- Land use pattern and systems, area under different cropping systems, forest types and soil types, etc.
- River basins and valley systems and irrigation systems
- Climatic systems, monsoon, rainfall and temperature trends and variability and dependency on monsoons
- Status of natural resources
- Climate sensitive sectors, infrastructure and systems, and vulnerable populations and regions
- Report on India's developmental policies and programmes at national and state levels
- Report covering the existing institutional arrangements relevant to the preparation of the GHG inventory on a periodic basis.

The following specific Outputs (information) will be included in the detailed updated report on national circumstances.

Output 1.1.1: India's development priorities, policies and programmes at national and state level
India faces challenges in economic development, which have to be met with the limited resources available with minimal externalities and in the presence of large uncertainties with respect to climate. The various programmes at national and state level like Jawaharlal Nehru National Solar Mission, National Mission for Enhanced Energy Efficiency, National Mission on Sustainable Habitat, National Water Mission, National Mission on Green India, National Mission for Sustaining the Himalayan Ecosystem National Mission for Sustainable Agriculture and National Mission on Strategic Knowledge for Climate Change as indicated in India's Second National Communication.

Output 1.1.2: Geography, climate, economy and the climate sensitive sectors and communities
India, flanked by the Himalayas in the north and lying in the sub-tropical terrain, is adorned with largely diverse topography, climate and biosphere, spanning across a geographic area of 3.28 million km^2. The country is situated between 66°E to 98°E and 8°N to 36°N and has a range of physio-geographic features that are shared widely by its 28 states and 7 union territories. India's climate is strongly influenced by the Himalayas in the north and the Thar Desert in the west. India juts out into the Indian Ocean, and is surrounded by the Arabian Sea on the west and the Bay of Bengal in the east. India is gifted with a variety of climatic conditions due to its distinct geography.

Output 1.1.3: Existing institutional arrangements relevant to the periodic conduct of GHG inventory
Figure below depicts the institutional arrangement as it was presented in the Annexure I of SNC and section 2.3.1 on National Inventory Management System (NIMS). This institutional structure will be strengthened further under the proposed project through involving more number of institutions.

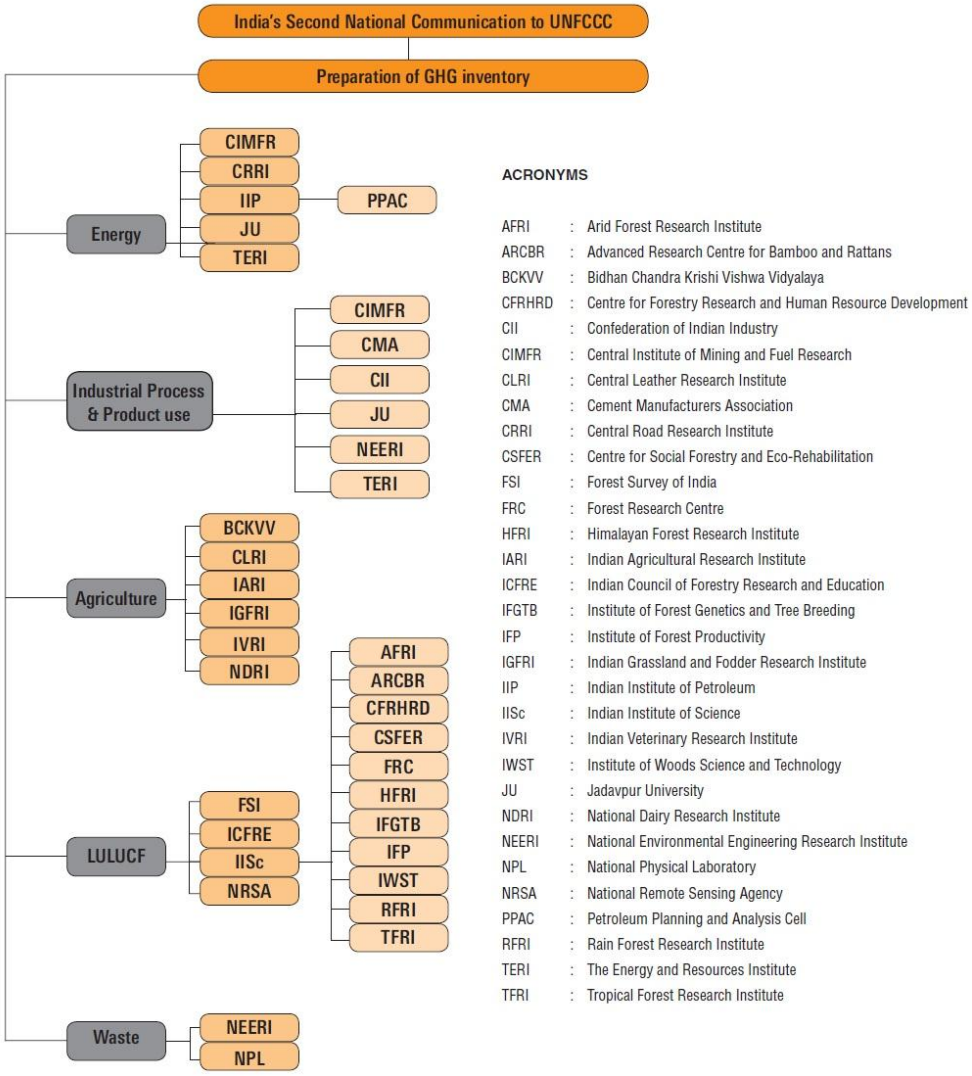


Figure 1:Institutional arrangement for the preparation of the greenhouse gas inventory

Output 1.1.4: Progress on national actions to reduce GHG emissions

The Government of India, state and local governments have initiated many new policies, programmes and measures that have implications for national actions to reduce GHG emissions since the year 2000 (national actions indicated in Chapter 4 of SNC document). These include Perform Achieve and Trade (PAT) scheme for energy intensive sectors, bus rapid transport system and metro railway systems in many cities, CNG for public transport in 15 major cities, and NAPCC under the 12th five-year plan. Many of these initiatives provide the national circumstances and imperatives for nationally appropriate mitigation actions (NAMA) in India. These will be captured through relevant national institutions and experts as identified in the institutional list at Annexure 2.

These sets of information need to be generated to take stock of progress on actions towards addressing issues relating to climate change. The information gathering work is also for understanding the current institutional arrangements for periodic conduct of GHG inventory as there are still many scientific, technical and institutional limitations when looked at sub-national level. There are still limitations that have to be addressed such as lack of reliable and complete activity data for many sectors at dispersed and large point source level, downscaling of climate change projections for sub-regional level, lack of impact assessment models at sub-regional level and lack of existing institutional arrangements relevant to the

preparation of the GHG inventory on a periodic basis. In order to effectively address these, the above mentioned set of information is very necessary. In this regard, this is indeed an important activity to guide the process of preparing the TNC especially in reporting on the developmental policies and programmes at the national and state levels; and supporting the existing institutional arrangements relevant to the preparation of the GHG inventory.

This component will not be limited to a simple update of the national circumstances from the SNC, as the national climate change agenda has evolved rather significantly in the past few years. Among this is India's launch of the NAPCC, which consists of eight National Missions. Numerous other initiatives and measures are also planned to be implemented during the period overlapping with the implementation of the TNC. These initiatives include those to be carried out by states that have committed to address the impacts of climate change. In line with this, many state governments are in the process of preparing their respective SAPCC incorporating GHG inventory, climate change mitigation actions, adaptation to climate change based on vulnerability and adaptation analyses, and other components as mentioned earlier. Therefore, NAPCC would require updated assessment of national circumstances, particularly activities related to mainstreaming of climate change into national development plans, and in particular state development plans with recognition to issues that have local relevance and peculiarities. The vast scale of scientific assessments (in line with the NAPCC and SAPCC) that have to be done warrants the allocation of necessary financial resources, especially when considering the varied circumstances at the regional level. The allocation of appropriate financial resources will ensure the alignment of mainstreaming efforts at regional level in the context of national climate change strategies.

Component 2: National GHG Inventory

The GHG inventories would be made available for the year 2014 for TNC and third BUR reporting by adopting the latest IPCC guidelines as well as good practice guidance and by reducing the uncertainty associated with GHG inventory considering the COP 17/CP.8 reporting requirements. This component would also create inventory at national aggregate level for 2011 and 2013, to maintain a consistent time series of inventories from 2010 to 2014, and would also analyse the trends for 2000-2012. It may be noted here that inventories for the years 2010 and 2012 will be created through BUR funding sought and separately reported in first and second BURs in the years 2014 and 2016 respectively. The inventory would cover the following sectors:

1. Energy Sector
2. Industrial Processes Sector
3. Agricultural Sector
4. Land-Use and Land Use Change and Forestry Sector
5. Waste Sector.

SNC addressed institutional arrangements i.e. INCCA worked mainly on the GHG emission inventory of 2007, establishment of database management including methodological issues to an extent, procedure for archiving and continuous update of the database, and uncertainty management issue of the inventory.

In the TNC, (a) Establishment of a national inventory management system is envisaged through involving additional institutions with varies research experience for data collection and archiving on a continuous basis, (b) GHG inventories would be made available for the latest year possible, i.e. 2010 for BUR and 2012 for the TNC by adopting the relevant scientific elements of IPCC GHG inventory guideline of 2006 as well as good practice guidance, (c) Reducing the uncertainty associated with GHG inventory by shifting to higher tier methodologies for main sources, (d) Reliable climate projections at regional level using multiple climate models, and (e) Assessment of climate change impacts using multiple GCM scenarios and multiple impact assessment models at the sub-regional level for different cropping systems, forest types, watersheds, coastal settlements etc.

Outcome 2.1: Information of GHG inventory.

Rationale: In INC and SNC, greenhouse gas emissions of CO_2, $CH_4$and N_2O were reported as per the 10/CP.2 guidelines (for non-Annex 1 communications to the UNFCCC) and estimated according to the methodologies provided in the IPCC 1996 guidelines for preparation of national greenhouse gas inventories. These also established measurement protocols and GHG emission measurement techniques for developing the country specific emission factors.

A review of the GHG inventory prepared in the first two NCs indicates that there were constraints in acquiring data for some sectors, and that high levels of uncertainties are still associated with some of the emission factors used for estimates. The TNC envisages preparing GHG inventories for the years 2012 and 2014 and include additional gases as per 17/CP.8 reporting requirements and generally following IPCC (2006) Guidelines to the extent capacity permits. Further the TNC will improve upon the estimation methodologies to higher tier methods for some of the key sectors and develop new country specific emission factors.

The data gaps encountered based on the first two NCs include detailed data on the various types fuel used in the informal unorganized and small scale industry sectors; data on coal consumption in aluminum production, ceramics, glass and brick industries; petroleum oil product accounting in road transport and household diesel generators; oil usage in informal sectors of the economy; and biomass fuels consumed in various sectors etc. Reporting of non-energy use of fuels is also to be improved. Industries such as engineering and electronic industries need more detailed coverage. Biomass consumption data was extrapolated based on small studies carried out earlier in some parts of the country, which needs to be improved.

Further, details of annual municipal solid waste generation, quantity dumped and dumpsite characteristics of MSW for major sites were not available.

The inventory estimation in TNC also will need to reflect the changing structure of the Indian economy as well as the differences in the rate of growth of various GHG emitting sectors since last decade as per reporting requirements of 17/CP.8. Uncertainty estimation and reducing the same in activity data are major areas for GHG inventory improvement in the TNC. Consistency would require recalculating previous inventories based on new information available under TNC activities. This would also be attempted to the extent possible.

A key source analysis of the 2000 GHG emission categories identifies 25 key categories which emit 95 per cent of the total GHG emissions in that year against 15 key categories in 1994. In descending order of emissions, some key categories for 2000 are CO_2 emission from electricity production (34.29%), CH_4emission from enteric fermentation (13.88%), CO_2emission from road transport (5.61%), CH_4emission from rice cultivation (4.88%), CO_2emission from non-specific industries (3.85%), N_2O emission from agricultural soils (3.79%), CO_2emission from residential (3.62%), CO_2 emission from iron and steel (3.44%), and CO_2emission from cement production (2.89%). The Energy sector contributed the highest number of key sources at 15 followed by industrial processes and product use (IPPU) 4 and Agriculture sector and Waste sector at 3 each. Direct contribution of CO_2 emissions in 15 key sources, CH_4 contributed 8, N_2O one and CF_4 contributed one.

Attempts in TNC will be made to refine existing GHG inventory estimation, by developing new country specific (CS) emission factors (EF) or by improving some existing EFs and by improving the activity data for some of the key categories identified in SNC. A wider, more regionally spread, broader technology coverage and year-on-year measurement of emission factors in key sources would be done. Key source estimation would involve both level and trend estimation. The strategy for developing the CS emission factors would include either direct measurements or estimation of the EFs, based on secondary data sources for the key sources selected. Direct measurements would involve standardized protocols and all necessary QA/QC measures including traceability and standardization of measurements and measuring equipment. Similarly, targeted surveys will be conducted to improve the activity data as well as estimation of EFs (for e.g. feed intake pattern of domestic dairy livestock will be evaluated through surveys which will lead to improved activity data as well as a bottom up estimation of EF from this source). The identified direct measurements will be incremental in nature to the activities that are already being carried out by

the prospective participating institutions and consequently the budget requirements are of an 'add-on' nature.

The emission estimates of some of the non-key categories will also be targeted for improvement, as the activity data of these category sectors show a high growth trend in recent years. Though QA/QC procedures were followed in SNC while making measurements for developing the various emission factors (like calibration of standard samples and inter-calibration of instruments), however, a comprehensive standardized QA/QC plan covering the entire inventory development process needs to be in place for certain key categories integrated within a National Inventory Management System (NIMS).

The following outputs and respective activities therein for each sector are envisaged. The activities have been prioritized according to the considerations outlined above and are aimed at strengthening the research networks, enhancing institutional capacity and technical expertise of researchers for GHG inventory preparation.

Output 2.1.1: Documented inventory of GHG emissions for (a) Energy (b) Transport (c) Industry (d) Agricultural (e) Land-Use Change and Forestry, and (f) Waste sectors.

The GHG inventories would be made available for 2011, 2013 and 2014 under the TNC by using the IPCC (2006) Guidelines to the extent applicable and possible and by reducing the uncertainty associated with GHG inventory. The inventory would cover the following sectors:

- Energy Sector: (1) Further strengthen the linkage between top-down energy balance and bottoms-up inventory estimation; (2) Further improve Net calorific Value (NCV) of coal; sampling of coal at power plant for estimating NCV of different types coal entering the plants and other coal intensive sectors; (3) Online measurement of CO_2 emission at each stack of large power plants, plant-level emission factors of CO_2, CO, NOx and SO_2 at plants in addition to those already undertaken during the SNC taking into account their combustion technology, capacity, vintage, efficiency, and fuel variability; (4) Refine emission factors for different types of gasoline and diesel driven vehicles incorporating driving cycles including using on-board analysers and improve the GHG emission estimates from the road transport sector based on specific emissions and fuel consumption by various types of vehicles; (5) Improve activity data in unorganized and informal sectors of the economy;(6) Improve emission estimation from medium, small and micro enterprises (MSME) especially those that are more energy intensive;(7) Improve the estimates of auto-fuel consumption in refineries and power plants;(8) Refine power sector emissions from top-down and bottom-up approaches; (9) Develop methodology to generate data related to oil and natural gas venting, flaring, transmission and distribution. Though contribution of the oil & natural gas sector to the national GHG emission is not very significant, but it has been considered as a major activity in the inventory development because it is one of the rapidly growing sectors of the economy;(10) Improve segregation of national and bunker fuel consumption in aviation and navigation sector, and (11) Carry out GHG inventory estimation for the entire sector.

  These activities will be conducted through a network of institutions (Annexure 2) coordinated by Indian Institute of Management, Ahmedabad.

- Industrial Processes Sector: (1) Update and refine GHG emissions estimates from key sources in Industrial process sector, including key source estimation at national, sectoral and firm level; (2) Further improve the SNC estimation of non-energy GHG emissions from iron and steel, fertilizer, and cement sectors, including creating carbon balance for some plants; (3) Improve estimation of GHG emissions of fluorinated gases in various industries, including verification of historical data, increased use of low GWP HFCs, increased use of R410A in air conditioners replacing R22 which is a controlled gas under Montreal protocol and validating IPPU bottom-up energy data with similar data collected in energy sector (4) Reduce uncertainty in EFs in representative integrated steel plants (the most common mode of production of iron and steel in India), developing correction factors for emissions related to electrode consumption and emissions from the combustion of fuels such as coke oven gas, aluminium production process; (5) Update of emission factor to reduce uncertainties in

GHG emissions from cement production; (6) Measure country specific EF from ammonia production and adipic acid production; (7) Estimate and compile GHG emission inventories from the IPPU sector.

These activities will be conducted through a network of institutions (Annexure 2) coordinated by Confederation of Indian Industries (CII).

- LULUCF and Agriculture Sector:

  The GHG inventory for the land use sectors during SNC was prepared using the IPCC Good Practice Guidance (2003) for LULUCF. The Good Practice Guidance (GPG) approach for LULUCF is a significant scientific advancement over the IPCC revised 1996 Guidelines, which was used for INC. The IPCC 2006 guidelines provide the latest and up to date methods for GHG inventory. India will adopt the IPCC 2003 GPG for the land use sectors during TNC. The main features of IPCC 2003 GPG guidelines include:

  - Adoption of six land use categories namely Cropland, Forestland, Grassland, Wetland, Settlement and Others. These land categories are further disaggregated to account for the carbon dynamics specially in the soil due to land use change into;
    - Land remaining in the same category such as forestland remaining forestland
    - Land converted to another land use category such as grassland converted to forestland
  - Guidance for all the five carbon pools namely aboveground biomass, belowground biomass, deadwood, litter and soil carbon is provided.

  Tier-3 methods will be adopted for the GHG inventory where remote sense-based methods and models will be adopted for the inventory. Land use change matrix will be developed for the period using remote-sensing techniques. Each of the land categories will be stratified into sub-categories such as different forest and plantation types, and CO_2 emissions and removals will be estimated based on nationally derived emission and removal factors. Uncertainty in the GHG inventory for the land use sectors is generally high, and by adopting Tier-3 methods and through conducting field studies to generate emission and removal factors, and use of remote sensing techniques, uncertainty will be reduced and estimated.

  IPCC 2006 GHG inventory guidelines provide the latest methods and models for estimating GHG emissions/removals for all the land use sectors. During TNC, some of the appropriate methods from IPCC 2006 guidelines will be adopted depending on the availability of activity data and emission factors for the AFOLU sector (Agriculture, Forest and other land uses).

  Emission factor measurements expansion for more livestock species and type of animals, nitrogen content estimation from dung and manure management, measurement diversification to capture wide national diversity in emission factors, comparing measurement techniques across institutions and synchronizing measurements for enteric fermentation, emission factor estimation from crops other than rice and accounting of rice management practices will be done as much as capacities permit. GHG inventory for the agriculture sector will be based on IPCC 1996 revised guidelines as well as the good practice guidance.

  Forestry sector activities will be conducted through a network of institutions (Annexure 2) coordinated by Indian Institute of Science, Bangalore. Agriculture sector activities will be conducted through a network of institutions (Annexure 2) coordinated by Indian Council for Agricultural Research (ICAR).

- Waste Sector:(1) Measure CH_4 emission factors from MSW in major cities in India, (2) Update and refine SNC data of CH_4 emission estimates from the MSW handling process and practices for urban areas; (3) Estimate composition of MSW and refine activity data and parameters of waste generation; (4) Strengthen model based MSW, methane emission measurements; (5) Refine CH_4 emission factors based on all year round flux measurements in unmanaged landfill areas; (6) Update data for

estimating CH_4 emission factors from industrial wastewater generation; (7) Improve GHG emission estimates from municipal waste water including sewage treatment plants in municipalities; and (8) Estimate and compile emission inventory from all categories under the waste sector.

These activities will be conducted through a network of institutions (Annexure 2) coordinated by National Environmental Engineering Research Institute (NEERI), Nagpur

Output 2.1.2: Completed National Activity Data and establishing Emission Factors database and information for all source categories.

National Activity Data and Emissions Factors database: It is necessary to have National Inventory Management System (NIMS) with the involvement of institutions and experts with varied research experience that will look at the various aspects of inventory development. Also a national emission factor database would be developed/revised/updated for key sources and country specific emission factors as per different IPCC inventory categories that belong to different sectors, regions based on field studies; laboratory measurements; and also surveys of industries, municipalities, households, farms, and unorganized sectors etc. to improve the activity data accuracy and consistency. The database would be validated along with uncertainty associated with the emission factors and activity data.

Outcome 2.2: Increased accuracy of GHG inventory through the use of tier-III methodologies for most sectors.

Output 2.2.1: Documented national and other methodologies adopted for the GHG inventory. For a transparent, accurate, comprehensive, complete and comparable, (TACCC) coverage, to the extent capacities permit, the methodology used follows the IPCC Revised Guidelines 1996, supported by the IPCC Good Practice Guidance (GPG) 2000 and 2003, LULUCF 2003 Guidelines, and IPCC 2006 Guidelines. The estimation also integrates some of the default emission factors from the IPCC 2006 Guidelines. The tiers of estimation would be largely Tier II and III. Higher tier implies more data-intensive estimation. The upgrading in the respective methodologies after the SNC and till the publication of TNC would be taken into account. A review of the methodologies for GHG inventory will be conducted based on national and international literature in addition to IPCC guidelines

These activities will be conducted through a network of institutions (from Annexure 2) coordinated by Indian Institute of Science, Bangalore and Indian Institute of Management, Ahmedabad.

Output 2.2.2: Developed and implemented tier II&III methodologies, emission factors and models for inventory of GHG emissions in some sectors, including the adoption of the 2006 IPCC inventory guidelines where relevant.

Tier-II and tier-III methods and models: Currently, only four of the seventeen key categories use higher Tier methods for emissions estimate. Based on the experience and capacity built during the previous NC preparations, higher Tier methods and models will be adopted for the formulation of the TNC. This would involve development, validation and application of models for different sectors and regions. Graduation to higher Tiers would potentially lead to reduction of uncertainties and complete estimation of inventory for all the relevant IPCC inventory categories for India.

Output 2.2.3: Adopted methodological approaches for uncertainty estimation as per the IPCC Good Practice Guidance and other appropriate methodologies.

Adoption of IPCC 2006 GHG Inventory Guidelines: The latest IPCC guidelines and good practice guidance recommended by the UNFCCC would be adopted. Moreover, the scientific and methodological improvements suggested in the IPCC GHG Inventory Guidelines-2006 would also be incorporated for various sectors.

Outcome 2.3: Strengthened and streamlined National institutional structure for long term National GHG inventory and the estimation of GHG emissions

Output 2.3.1: Established National Inventory Management System (NIMS) through sectoral institutions and network of supporting research institutions

Development of National GHG inventory Management system: It is necessary to build on the base of existing knowledge institutions engaged in the preparation of earlier NCs for the preparation and operation of NIMS. Hence, it is required to formulate an approach to bridge the gap in activity data identified in inventory preparation of SNC.

The NIMS was initiated under the SNC, where it has addressed the following. However considerable streamlining is required to make it operate on a regular basis as NIMS.

(a) Institutional arrangements were created on project basis and not as continuous NIMS. These were initiated under INC project, again established for SNC project. INCCA was also established. It is to be noted that for the present context, the focus of INCCA was one time vulnerability assessment and development of adaptation strategies at selected sub-regional levels, and not on preparation of periodic GHG inventory or networking thereof. On inventory fronts, it produced a one-time GHG inventory for the year 2007 but is mainly focused on black carbon and other similar emissions, except GHG.
(b) Establishment of database management including methodological issues to an extent
(c) Procedure for archiving and continuous update of the database
(d) Uncertainty management issues of the inventory

During the SNC preparation, the arrangements related to the formulation of a separate steering group to oversee the operations of NIMS and provision of technical guidance were not finalized. In addition, identifying elements and issues and preparing subsequent inventories thereafter requires continuous updating of inventories at regular intervals and as per requirements.

The NIMS is a dynamic system for continuous inventory preparation that always meets all national reporting commitments to UNFCCC, enhances inventory quality continuously, and develops and enhances institutional and human capacity for the same. It will address the requirements of documentation, archiving and continuous updating of the database and uncertainty management issues of the GHG inventories being developed across the years. Under the TNC, the following strategies are proposed:

- **Institutional structure:** Further strengthening and streamlining of the institutional structures initiated under the aegis of previous NCs and INCCA to sustain and take care of long term reporting requirements of national GHG inventory and the estimation of GHG emissions. Establishing of a separate steering group to oversee the operations of the NIMS and provide technical guidance. This process will be driven by experts in various inventory sectors of energy, IPPU, agriculture, waste and LUCF through national and state level institutions. India has many eminent international inventory experts and their services will be deployed appropriately for this purpose. Some of the institutions have initiated preliminary processes to develop GHG inventory, particularly in the LULUCF sector. Forest Survey of India has initiated a programme for periodic national forest inventory and similarly, National Remote Sensing Centre has initiated a programme for developing land use and land use change matrix.

  Regular efforts for activity data uncertainty reduction: Stress will be laid on reducing uncertainty in activity data, especially from sources such as coal-mix at power plants and other energy intensive sectors, diesel generator based fuel consumption in urban areas, energy consumption in informal and unorganized sectors, biomass consumption for energy purposes etc. Primary surveys need to be conducted on a regular basis.
- **Improving emission factors continuously:** The robustness of the GHG inventory making process is dependent on the Tier of methodology used. Higher the Tier, more representatives is the emission

estimated of the actual emissions. Of the total 1,727.71 million tonnes of CO_2 equivalent emissions from India in 2007, 21% of the emissions have been estimated using Tier I methodology, 67% by Tier II and 12% by Tier III. For improving the inventory estimations of key categories using Tier II and Tier III methodologies, there is a need to move up the Tier ladder. Strategies needed include improvement in assimilation of activity data representing national circumstances, bridging data gaps, and eliminating uncertainties by developing country specific GHG emission factors. Uncertainty reduction and estimation: The GHG inventory in some of the sectors such as LULUCF and agriculture is characterized by high uncertainty. Uncertainty was assessed using Tier II IPCC methods during the SNC preparation. This uncertainty would be reduced through the adoption of QA/QC procedures and shift to Tier III methods during the TNC preparation.

- **Inventory software selection:** This is a very important aspect of the whole NIMS process. This has to ensure that updating of methodologies and related information are absorbed in the system in a sustained manner. Appropriate UNFCCC or IPCC (2006) software will be deployed for creating Indian GHG inventory for various sectors. All the existing data will be converted into standard formats and archived.
- Data reporting and archiving will be done.
- **Capacity Building for NIMS:** Capacity building is essential at institutional and individual levels. Capacity at the institutional level addresses the needs of inventory preparation at national, sectoral and point source level that requires collection and archiving of data on a continuous basis. Establishment of a National Inventory Management System is therefore necessary. It is also important to involve new institutions with varied research experience, to widen the pool of researchers and enable the integration of latest practices.

In the other words, the TNC will focus on continuous implementation and improvement of the NIMS elements developed under SNC. The gap in activity data identified in inventory preparation during the SNC will also be filled. In order to embed these elements, it needs additional financial resources especially for the studies to be conducted at regional level, use of higher tier methodologies, etc.

Therefore, it is necessary to identify researchers and groups that will be involved in the assessments and complete institutional arrangements for reporting, documentation, archiving mechanisms for undertaking GHG emission estimates. These will be led and coordinated by Indian Institute of Management Ahmedabad. Indian Institute of Science Bangalore and Indian Institute of Technology Delhi; and various institutions of Indian Council for Agriculture Research (ICAR), Council for Scientific and Industrial Research (CSIR) and other national and state level institutions will participate in this arrangement (Annexure 2). A national inventory system for different sectors will be further updated and improved by identifying lead institutions, initially with the support of INCCA, to be supported by a network of institutions for making periodic GHG inventory on a continuous basis. The technical and institutional capacity would be enhanced with additional financial support for the inventory process.

Output 2.3.2: Established Quality Control and Quality Assurance Procedures.

Standard IPCC sectoral QC methodologies will be followed. A QA/QC plan will be prepared and implemented in phases. This will include an overall QA/QC plan for GHG inventory preparation process, backed up by sectoral QA/QC plans. For instance, energy sector is the largest contributor to Indian GHG inventory. Many data validation needs have been felt during the previous two NC processes including proper accounting of activity data under various sub-categories as per UNFCCC reporting guidelines and IPCC best practices, better reporting of non-energy fuel use and emissions across energy and Industrial process sectors, reconciling biomass combustion consistently across energy and AFOLU sectors, and improving the completeness of inventory estimation sources. Energy sector QA/QC procedures will be established for improving on all these on a regular basis. Similarly for all other sectors as well.

Output 2.3.3: Published and disseminated GHG inventory.

GHG inventory will be submitted to the Steering Committee of the Ministry of Environment and Forests for approval. The GHG inventory prepared will be uploaded on to the NCs project website. National

workshop will be held to present the GHG inventory to all the stakeholders. Finally after the approval by the Government of India, the GHG inventory will be submitted to the UNFCCC. The inventory will be published in peer reviewed journals.

Component 3: Impacts and Vulnerability Assessment and Adaptation Measures

This component would involve improved climate change projections, impact assessment using the latest scientific models and methods, development of vulnerability profiles at decentralized level, assessment of adaptation options and development of strategy for mainstreaming adaptation. A network of institutions would conduct this work for various sectors, and regions (Annexure 2).

This component would involve improved assessment of climate change impacts and vulnerability of different sectors and regions at decentralized level as well as development of adaptation strategies and practices. Multiple climate model projections and multiple impact assessment models would be adopted for realistic assessment of climate change impacts. Vulnerability profiles would be developed at sub-regional level to enable mainstreaming adaptation into developmental programmes and projects. Climate impacts and vulnerability will also be assessed particularly focused on the short term (2030) along with medium (2050) and long term (2075).

Development of climate projections using multiple GCMs and RCMs: During the two previous NCs preparations only one GCM and RCM model was used. It was identified in SNC that the regional-level Atmosphere-Ocean Global Circulation Models (AOGCM) projections currently have several limitations. The methodologies to generate high-resolution information of climate change for different regions are still maturing, and existing climate models lack the spatial details required to make confident projections. A framework of three regional climate models (PRECIS, WRF and Reg CM) has started under SNC, which will be continued under TNC to examine spatial characteristics associated with the summer monsoon in the coming decades. Analysis of current and future climatic scenarios using HADRM3 model has revealed that Himalayan ecosystems will suffer from reduced winter precipitation (January–June) in sub-tropical zone, high temperature during winters and summers as well as change in seasonal rainfall patterns besides significant reduction in snowfall. Given the variations in the projections for the future climate, for the TNC multiple GCMs will be adopted to make reliable projections along with uncertainty estimates. Climate projections would be made by down-scaling the GCM outputs to finer grid scales such as 20 × 25 km^2. Climate variability and climate projections would be determined at state level for different parameters such as temperature, rainfall, floods and droughts.

The various institutes responsible for these activities in different sectors are: Indian Institute of Science, Bangalore; Indian Institute of Tropical Metrology, Pune; Indian Institute of Management, Ahmedabad; Institute of Economic Growth, New Delhi; National Chemical Laboratory, Pune; The Energy and Resources Institute, New Delhi. A detailed list is available at Annexure 2.

Impact assessment for all the sectors using multiple models: It is necessary to identify researchers and groups that will be involved in the development of climate change scenarios for India. Also, it is required to identify climate models (Multiple models) that can be used to simulate the highly variable climate in India. The impact assessment would cover all the sectors wherever possible using multiple models along the following lines:

- Sectors: Agriculture (different cropping systems), forest ecosystems, river basins and watersheds, coastal zones, fish production, health, energy systems, infrastructure and built space, livelihoods, slums and rural households. In the agriculture sector, TNC will be covering more crops in different regions, and updating N_2O emission factors for crop soils in India.
- Scale: Climate impacts would be assessed at finer scales to enable adaptation policy formulation. The scale to be used is determined by the GCM and the downscaled RCM.
- Period for assessment: To enable short term adaptation policy development, the focus of impact assessment would be for short term period, along with impact assessments for medium and long term.

- Models: The most advanced impact assessment models available would be adopted for impact assessment and wherever possible multiple models would be used to obtain a range of impact assessments.

  Crop production: INFOCROP and Cropsyst
  Water resources: SWAT
  Forest ecosystems: Lund-Potsdam-Jena (LPJ), Integrated Biosphere Simulator (IBIS) and Community Land Model (CLM)

  In the SNC, crop growth simulation models that share a common input data and format have been developed and embedded in a software package called Decision Support System for Agro-technology Transfer (DSSAT). Simulation studies were conducted using InfoCrop models for soybean and groundnut, the DSSAT CROPGRO model for chickpea, Wheat Grown Simulator (WTGROWS) for wheat with projected changes in temperature, CO_2 and rainfall. The scenarios indicate a positive impact of climate change on the crops productivity. This analysis will be extended for other crops during TNC and rigorous analysis is needed to make confident projections. Concerning the Soil and Water Assessment Tool (SWAT), the current input information on terrain, soil profile and land-use are from global sources. However, there will be further improvement in the inputs from specific institutions in the country.

Vulnerability profiles: Climate change risk and vulnerability assessment tool and framework will be developed. It is very necessary to identify and prioritize vulnerable sectors at the national level, as well as develop vulnerability indicators and profile for these sectors, regions and population. This would require the conduct of activities such as identification of scientist/groups that will develop the socioeconomic scenarios relevant to Indian circumstances especially for vulnerability assessment. It is necessary that the scenarios must be developed at national level as well as sub-national level e.g. at agro-ecological zones. Vulnerability profiles would be developed based on vulnerability indices for different sectors, sub sectors at sub-regional, cropping system and watershed level. Spatial vulnerability profiles on a GIS format would be developed at sub-regional level along with ranking of the most vulnerable natural ecosystems, food production systems and water resources. Vulnerability indices would be developed for a set of indicators identified for each sector. These indicators would be quantified, normalized and aggregated to obtain composite vulnerability indices for different sectors. Vulnerability profiles would be developed according to:

- Different sectors and sub sectors
- At cropping system, forest type, watershed and sub-regional level
- For short, medium and long term periods.

Adaptive capacity: The adaptive capacity of the natural and socioeconomic systems, the institutions (such as departments of agriculture, forests and irrigation) and local communities (farmers, coastal fishermen and forest dwellers) would be assessed.

Adaptation framework and decision tool: It is necessary to identify priority adaptation strategies. An adaptation framework would be developed incorporating the impact assessment, vulnerability profile development, adaptation capacity assessment and participation of different stakeholders. Studies would be conducted to assess the traditional adaptation practices and coping strategies. In addition to traditional adaptation strategies, scientific methods and practices for enhancing adaptation would be developed for different sectors and regions and methodologies for merging the traditional and modern technologies would also be explored.

Outcome 3.1: Improved climate change projections with the use of advanced and updated Regional Climate Change models.

Output 3.1.1: Developed and applied advanced models to profile climate variability at sub-regional level (such as state and district)

India is experiencing high climate variability with extremes of temperature, rainfall, droughts and floods. Further, for vulnerability and adaptation assessments in the short-term, an improved understanding of climate variability is very critical. Thus based on advanced statistical techniques and historical climate data, very detailed current climate variability will be assessed and climate profiles and trends will be developed at state and sub-regional level to assist in developing adaptation strategies and practices to cope with current climate risks. Trends in occurrence of extreme rainfall events (> 5 cm/day, >10 cm/day), droughts during cropping seasons and occurrence of hurricanes and cyclones will be assessed.

The model projections derived or developed under TNC will be used in preparation of SAPCC.

Output 3.1.2: Developed climate variability maps at district level for India

The most important administrative unit for decision-making on developmental programmes is the district. Thus current climate variability profiles will be developed and spatial maps will be prepared at the sub-regional level for temperature, rainfall, floods and droughts. Based on the sub-regional level profile maps, the sub-regions could be ranked for extent of vulnerability to enable development of adaptation projects. The current vulnerability of various regions and sectors will also be mapped to capture the status of present vulnerability and adaptability in India. The recent trends of climatic parameters in Indian climatic zones will be assessed to estimate any need for reclassification of the zones.

Outcome 3.2: Availability and clearer understanding of climate and socioeconomic scenarios for India.

Output 3.2.1: Documented climate scenarios (short-, medium-, and long-term) based on Multiple Global climate models (GCM) / Regional Climate Models (RCMs) and climate change parameters at RCM grid level.

During INC and SNC, climate projections were made using only one GCM and RCM. During SNC, climate projections were made using Hadley Centre HadRM3 and A1B scenario. Post-SRES, new scenarios based on Representative Concentration Pathways have been developed. Climate change projections during TNC will be made using the model outputs from the CMIP-5 project for the different RCPs such as RCP2.6, RCP4.5, RCP6.0 and RCP8.5. Multiple CMIP-5 model-based ensembles would be developed and used for climate projections. The CORDEX-based RCM projections will be used when they become available. Climate change projections will be made at national, state and sub-regional levels. Current climate variability will be assessed due to their relevance for developing adaptation strategies for the immediate period of say up to 5-10 years. During TNC, special focus will be given for projecting extreme events such as floods, droughts and hurricanes since India is exposed to such events periodically. The climate change data would be suitably converted into appropriate data formats for use by impact, vulnerability and adaptation assessments and a centralized database on climate change projections would be created

Outcome 3.3: Improved understanding of projected climate change impacts for all relevant sectors and regions.

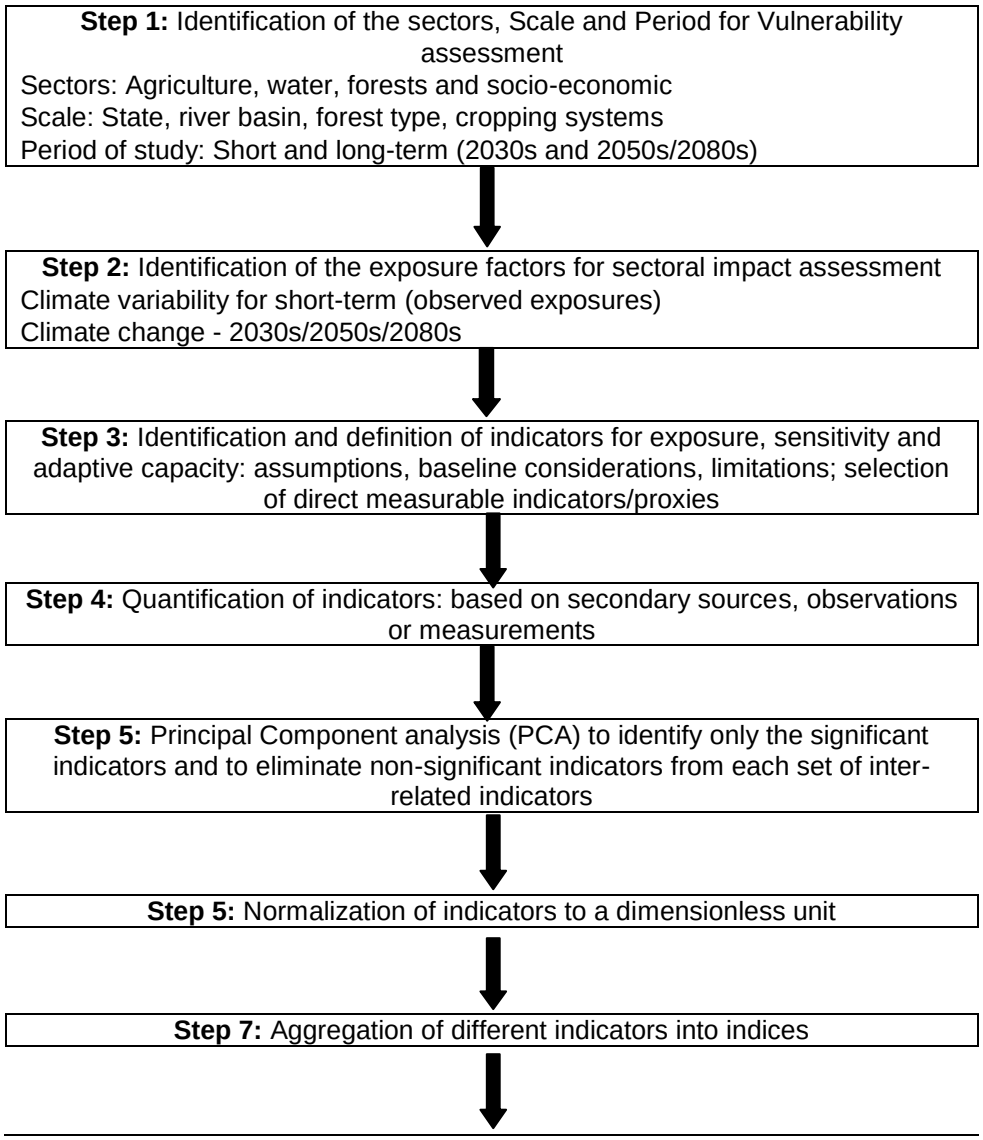
Output 3.3.1.Documented projections and results of impact assessments of climate change (based on multiple GCMs) for different sectors in India.

Climate change impacts will be assessed for all the important sectors and ecosystems such as, water, agriculture, forestry, coastal areas, fisheries, energy, industry, infrastructure, built space etc., based on climate projections as well as climate impact assessment models. The physical impacts would be converted to economic impacts to the extent possible including uncertainty and risk of climate change impacts. The impacts of extreme events will also be assessed. The details of the climate change impact assessment are given below:

- Sectors: Climate change is projected to impact all natural ecosystems as well as socio-economic sectors. During TNC, climate change impacts will be assessed for:
  - Natural ecosystems such as forests, river basins, mountain ecosystems
  - Sectors: Agriculture including livestock and fisheries, water resource, health, fisheries, coastal zones, and infrastructure
  - Climate change models and scenarios: Impact assessment during SNC was carried out using Hadley Centre Regional Climate Model (HadRM3) outputs for A1B scenario. During TNC, the latest CMIP-5-based climate change projections will be used. Climate impacts will be assessed for the RCP scenarios 4.5 and 8.5

- Scale: Climate projections will be assessed at RCM grid level and extrapolated to sub-regional, states and national level.
- Period of assessment: Climate change impacts will be assessed for the short-term period of 2030s for adaptation policy-making and for long-term period of 2100.
- Models: Most advanced impact assessment models available in literature would be adopted for different sectors.

Vulnerability profile will be developed using the following approach (Figure 2).



Step 8: Plotting of the spatial pattern in vulnerability and generation of vulnerability profiles on a scale of 1-5 (least to most vulnerable)

Figure 2: General approach to vulnerability assessment

Outcome 3.4: Improved understanding of, and appropriate actions planned for addressing, vulnerability to climate change at different sectors and regions.

Output 3.4.1: Developed multiple impact assessment models for adoption, including integrated assessment models

During SNC, to assess the impact of climate change on different sectors, single impact models were used. During TNC, it is proposed to use multiple impact models for different sectors, wherever the literature permits. For example, to assess the impacts of climate change on forest ecosystems, it is proposed to use models such as BIOME, IBIS and LPJ.

Some likely integrated impact assessment would be understanding interactions of water, energy, irrigation and climate change; human settlements, water, and energy; water, agriculture, and forestry; human health, water and vegetation; livelihoods and climate change; gender issues, livelihoods, energy and climate change; urban settlements, human health and water etc. Appropriate data sharing platforms would be created for enhancing the capability to conduct such assessments.

Output 3.4.2: Developed district level vulnerability assessment reports

Vulnerability of different sectors developed for the projected climate change will be presented at the sub-regional level by overlaying different indicators such as land use, socio-economic status, climate projections and impacts. Spatial maps will be developed to assist decision-makers on a vulnerability scale. The vulnerability maps will be developed wherever possible for the dominant crops, forest types and river basins. Integrated impact assessment will be conducted to capture the vulnerability of natural resources such as land, water, forest, and energy across various sectors and regions.

Vulnerability indices will be developed for different sectors such as water vulnerability index, agriculture vulnerability index and forest vulnerability index. Vulnerability indices developed at the sub-regional level for different sectors and sub-sectors will be ranked on a scale of 1 (least vulnerable) - 5 (most vulnerable) and presented to enable development of adaptation projects for implementation.

Outcome 3.5: Increased understanding of Adaptation framework, measures and possible projects

Output 3.5.1. Developed Spatial vulnerability profiles in GIS format at sub regional level (such as state or district) based on vulnerability indices for different sectors, sub sectors at sub regional covering parameters such as, cropping systems and watershed level

Output 3.5.2. Documented ranking of most vulnerable natural ecosystem, crops, and water resources at sub-regional level (such as state or district) for India.

Output 3.5.3. Adaptation framework describing measures currently implemented and proposed measures

Output 3.5.4. Adaptation action plans, including strategies for implementation and project profiles for key adaptation options.

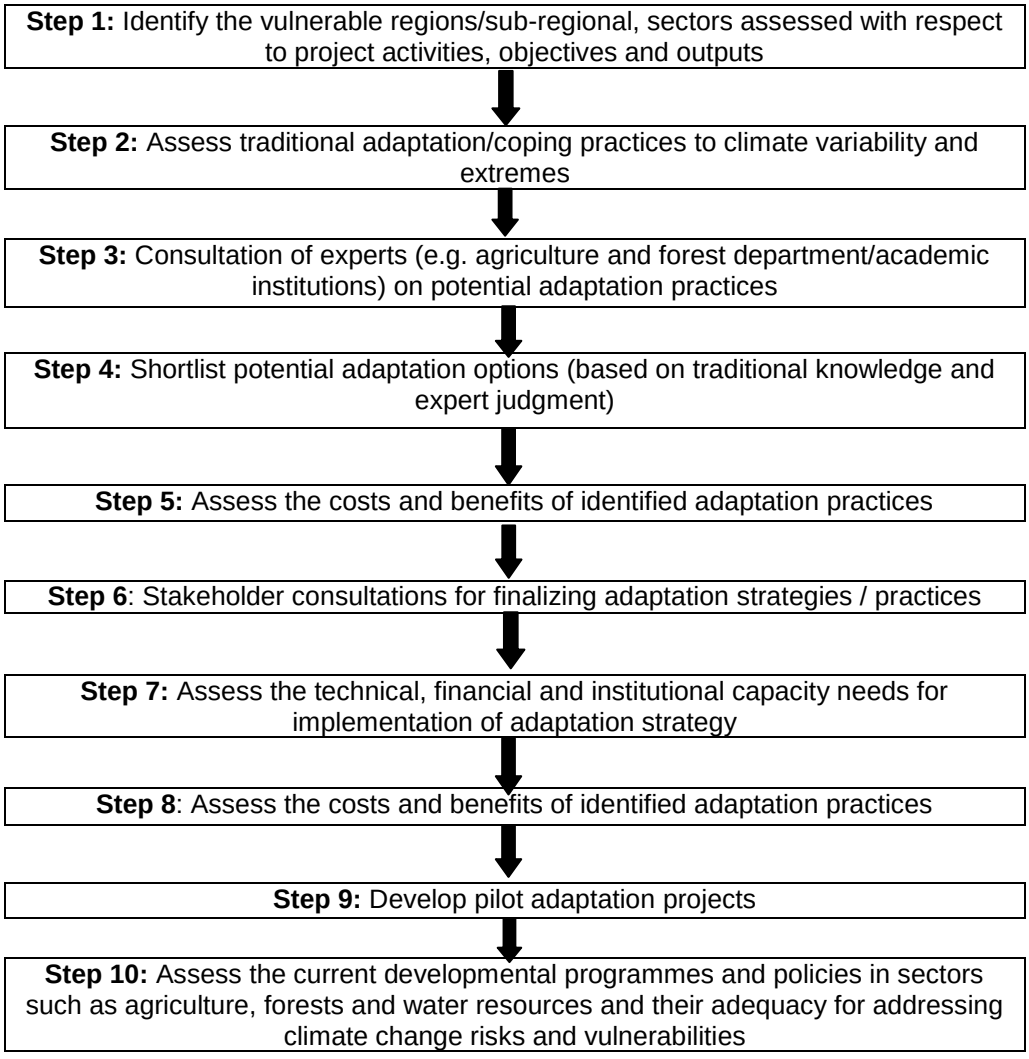
These outputs are jointly addressed as below to develop adaptation measures, strategies and project profiles.

A detailed assessment of impacts of climate change and the development of vulnerability profiles will facilitate development of adaptation strategies and practices to enable different sectors and stakeholders

to cope with climate risks. Selection of adaptation strategies requires clear identification of the impacts, vulnerability and adaptive capacity as well as the access to technology, information and finance (Figure 3). The broad approach to developing adaptation strategies and practices would involve the following steps.

The key activities in developing an adaptation framework, measures and projects are as follows:

- Developing vulnerability profiles for different cropping systems, river basins, forest types, etc.
- Assessment of the current practices and technologies adopted in different sectors by different communities and their adequacy to cope with current climate variability (including extreme events) and climate change risks
- Assess the developmental policies and programmes for their ability to address climate risks
- Assess the barriers to adaptation to current climate risks as well as future climate change impacts - technical, institutional and financial
- Develop a framework for mainstreaming adaptation in developmental programmes and projects.
- A framework for Adaptation Indices would be created for various interventions to the extent possible. Adaptation actions such as climate risk management committees, climate resilient agriculture, sub-regional contingency plans and creating adaptation index for critical sectors and regions would be done to the extent capacities permit.
- Develop pilot adaptation projects for the identified vulnerable sectors and regions.



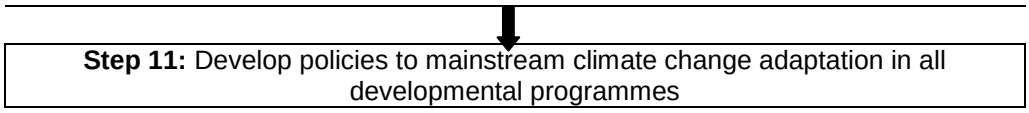


Figure 3: **Broad approach to developing an adaptation framework**

Component 4: Measures to Mitigate Climate Change

Under this component, work on mitigation actions and information on mitigation related activities will be presented. The information on mitigation inter-alia would include description of actions, nature of action, coverage and progress indicators. It will also provide information on methodologies, assumptions, progress of implementation including steps undertaken or envisaged. Further, the work would also include synthesis of information emerging from several national climate change missions especially activities relating to mitigation. It will also attempt identification of existing policies/actions/programmes/projects both at national and state levels that are focusing on climate change mitigation and adaptation. In addition to national missions, SAPCCs would be assessed and incorporated as relevant. It is also envisaged to identify institutions and approaches including models that can be utilized to develop information relating to GHG emissions. The TNC will also develop improved GHG emissions estimates using country specific emission factors and projections for India using more up to date information. It also envisaged developing assessments based on appropriate models, availability of technologies, R&D programmes, technology transfer needs, mitigation potential, costs and benefit including the limitations of such assessments. The work will also include identification of mitigation opportunities and potential in various activities. The TNC would document information on progress of implementation of mitigation actions, results achieved, estimated emissions reduction to the extent possible. Besides, information would also include description of domestic measures, report and verification arrangements.

These activities will be conducted through a network of institutions (from Annexure 2) coordinated by Indian Institute of Management, Ahmedabad and Indian Institute of Science, Bangalore.

Outcome 4.1: Increased understanding of GHG mitigation policies and measures at national and state level.

Output 4.1.1:Documentation on national climate change mitigation policies.

India has adopted NAPCC, wherein enhancing energy efficiency mission and solar mission are two important national missions. Ensuring energy security, improving access and affordability of modern energy resources for all Indians, diversifying energy resources, resource use efficiency enhancement, reducing technical and commercial losses in power transmission, and enhancing renewable energy are pillars of Indian energy policies. The Bureau of Energy Efficiency has already instituted many demand side energy efficiency improvement measures and policies such as Perform Achieve and Trade (PAT) scheme, labels and standards, etc. Many state governments have devised their own mechanisms and policies for energy sector that would contribute to climate change mitigation, e.g. solar park programme in Gujarat state, renewable power obligation in many states, replacing incandescent lamps with compact florescent lamps, three phase power for rural areas, agriculture pump set replacement programmes etc. TNC will document these developments.

Land use sectors include cropland, forestland, grassland, and wetland. The national and state-level land use policies will be assessed. This would also include assessment of current and proposed afforestation and reforestation rates, deforestation, forest degradation, and fuelwood and timber extraction. Policy factors driving land use and land use change will be assessed. Potential future land use changes will be projected and its implications for GHG emissions and removals will be assessed. The implications of existing land use policies in agriculture and forest sector on the carbon stocks in land use sectors will be assessed.

Output 4.1.2: Improved future GHG emission projections for India using up-to-date information.

This component will include socio-economic scenario creation, future GHG emission projection and low carbon economy research and emission estimation.

Future GHG emissions reflect the development pathways based on national and sub-regional socio-economic scenarios in future. These include economic development, population growth, regional development, technological penetration and adoption, income distribution, urbanization, rural development, management and enhancement of natural resources such as water and green cover, education and health, and climate change policies. For a developing country like India, integrating sustainable development and climate change policies and measures is paramount for a sustained inclusive development. Socio-economic scenarios will be developed to capture these myriad dimensions and parameters in an integrated manner. These scenarios will be linked to global scenarios such as Representative Concentration Pathways (RCPs) and Shared Socio-economic Pathways (SSPs).

These socio-economic scenarios will be used to project GHG emissions for India for various gases. This will preferably be done until 2030 using appropriate methodology and tools. Technology-fuel mix, land-use and cropping patterns, resource consumption that contribute to GHG emissions etc. will be estimated and modeled appropriately. This would form the basis for analyzing the impacts of various mitigation measures on Indian GHG emissions.

For the land use sector, according to SNC, land use sector in India is a net sink, while it was a marginal source during the INC. GHG emissions/removals from land use sectors will be improved based on improved emission/removal factors and activity data, as well as modeling. GHG emissions/removals for the land use sector will be estimated and projected for the future. Land use scenarios will be developed and the resulting emissions/removals will be estimated.

Low carbon development is important research area for India since considerable infrastructure, power plants and systems are yet to be built. These could follow a low carbon pathway therefore reducing the need for mitigation. The opportunities and initiatives existing to follow a low carbon path in various sectors will be analyzed and documented.

Output 4.1.3: Mitigation potential for energy and land-use change

Mitigation potential assessment for energy and industry sectors: Decoupling energy and economic growth, and decoupling energy and GHG emissions are the two fundamental approaches for mitigation from energy and industry. Enhancing energy efficiency in major energy intensive sectors, fuel switching, cleaner technologies and processes, low GWP gas introduction in industrial applications, transport, buildings, water use efficiency, waste to energy and demand side management are some of the important mitigation strategies. Mitigation impact of the policies that are already in place at central and state levels, policies that are under discussion, and advanced policies that would be required for integrating sustainable development and climate change concerns would be documented. Various missions under NAPCC will also be assessed for classifying mitigation potential assessment. Baseline creation for some key sectors would be attempted, although India is a very diverse country for sectoral energy consumption.

Mitigation potential assessment for agriculture sector: Livestock, rice cultivation and synthetic fertilizer use are the three dominant sources of Indian GHG emissions from agriculture sector. Better farming practices, manure management, appropriate mechanization, water use efficiency, feed enhancement for livestock are some of the mitigation techniques. A national assessment would be conducted to estimate GHG emission mitigation potential.

Mitigation potential assessment for waste sector: Collection and compaction of MSW, waste segregation, composting, landfill gas recovery, waste to energy are some of the mitigation options. India already has some CDM projects around these.

Mitigation potential assessment for land use sectors

- Baseline carbon stocks estimated: India has a significant scale afforestation and reforestation programme as well as progressive forest conservation policies. The implications of the policies and programmes on carbon stocks in forestlands, croplands and grasslands will be analyzed. Baseline carbon stocks on forestlands, croplands and grasslands will be estimated and projected based on field measurements as well as modeling.

- Mitigation potential assessed for land use sectors: Mitigation options for agriculture, forests and grasslands will be developed through stakeholder consultations. After identifying the mitigation options, data required for assessing the mitigation potential will be collected from literature and field studies. Biomass and soil carbon growth rates will be developed for different mitigation options. Projections of mitigation potential of forestry mitigation options will be estimated using the GCOMAP or other mitigation models. Agricultural soil carbon enhancement is an important mitigation option and thus will be assessed based on field studies and modeling. Multiple scenarios will be used for determining the mitigation potential. The scenarios could include; technical, economic and market potential.

Government of India has formulated the Greening India Mission under the NAPCC to address climate change through mitigation and adaptation. The mitigation options, the area to be dedicated for each of the options and the mitigation potential has been estimated. The mitigation potential estimated will be revised based on improved estimates of biomass and soil carbon stocks and growth rates.

The above mitigation potential assessment for various sectors will be done until 2030 using appropriate methodologies.

Output 4.1.4: National climate change mitigation action plan and state level action plans

SAPCC have been initiated in India, broadly in line with NAPCC. The main purpose behind creation of SAPCC is to sensitize states about inter-linkages of their developmental plans with climate change, articulate the challenges of adaptation, and wherever possible suggest projects for enhancing resilience to climate change impacts. The national plan incorporates scope for nationally appropriate mitigation actions.

Outcome 4.2: Increased understanding of gaps and constraints pertaining to financial, technical and capacity needs to address climate change

Output 4.2.1: Report on the gap analysis and constraints pertaining to (a) access to technologies and technology transfer arrangements, (b) financial assistance needed for technology transfer and capacity development, and (c) investment requirements for mitigation measures based on the national and state climate change action plans

Energy sector is the largest contributor to GHG emissions in India. There are many data gaps such as informal sector, unorganized sector, biomass reporting, top-down and bottom-up consumption of almost all fuels, coal grade consumption details, proper sectoral allocation of fuel consumption etc. There are also limited measurement of GHG emission factors in energy intensive industries and transport. Allocation of fuel for energy and non-energy purposes in iron and steel and fertilizer industries also requires further refinement. MSW and Industrial wastewater assessment need improvement.

Land use policies will be assessed for agriculture, forests and grasslands. The implications of the existing land use policies determining the availability of land for mitigation will be assessed. There are competing demands on land for food production, infrastructure development, expansion of settlements, etc. Barrier analysis will be conducted to assess and rank the barriers.

- Policy constraints to realizing the mitigation potential
- Institutional and capacity constraints
- Financial constraints to meet the investment cost of mitigation options
- Technical constraints, with respect to reclaiming degraded agricultural lands and wastelands

- Constraints to land availability for mitigation

Potential data gaps in mitigation assessment include baseline biomass and soil carbon stocks, growth rates of biomass and soil carbon for different land categories and mitigation options, and costs and benefits data.

Apart from these technical constraints, continuous funding of climate change mitigation and adaptation measures, policies and plans is also needed.

Investment cost assessed for mitigation options in land use sectors: The investment cost required for achieving the technical, economic and market mitigation potential of different mitigation options in the land use sectors will be assessed. The Government, Industry and donor agencies have to prepare long term commitments for managing this and the overall financial requirement will be assessed. The capacity needs includes building institutional networks and capacity, training and expanding human resources working on climate change issues, and disseminating information to the public at large for better sensitization on how climate change issues would affect them.

Output 4.2.2: Completed technology needs assessment (TNA) for different sectors

India is a vast country, where myriad technologies of broad vintages and spectrum co-exist. This poses huge challenge for assessing technology needs for climate change mitigation and adaptation in different sectors and regions. Technology need assessment is based upon technology availability, economic potential, diffusion rates, adoption capabilities, traditional practices and behavioural patterns, among many other factors. TNC will assess this for different sectors. TNA is based on a sectoral approach therefore first step would be to identify the priority sectors that can contribute to nationally appropriate mitigation actions and adaptation requirements of the country, while meeting national sustainable development goals and priorities of India. Once the sectors are identified, technologies within the chosen sectors will be prioritized based on NAPCC and India's 12th five-year Plan targets. Barriers faced by chosen technologies will be identified. Assessment of key mitigation and adaptation technology needs, availability of those technologies in the country, national R&D programmes and technology transfer needs including financial and technological limitations will be conducted.

Output 4.2.3: Documentation on the detailed information of key mitigation-adaptation technology needs, availability of those technologies in the country, national R&D programmes, implementation & monitoring of activities, technology transfer needs, and financial support needed along with limitations.

A comprehensive documentation of the mitigation options, technologies, R&D institutions involved in developing and adoption of nationally developed as well as transferred technologies from other countries will be prepared. The next steps involved are simple prioritization of the technologies including their grouping, stage of development, as well as technological, financial and capacity related resource requirements. These would include prioritization of nationally appropriate mitigation actions and national adaptation actions from a technological perspective. These activities can be considered as part of technology action plan. A review and documentation of R&D programmes in different national institutions will be completed to assist in assessment of technology transfer needs in different mitigation sectors such as power generation, energy efficiency, transportation and renewable energy. The financial needs for R&D in different sectors will be assessed. Similarly, current state of adaptation in different sectors and the technologies involved will be evaluated. Further, traditional as well as modern technologies aimed at adaptation will be assessed and the limitations in promoting transfer of adaptation technologies will be documented. The financial support required for R&D and dissemination of adaptation technologies and practices will be estimated for different sectors. Coordination with other GEF funded projects in India that has similar activities will be done through common institutions and experts that are participating in these projects.

Component 5: Other information relevant for the preparation of the TNC

This component of the project explicitly deals with national issues concerning capacity needs (more at the aggregate level) with specific reference to regional diversity and would involve the following:

- Analysis of the capacity building needs (including education and training) including for absorbing technology transfers, activities for research, implementation and monitoring of climate change mitigation-adaptation activities and NC preparation.
- Assessment of the status and needs for research and systematic observations and limitations.
- Evaluation of financial resources and technical support received from national and international sources for activities related to climate change including new initiatives of all the line ministries vis-à-vis their climate change concerns.
- Formulated a framework in accessing updated information/data from different institutions, establishment of a long term strategy for NC preparation, along with financial, institutional limitations and mitigation measures to overcome the limitations.
- Organization and conduct of workshops, seminars and training programmes to disseminate information on climate change in different parts of India.
- Activities aimed at enhancing the participation of the relevant stakeholders at national and state level would be considered. Stakeholders include government departments, industry, elected representatives, research organizations and NGOs.

One of the major focus areas for the TNC report pertains to activities planned at decentralized level (state). Such activities would require significant resources for assessing local capacities and developing further the existing levels in line with the requirements for formulating NCs and in implementing measures and actions developed and stated in NC reports. This would also entail the operationalization of a more robust, systematic and continuous information dissemination system (through establishment of zonal and regional networks, organizing of dissemination events) and updating the same on a regular basis. This would require identification of key stakeholders, defining a sustainable role for all and ensuring a sustainable system that will be complementary to achieving the objectives of the Convention.

Outcome 5.1: Comprehensive description of systematic observations and research on climate change

Output 5.1.1: Documented the status of and need for research on systematic observations, and technical and financial limitations.

SNC has reviewed and reported the status of scientific research and systematic observations with respect to climate change. India has a large network of scientific and technological institutions. India has established satellite, ground, earth and ocean observation systems in place. The adequacy or limitations of the current climate observation systems will be reviewed and the research needs will be identified. India has a strong meteorological department, which is generating and managing climate data. India has also launched the INCCA. Despite having a large scientific establishment, India still needs modeling capability for climate change projections, development of earth system models and global climate models. During SNC, climate projections and impact assessments were based only on one GCM output namely HadRM3 and only one emission scenario, namely A1B. The limitations of depending on single scenario such as A1B and single GCM model such as HadCM3 will be analyzed. Further, climate projections and ensemble of multiple GCMs from the CMIP-5 outputs will be derived. Climate projections will be made using RCP scenarios. The limitations of existing research, observation and institutional arrangements will be reviewed and updated during TNC. Similarly the limitations of depending on single impact model for different sectors such as forest, agriculture and water resources will be assessed and attempts will be made to use multiple impact models for some of these sectors.

5.1.2. Documentation on the update of the financial resources and technical support received from national and international resources for activities related to climate change.

India has successfully implemented many GEF funded projects over the years. Many international multilateral organizations and bilateral donor agencies have also funded activities related to climate change. Indian federal government has over the years initiated and funded large programmes and activities that are related to climate change in various sectors. Many state governments have also taken initiatives and are funding activities in similar domains, including crop insurance, renewable energy expansion etc. All these financial resources and technical support received will be documented under the TNC.

Outcome 5.2: Strategy for a sustainable national communication process.

Output 5.2.1: Report on the planned activities to establish a long term strategy for national communications preparation along with financial, institutional limitations, adaptation and mitigation measures to overcome the limitations.

Recognizing the continuous nature of reporting on the implementation of the convention in the form of NCs and BURs, it is necessary to devise a long term strategy for preparation of these reports on a regular basis. Several of the participating institutions in this process serve as core institutions which would require to be produced with financial support on a continuous basis. The institutions which are already in the INCCA cater to the needs of preparation of information in areas such as adaptations and mitigations which require strengthening and new capacity development. The NIMS will contribute to inventory of GHG preparation aswell as identification of potential for mitigation measures / approaches. This is proposed to be developed which will contribute to sustenance of national communication process.

Outcome 5.3: Increased public awareness and understanding of climate change

Output 5.3.1: Strengthened system of information dissemination on climate change through workshops and seminars in various parts of India, training and publications.

Periodic information dissemination workshops on latest climate change projections, implications for different socio-economic and natural ecosystems will be organized. Scientific seminars will be conducted on climate change projection modelling, impacts and vulnerability assessment. Periodic publications will be brought out reflecting the progress made on the various aspects of the NC process.

Output 5.3.2: Designed activities for enhancing participation of the relevant stakeholders in the preparation of the national communication

Stakeholders' capacity will be enhanced through periodic workshops wherein key results and findings periodically published in the form of brochures and booklets and disseminated. Technical training programmes on the latest IPCC GHG inventory guidelines, new climate projections, QA/QC procedures, uncertainty reduction, latest climate change projection models, impact and vulnerability assessment modeling, future emission projection and mitigation modelling will be organized.

Component 6: Third National Communication report preparation

Published TNC of India to UNFCCC and Periodic Technical reports, such as the GHG inventories, V&A adaptation assessments at the sectoral level, brief summaries of key policy issues relevant for decision making, and brief summaries of the key climate changes issues and findings at the regional level (such as state or districts).

Outcome 6.1: Government of India-approved TNC Report and submitted to UNFCCC, along with relevant technical document and policy briefs

Output 6.1.1: Published TNC of India to UNFCCC

The TNC will be approved by the Steering Committee. The approved National Communications report will be further examined and approved by the appropriate government authorities. National Communications Report will be submitted to the UNFCCC.

TNC will be published and disseminated through various fora. The Executive Summary will be published and disseminated in different regional languages. The National Communications Report will also be disseminated on a web site. Technical reports on national GHG inventory, vulnerability and adaptation assessments for different sectors and key policy issues relevant to climate change will be published to disseminate the findings of the National Communications process. Technical publications such as books and journal articles will be periodically published highlighting the latest developments.

Output 6.1.2:Technical reports, such as the GHG inventories, V&A adaptation assessments at the sectoral level, brief summaries of key policy issues relevant for decision making, and brief summaries of the key climate changes issues and findings at the sub-regional (state and district) level

A draft national communication report would be prepared and presented at workshops to seek the opinion of different stakeholders particularly research organizations. Apart from the required components of NCs (National circumstances, GHG inventory, vulnerability and adaptation etc.), the descriptions of the NC process/methodology followed, activities and participation of different organizations would be included in the TNC report. After the expert consultations, the TNC report would be finalized and submitted for GOI approval, and the approved document would be finally submitted to UNFCCC. A number of technical reports, such as the GHG inventories, V&A adaptation assessments at the sectoral level, key policy issues relevant for decision making, brief and summaries of the key climate changes issues and findings at sub-regional level (e.g. state or district) in collaboration with the local institutions/government involved.

The distribution of publications does not only pertain to the finished product i.e. the TNC report but also the numerous and in-depth publications focusing on vulnerability & adaptation and inventory assessments. During the TNC project, a major focus would be at decentralized levels and the major research and capacity development activities that will be carried out are expected to produce reports that contain in-depth analysis of information at decentralized level. The information that will be generated will have to be communicated in regional or local language in most cases. Therefore, financial resources are needed for the translation of such reports in local language in addition to the main report of TNC.

The guidelines regarding MRV and other mechanisms are still evolving and therefore the assessment of the nature of their incorporation for reporting purpose would be discussed as the guidelines and other related matters evolve.

Component 7: Other new information required under the aegis of the Convention

In line with the decision set forth during COP 17 in Durban, non-Annex 1 countries like India shall submit a BUR every two years, either as a summary of parts of their national communication in the year when national communication is submitted or as a stand-alone update report, containing updates of national greenhouse gas inventories, including a national inventory report and information on mitigation actions, needs and support received. To comply with this new obligation, such report will be prepared taking into account their development priorities, objectives, capacities and national circumstances. Data gathering and analysis work, as well as consultations with relevant institutions that were involved in the national communications preparation, will be carried out in order to deliver and consolidate the following items into India's BUR:

- Information on national circumstances and institutional arrangements relevant to the preparation of the national communications on a continuous basis;
- National inventory of anthropogenic emissions by sources and removal by sinks of all GHGs not controlled by the Montreal Protocol;
- Information on mitigation actions and their effects, including associated methodologies and assumptions;

- Constraints and gaps, and related financial, technical and capacity needs, including a description of support needed and received;
- Information on the level of support received to enable the preparation and submission of BURs;
- Information on domestic measurement reporting and verification; and,
- Information that India considers relevant to the achievement of the objective of the Convention and suitable for inclusion in its biennial update report.

BURs will be prepared for reference years 2010 and 2012 and submitted in 2014, 2016 and 2018 respectively as initial BUR, second BUR and Third BUR. The TNC and third BUR will be created from TNC will be submitted in 2017 and 2018 respectively for the reference year 2014. The discussions (through expert group consultations, workshops and seminars) necessary to come up with the stocktaking, analytical and updating work to be done in the preparation of the BUR shall cover the major components of the NCs, as well as the level and nature of support received by the country in implementing the planned mitigation and adaptation actions, as well as the estimated level of support required. Institutional networks have been created on a one-time basis for INC and SNC, apart from other one-time activity reports through INCCA. These networks have to be now activated on a continuous basis for periodic BUR reporting.

MRV mechanisms would be appropriately included for domestic NAMAs for 2014, 2016 and 2018 BURs.

Outcome 7.1: Enhanced understanding of domestic mitigation actions, its need and the level/nature of support required, greenhouse gas emissions inventory and other related information

Output 7.1.1: Information on national circumstances and institutional arrangements relevant to the preparation of the national communications on a continuous basis

Updated information on the national circumstances consisting of; changes in development priorities, policies, national and state level developmental programmes. Information on GDP, growth rates, land use changes, energy production and consumption, and other relevant factors will be updated.

Technical and institutional arrangements for preparing the NCs on a sustained basis will be established and presented. Institutional and technical arrangements for sustained NC will be an outcome of the TNC. BUR is a continuous process starting from the first BUR reporting in 2014 by India. Therefore requirement for sustained institutional arrangements will have to be articulated in various activities and sectors. Establishment of institutional arrangements relevant to the preparation of the BUR on a continuous basis will be estimated and presented.

Output 7.1.2: The national inventory of anthropogenic emissions by sources and removal of sinks of all greenhouse gases (GHGs) not controlled by the Montreal Protocol, including national inventory report

GHG inventory will be estimated, updated and presented on a biannual basis for the inventory year 2010. The methods and guidelines provided in the IPCC 2006 GHG inventory guideline will be generally followed for the GHG inventory and reported using the UNFCCC reporting guidelines for non-annex-I countries to the extent capacity permits. Uncertainty in the estimates of GHG inventory will be estimated and reduced with successive inventory submissions. National Inventory Report will be prepared describing the methods, activity data and emission factors, uncertainty estimates, assumptions made, and QA/QC procedures. Annexure 2 provides a detailed list of institutions to be involved including lead institutions.

Output 7.1.3: Information on mitigation actions and their effects, including associated methodologies and assumptions

Domestic mitigation actions planned and implemented will be presented, including those mandated through NAPCC. Progress made on the different mitigation missions such as solar energy and energy efficiency will be presented. Implications of mitigation missions and national and state level mitigation actions for GHG emissions will be estimated and presented, such as for agriculture, buildings, energy supply, industries, transport, forestry and waste. Appropriate MRV systems would also be designed. Projections of mitigation potential of the mitigation policies and programmes will be made using appropriate models. The models adopted, data used, and assumptions made will be reported.

Output 7.1.4: Constraints and gaps, and related financial, technical and capacity needs, including a description of support needed and received

Institutional arrangements required and the status of the existing institutions for conducting GHG inventory on a continuous basis will be assessed and reported. Modelling and data constraints for GHG inventory will be identified and addressed. Long-term arrangements needed for sustained GHG inventory preparation for the BUR updates will be assessed and established. Technical manpower and infrastructural needs for GHG inventory and mitigation assessment, along with the existing barriers will be identified, assessed and addressed. Technology needs for mitigation along with the financial support required for implementing the mitigation actions will be assessed. The support provided by the Government of India and the state governments for the mitigation actions will be reported.

Output 7.1.5: Information on the level of support received to enable the preparation and submission of biennial update reports

Support provided by the Government of India and state governments to institutions involved in the preparation of biennial reports will be included in the BUR. Annexure 2 provides a detailed list of institutions to be involved including lead institutions. The financial support received from GEF-UNDP, Government of India and the state governments for preparation of biennial reports will also be presented. The direct financial support as well as the indirect support provided by Government of India and state governments to the existing institutions involved in the preparation of BUR will be reported.

Output 7.1.6: Other information relevant to the achievement of the objective of the Convention and suitable for inclusion in its biennial update report

BUR also includes information on programmes and activities, which are relevant in the context of and in response to climate change. It includes many developmental programmes that enhance the resilience and adaptive capacity of vulnerable regions, populations and ecosystems. Programmes and policies that are aimed at promoting sustainable development and which also promote mitigation and adaptation to climate change will be included in the BAU.

Output 7.1.7: MRV mechanisms for domestic NAMAs

Appropriate MRV mechanisms would be developed for domestic NAMAs. These would consider differences in the type of NAMAs, for instance, energy, transport, industry and forestry related NAMAs and also be dynamically adjusted for the 2 BURs (2014 and 2016).

8. Key indicators, risk and assumptions

The main risks identified, assumptions and mitigation measures are presented in Annex 1 and the Project Logical Framework. The key risks for implementation of the TNC communication are as follows.

- Non-availability of regional climate model projections for multiple GCMs and different RCPs
- Non availability of multi-model ensemble of RCM outputs from CORDEX for Indian sub-continent
- Coordination with a large number of institutions and stakeholders may cause delay in implementing GHG inventory or impact, vulnerability and adaptation activities
- Lack of cooperation from the state governments leading to delays in preparing mitigation and adaptation strategies
- Delay in BUR preparation due to limited time available for the first BUR
- Limited political support for climate change and preparation of national communication
- Lack of cooperation from industries, municipalities, forest departments, transport agencies in generating emission factors or in assessing mitigation costs and potential.

The mitigation measures for each of the identified risks are outlined in Annexure 1.

Further it is assumed that all the reports and studies to be prepared under the TNC project will be completed on time and with the highest quality possible. Where competences are still to be developed or strengthened capacity building activities have been included. To ensure the quality of reports and documents developed, peer reviews are also considered. Another underlying assumption is that outputs will give us the expected impacts assuming no major natural disaster or political variation takes place.

Another general assumption of the Project is that the political, financial and social conditions will not experience a great variability, showing relative stability and that government regulations will not directly affect the contents, quality and preparation of TNC.

9. Cost-effectiveness; GEF incremental reasoning

The design of the TNC draws on the experiences and results of the previous NCs; in particular, activities are focused on areas and sectors that have been identified as most relevant for the GHG balance in India. A central element of the strategy to enhance the cost effectiveness of the TNC Project is the capitalization on institutional networks and working relations built during the INC and SNC, and on existing experience with climate change within national institutions. National Inventory Management System would built upon and strengthen the existing institutional structures and measurement capabilities created during first two NCs. The databases already developed using INC and SNC will be used, duly validating them for completeness, consistency and accuracy of time series inventory assessments. Similarly the climate modeling, sectoral and regional impact assessments capabilities developed during INC and SNC will be used as baselines for a deep-dive into detailed sub-regional integrated assessments.

In India, UNDP supports a large portfolio of climate change programmes and projects. The 2 previous NCs of India were prepared with the support of UNDP-GEF in partnership with the Ministry of Environment and Forests (MoEF), Government of India. UNDP India has been working collaboratively with many ministries of the Government of India (e.g. National Bureau of Energy Efficiency, Ministry of New and Renewable Energy), research organization and civil society organizations in implementing a number of projects as well as several state governments. UNDP also supports the Government of India in strengthening the capacity of ten state governments in preparation of their SAPCC. Synergies between the SAPCC and the TNC will contribute to improved capacities and better coordination among different stakeholders at the national and state levels.

10. Sustainability and replicability

The Government of India is fully committed to all the commitments made to the UNFCCC. Government of India is providing direct financial as well as indirect support to the institutions involved in the preparation of the TNC. The proposed activities will involve the existing institutions and networks such as INCCA, which are wholly supported by the government. The proposed outcomes and outputs of the TNC project will be delivered in collaboration with various institutes, departments, research labs, non-governmental organizations, central ministries, state governments and other stakeholders. The resource base and networks established during SNC will be utilized, enhanced and strengthened during the full-scale TNC project implementation. Involvement of various stakeholders in the different project components and activities will create awareness, and sensitize and build capacity and understanding on different aspects of climate change and related issues and enable continuation of the NCs preparation process.

Many research institutions have already established technical teams for GHG inventory preparation as well as impact and vulnerability assessments. Some of these initiatives are supported by co-financing arrangements. For example, the Forest Survey of India - a Government agency, has established carbon stock estimation in forest sector on a periodic basis. Thus these institutions will sustain the NCs preparation process.

The methods, models, tools and data generated during the NC preparation process will be useful to Government departments, industry and other stakeholder institutions to implement the climate change missions and mitigation-adaptation programmes and projects. Thus other sectors will also benefit from the NC process which will further help sustain the process. Similarly, the technical capacity built for the preparation of NC process is being deployed by the state governments in preparing the state climate change action plans.

11. Project Results Framework:

This project will contribute to achieving the following Country Programme Outcome as defined in CPAP or CPD: Management and preparation for climate change and disasters					
Country Programme Outcome Indicators: Government, industry and other relevant stakeholders actively promote more environmentally sustainable development and resilience of communities is enhanced in the face of challenges of climate change, disaster risk and natural resource depletion					
Primary applicable Key Environment and Sustainable Development Key Result Area: 1. Mainstreaming environment and energy					
Applicable GEF Strategic Objective and Program: Enabling Activities (CCM-6): Support enabling activities and capacity building under the Convention					
Applicable GEF Expected Outcomes: Adequate resources allocated to support enabling activities under the Convention (Outcome 6.1)					
Applicable GEF Outcome Indicators: Completed and submitted Third National Communication (TNC) and Biennial Update Report (BUR)					
Strategy	**Objectively Verifiable Indicators**			**Source of Verification/Means of Gauging Success**	**Risks and Assumptions**
	Indicator	**Baseline**	**Target (End of Project)**		
Project objective: To prepare the Third National Communication and other new information required to meet obligations under the UNFCCC	(A) National GHG inventory according to IPCC guidelines for the sectors; (i)Energy, (ii)Industry, (iii)Agriculture, (iv)LULUCF and (v)Waste for 2011, 2013 and 2014; and trend analysis over 2000-2012	(A) SNC	(A) TNC	Project evaluation and official reports to the UNFCCC	**Risks:** No major risks have visualized in the successful implementation of this project as government of India is fully committed to meeting the obligation towards the UNFCCC especially in the context of submission of National communication **Assumptions:** Government of India maintains its support to implement the UNFCCC.
	(B) Climate projections and assessment of impacts and vulnerability and adaptation policies & measures to address climate variability, climate change and extreme events	(B) SNC	(B)TNC		
	(C) Assessment of policies and measures to mitigate climate change	(C) SNC	(C)TNC		
	(D) Publication of Third National Communication	(D) N/A	(D)TNC		
	(E) Biennial Update Report for reference year 2014	(E) N/A	(E) BUR-2018		
Outcome 1: Updated report on India's national	(A) Report on national and state level developmental priorities in the context of climate change	(A) SNC	(A) TNC	Project reports, information contained in third	**Risks:** No risks have been identified **Assumptions:** (A) All the data, information required

circumstances prepared	(B) Report on the national actions to reduce GHG emissions	(B) SNC	(B) TNC	NC	is accessible (B) TNC will benefit from the experience gained in preparing INC & SNC
	(C) Report on the status of the environment, natural resources and energy use	(C) SNC	(C)TNC		
	(D) Description of the status of the national missions under NAPCC	(D) SNC	(D)TNC		
Outcome 2: National GHG inventory prepared for the years 2011, 2013 & 2014	(A) National GHG inventory for the sectors; (i)Energy, (ii)Industry, (iii)Agriculture, (iv)LULUCF and (v)Waste for 2011, 2013 & 2014; and trend analysis over 2000-2012	(A) GHG inventory available for the period 1994, 2000 & 2007 from INC, SNC and INCCA report respectively	(A) GHG inventory prepared for the 2011, 2013 & 2014, and trend analysis over 2000-2012	Reports on status of preparation of inventory and supporting documents	**Risks:** A large number of institutions from different parts of India will be involved in the preparation of GHG inventory and emission factor database. Co-ordination of the efforts and the periodic delivery of the data may cause delays. **Assumptions:** (1) India has a large number of experts who are authors for the IPCC, GHG inventory reports (2003, 2006); (2) Indian experts are also GHG inventory review experts for UNFCCC for Annex1 countries inventory review; (3) TNC will benefit from experience in preparing inventory for SNC & INCCA; (4) Government of India maintains its support to implement UNFCCC
	(B) IPCC 2006 guidelines, AFLOU approach adopted	(B) IPCC 2003, LULUCF, guidelines, methods used in SNC	(B) Activity data on emission factors generated for all sectors including AFLOU		
	(C) Uncertainty of the GHG inventory estimation using Approach-2 methods and reduction	(C) Uncertainty estimated using Tier 1 methods in SNC	(C) Uncertainty estimates provided in third NC		
	(D) Emission factor database and activity database prepared	(D) Book published on emission factors	(D) Emission factors and activity database available		
	(E) QA/QC procedures established	(E) No previous experience	(E) QA/QC systems established and operational		
	(F) National inventory management system for different sectors	(F) No previous experience	(F) Institutional arrangements for sustained inventory established and operational		

Outcome 3: Impacts and vulnerability assessments, and adaptation measures	(A) Climate variability profiles & trends prepared at national & state level	(A) No state level climate variability profiles available	(A) Climate variability profiles and maps prepared at state level	- Project reports - Technical reports -TNC	**Risks:** (1) Delay in availability in RCM (Regional Climate Model projections) from multiple GCMs; (2) Data limitations for impact assessment in different sectors such as agriculture, forest and water resources; (3) Complex coordination between large number of institutions making impact modeling and vulnerability profile development **Assumptions:** (1) Impact, vulnerability & adaptation assessments will benefit from INCCA studies and SNC. (2) TNC will benefit from participation of several IPCC authors of working group I & II. (3) Government of India maintains its support to implement UNFCCC; (4) Statistically downscaled GCM outputs are available that can reasonably substitute RCM outputs from multiple GCMs.
	(B) Climate change projections using latest CIMIP5 multiple GCM based outputs for different RCP scenarios at national & state level	(B) Climate change projections are available only for SRES A2, B2 & A1B scenarios	(B) Climate change projections and maps prepared based on multiple model ensemble based on CIMIP5 & RCP scenarios at GCM & RCM grid scales. Projections of extreme events made available		
	(C) Quantitative impacts of climate change using latest models for different sectors such as (Water resource, agriculture, forest ecosystems, health, coastal zones etc.)	(C) SNC presents climate impacts based on SRES scenarios	(C) Impacts of climate change on key sectors assessed using latest climate change projections for RCP scenarios and improved impact models		
	(D) Climate change vulnerability profiles developed at national &state level for different sectors	(D) Vulnerability profiles are not available for all the key sectors at national & state level	(D) Vulnerability profiles based on climatic, bio-physical & socio-economic factors developed		
	(E) Adaptation matrix for coping with climate impacts for different sectors and different regions	(E) Preliminary adaptation practices presented in SNC for only agriculture and forest sectors	(E) Adaptation matrix developed for projected climate change impacts for different sectors at regional level and updated information for agriculture and forest sectors		

	(F) Adaptation framework and policies for mainstreaming developed	(F) No adaptation framework presented in SNC and no national & state level adaptation framework & policies exist for mainstreaming adaptation in different sectors	(F) Policy framework developed for mainstreaming adaptation		
Outcome 4: Measures to mitigate climate change	(A) Documentation and synthesis of national climate change policies.	(A) No such analysis is available, except a book published in 2004	(A) Climate change policy synthesis, analysis and implications described	Project reports, information contained in the TNC	**Risks:** (1) Lack of data for state level mitigation assessments (2) Limited participations of some states (3) Delay in decisions on selection of scenarios (4) Involvement of multiple stakeholders may lead to delays in agreement of mitigation strategies (5) Coordination of the large number of institutions could lead the delays in preparation of GHG emission scenarios, mitigation plans and TNA **Assumptions:** (1) TNC will benefit from experience gained during preparation for SNC, INCCA reports on GHG emissions projections and low carbon strategy from the Planning Commission (2) Capacity building at national and particularly at state level (3) Multiple institutions will be involved and networks created for different sectors (4) Indian Government maintains its support to implement the UNFCCC
	(B) GHG emissions scenarios for 2020 and 2030	(B) Ministry of Environment has published GHG emissions for 2030, which is outdated	(B)Improved model based GHG emissions projections developed		
	(C) Mitigation potential of Energy and Land use sectors and projections for 2020 and 2030 based on modelling	(C)Mitigation potential not reported in SNC, but a few published papers available, which are based on limited information	(C)Model based mitigation potential estimates for energy and land use sectors along with marginal abatement cost curves developed		

	(D) Mitigation action plans at national and state levels	(D) No national mitigation plan available apart from a Low Carbon strategy prepared by the Planning Commission. State level preliminary mitigation plans available for some states	(D) Sectoral mitigation options developed at national & state level along implications for GDP, employment, etc.		
	(E) Constraints, gaps and related technical, financial and capacity needs	(E) SNC	(E) Gaps and constraints analyzed and barriers are ranked using AHP methods		
	(F) TNA and technology transfer and financial needs	(F) SNC	(F) Detailed TNA and technology transfer and financial needs assessed		
Outcome 5: Other information relevant for the preparation of the TNC – Comprehensive description of climate change research, strategies for sustainable National Communication process and communicating climate change to public	(A) Climate change research status and needs	(A) SNC information until 2010	(A) Systematic and comprehensive plan for research and climate change along with estimation of financial resources	Project reports, TNC	**Risks:** (1) Limited public interest in climate change issues (2) Delay in agreements on institutional arrangements for sustained national communication process **Assumptions:** (1) TNC will benefit from experience gained in the preparation of SNC (2) Indian Government maintains its support to implement the UNFCCC
	(B) Financial and technical support for climate change related activities received from national and international sources	(B) No quantitative estimates available in SNC	(B) Report on the financial flows into climate change activities from national and international sources		

	(C) Institutional arrangements for sustained National Communication process	(C) No institutional arrangement for long term and sustained preparation of national communication process presented in SNC	(C) Institutional arrangements with roles and responsibilities and financial and technical resource needs assessed and made available		
	(D) Stakeholder consultation and communicating climate change to different stakeholders	(D) Limited stakeholder consultation during SNC and no programs for communicating climate change	(D) Mechanisms and institutional arrangements made and implemented for communicating climate change to stakeholder and public		
Outcome 6: Third National Communication Report Preparation	(A) Reporting of the outcomes of the National Communication process on the NATCOM website, along with GHG inventories, climate change projection and impact and vulnerability maps	(A) SNC reported on the website	(A)All information relevant to preparation of TNC published on the NATCOM website	(1) Periodic technical reports, books and journal articles (2) Third NC report (3) Final evaluation report	**Risks:** (1) Delays in submission of technical reports, project reports and submission of information to PMU by large diversity and number of institutions (2) Difficulties in coordination with large number of institutions spread all over the country **Assumptions:** (1) Indian Government maintains its support to implement the UNFCCC
	(B) Publication / printing of the TNC	(B) SNC published and shared with the public and stakeholders	(B) TNC finalized and presented to Government of India and report published after approval		
	(C) Summary Report of the National Communication translated in major languages of India	(C) So far no summaries has been published in major Indian languages	(C) Summary and key findings of the TNC published in major India languages		
	(D) Periodic technical reports on climate change projections, impacts and vulnerability assessments\	(D) A few technical reports published during the preparation of SNC	(D) Periodic technical reports, book and journal articles published		
	(E) Final evaluation report	(E) Final evaluation report of SNC completed	(E) Final evaluation report completed and submitted		

Outcome 7: Enhanced understanding of domestic mitigation actions and preparation of Biennial Update Reports for submission during 2014, 2016 and 2018	(A) Biennial update of GHG inventory for the years 2010 and 2012	(A) No previous reports other than SNC reporting GHG inventory for year 2000	(A) BUR for 2014, 2016 and 2018	BUR 2014, 2016 and 2018 project reports	**Risks:** (1) Delay in compilation of GHG inventory for year 2010 and 2012 by 2014 and 2016, respectively due to limited time **Assumptions:** (1) Indian Government maintains its support to implement the UNFCCC
	(B) Update of the national circumstances and institutional arrangements from BUR perspective for 2014 and 2016	(B) Only SNC report	(B) BUR for 2014, 2016 and 2018		
	(C) Mitigation actions and their effects until 2020, including associated assumptions, methodologies and modeling	(C) No previous reports	(C) BUR for 2014, 2016 and 2018		
	(D) Update on the technical, financial capacity needs and support received for implementing these mitigation actions	(D) Only SNC	(D) BUR for 2014, 2016 and 2018		
	(E) Biennial Update Reports (BUR) submitted in 2014 and 2016	(E) Only SNC	(E) BUR for 2014, 2016 and 2018		

12. Total Budget and Work Plan

Table 1: Total Budget and Work Plan (TBWP)

Award ID:	**70193**	Project ID(s):	*GEFSEC PROJECT ID:* ***4673*** *GEF AGENCY PROJECT ID:* ***4603***
Award Title:	Preparation of Third National Communication (TNC) and other new information to the UNFCCC		
Business Unit:	IND 10		
Project Title:	Preparation of Third National Communication (TNC) and other new information to the UNFCCC		
PIMS no.	4603		
Implementing Partner (Executing Agency)	Ministry of Environment and Forests		

Outcomes	Implementing partner	Fund ID	Source of funds	ATLAS Budget Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	Total (USD)
1. India's National Circumstances	MoEF	62000	GEF	71300	National Consultants	27,000	27,000	21,000	11,000	10,000	96,000
	MoEF	62000	GEF	72100	Sub-contracts	73,000	74,000	45,000	20,000	19,000	231,000
	MoEF	62000	GEF	71600	Travel	10,000	9,000	7,000	7,000	7,000	40,000
	MoEF	62000	GEF	72200	Equipment and Furniture	0	0	0	0	0	0
	MoEF	62000	GEF	72800	Info Tech Equipment	10,000	10,000	0	0	0	20,000
	MoEF	62000	GEF	74200	Audio Visual and Printing	5,000	5,000	9,000	3,500	3,000	25,500
	MoEF	62000	GEF	74500	Miscellaneous	5,000	5,000	4,000	2,500	1,936	18,436
Subtotal						**130,000**	**130,000**	**86,000**	**44,000**	**40,936**	**430,936**
2. National GHG Inventory	MoEF	62000	GEF	71300	National Consultants	55,000	55,000	45,000	20,000	20,000	195,000
	MoEF	62000	GEF	72100	Sub-contracts	264,000	264,000	170,000	84,000	78,000	860,000
	MoEF	62000	GEF	71600	Travel	50,000	50,000	25,000	13,000	12,000	150,000
	MoEF	62000	GEF	72200	Equipment and Furniture	20,000	10,000	5,000	0	0	35,000
	MoEF	62000	GEF	72800	Info Tech Equipment	35,000	45,000	20,000	7,000	7,000	114,000
	MoEF	62000	GEF	74200	Audio Visual and Printing	15,000	15,000	30,000	21,000	20,000	101,000
	MoEF	62000	GEF	74500	Miscellaneous	5,000	5,000	5,000	5,000	4,360	24,360
Subtotal						**444,000**	**444,000**	**300,000**	**150,000**	**141,360**	**1,479,360**
3. Impacts and	MoEF	62000	GEF	71300	National Consultants	100,000	100,000	65,000	30,000	30,000	325,000

Outcomes	Implementing partner	Fund ID	Source of funds	ATLAS Budget Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	Total (USD)
vulnerability assessment and adaptation measures	MoEF	62000	GEF	72100	Sub-contracts	370,000	376,000	261,000	126,000	106,000	1,239,000
	MoEF	62000	GEF	71600	Travel	50,000	44,000	19,000	16,000	16,000	145,000
	MoEF	62000	GEF	72200	Equipment and Furniture	15,000	10,000	5,000	0	0	30,000
	MoEF	62000	GEF	72800	Info Tech Equipment	25,000	20,000	10,000	5,000	5,000	65,000
	MoEF	62000	GEF	74200	Audio Visual and Printing	15,000	25,000	15,000	18,000	34,000	107,000
	MoEF	62000	GEF	74500	Miscellaneous	5,000	5,000	5,000	5,000	4,195	24,195
Subtotal						**580,000**	**580,000**	**380,000**	**200,000**	**195,195**	**1,935,195**
4. Measures to mitigate climate change	MoEF	62000	GEF	71300	National Consultants	60,000	60,000	40,000	20,000	20,000	200,000
	MoEF	62000	GEF	72100	Sub-contracts	180,000	180,000	120,000	53,000	46,000	579,000
	MoEF	62000	GEF	71600	Travel	40,000	40,000	25,000	15,000	15,000	135,000
	MoEF	62000	GEF	72200	Equipment and Furniture	15,000	10,000	0	0	0	25,000
	MoEF	62000	GEF	72800	Info Tech Equipment	25,000	25,000	15,000	5,000	5,000	75,000
	MoEF	62000	GEF	74200	Audio Visual and Printing	25,000	30,000	25,000	12,000	14,000	106,000
	MoEF	62000	GEF	74500	Miscellaneous	5,000	5,000	5,000	5,000	4,045	24,045
Subtotal						**350,000**	**350,000**	**230,000**	**110,000**	**104,045**	**1,144,045**
5. Other information relevant for the preparation of the TNC	MoEF	62000	GEF	71300	National Consultants	35,000	35,000	24,000	10,000	10,000	114,000
	MoEF	62000	GEF	72100	Sub-contracts	100,000	100,000	69,000	30,000	28,000	327,000
	MoEF	62000	GEF	71600	Travel	25,000	25,000	18,000	12,000	10,000	90,000
	MoEF	62000	GEF	72200	Equipment and Furniture	5,000	5,000	0	0	0	10,000
	MoEF	62000	GEF	72800	Info Tech Equipment	15,000	15,000	5,000	0	0	35,000
	MoEF	62000	GEF	74200	Audio Visual and Printing	15,000	15,000	19,000	8,000	9,000	66,000
	MoEF	62000	GEF	74500	Miscellaneous	5,000	5,000	5,000	5,000	4,818	24,818
Subtotal						**200,000**	**200,000**	**140,000**	**65,000**	**61,818**	**666,818**
6. Third	MoEF	62000	GEF	71300	National Consultants	4,000	8,000	16,000	20,000	32,000	80,000

Outcomes	Implementing partner	Fund ID	Source of funds	ATLAS Budget Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	Total (USD)
National Communication report preparation	MoEF	62000	GEF	72100	Sub-contracts	8,000	16,000	32,000	40,000	70,000	166,000
	MoEF	62000	GEF	71600	Travel	2,000	4,000	8,000	10,000	15,000	39,000
	MoEF	62000	GEF	72200	Equipment and Furniture	0	2,000	3,000	2,000	2,000	9,000
	MoEF	62000	GEF	72800	Info Tech Equipment	0	2,000	3,000	5,000	2,000	12,000
	MoEF	62000	GEF	74200	Audio Visual and Printing	1,000	7,000	16,000	21,000	38,000	83,000
	MoEF	62000	GEF	74500	Miscellaneous	5,000	1,000	2,000	2,000	4,720	14,720
Subtotal						**20,000**	**40,000**	**80,000**	**100,000**	**163,720**	**403,720**
7. Other new information required under the aegis of the Convention	MoEF	62000	GEF	71300	National Consultants	125,000	100,000	100,000	100,000	40,000	465,000
	MoEF	62000	GEF	72100	Sub-contracts	500,000	350,000	250,000	250,000	25,000	1,375,000
	MoEF	62000	GEF	71600	Travel	50,000	50,000	50,000	50,000	10,000	210,000
	MoEF	62000	GEF	72200	Equipment and Furniture	25,000	20,000	15,000	10,000	0	70,000
	MoEF	62000	GEF	72800	Info Tech Equipment	35,000	25,000	20,000	20,000	0	100,000
	MoEF	62000	GEF	74200	Audio Visual and Printing	60,000	50,000	60,000	65,000	20,000	255,000
	MoEF	62000	GEF	74500	Miscellaneous	5,000	5,000	5,000	5,000	5,000	25,000
Subtotal						**800,000**	**600,000**	**500,000**	**500,000**	**100,000**	**2,500,000**
8. Project Management Cost	MoEF	62000	GEF	71300	National Consultants	70,000	77,000	94,000	94,000	40,000	375,000
	MoEF	62000	GEF	71600	Travel	4,500	5,000	6,000	6,000	2,500	24,000
	MoEF	62000	GEF	72200	Equipment and Furniture	0	0	0	0	0	0
	MoEF	62000	GEF	72800	Info Tech Equipment	0	0	0	0	0	0
	MoEF	62000	GEF	74200	Audio Visual and Printing	6,500	4,000	4,000	4,000	2,000	20,500
	MoEF	62000	GEF	74500	Miscellaneous	2,000	2,000	2,500	2,000	530	9,030
	MoEF	62000	GEF	74599	UNDP cost recovery chrgs-Bills*	7,000	7,000	3,500	4,000	500	22,000
Subtotal						**90,000**	**95,000**	**110,000**	**110,000**	**45,530**	**450,530**
Grand Total						**2,614,000**	**2,439,000**	**1,826,000**	**1,279,000**	**852,604**	**9,010,604**

*Estimated costs of Direct Project Services (DPS) requested by the MoEF to UNDP for executing services as indicated in TBWP and as per the Agreement in Annexure 4 of the Prodoc for recruitment of consultants and selection & awarding of sub-contracts. In accordance with GEF Council requirements, the costs of these services will be part of the executing entity's Project Management Cost allocation identified in the project budget. In accordance with GEF Council requirements, the costs of these services will be part of the executing entity's Project Management Cost allocation identified in the project budget. DPS costs would be charged at the end of each year based on the UNDP Universal Pricelist (UPL) or the actual corresponding service cost. The amounts here are estimations based on the services indicated, however as part of annual project operational planning the DPS to be requested during the calendar year would be defined and the amount included in the yearly project management budgets and would be charged based on actual services provided at the end of that year.

Note: Considering the size of the country, and the fact that the project would cover state and district levels, large amount of travel is required. However the nature of a few outcomes (1, 5, 6 and 8) either requires timing of travel to fall differently than in other outcomes or be relatively lower than other outcomes. For instance travel for outcome 6 (TNC report preparation) would accrue more in the final years and it would also not require much grass-root level travel. Similarly for outcome 8 (Project management costs), the travel would be more limited to visiting the lead institutions for various tasks and attending task-level coordination meetings for various outcomes that would normally be held centrally in New Delhi, the head quarter of PMU.

Table 2: Summary of Funds (GEF and co-financing, $)[4]

	Amount Year 1	Amount Year 2	Amount Year 3	Amount Year 4	Amount Year 5	Total
GEF	2,614,000	2,439,000	1,826,000	1,279,000	852,604	**9,010,604**
Government of India (cash and in-kind)	7,612,293	7,102,671	5,317,539	3,724,607	2,482,890	**26,240,000**
TOTAL	10,226,293	9,541,671	7,143,539	5,003,607	3,335,494	**35,250,604**

Table 3: GEF budget and co-financing (in USD)

Project Component	Expected Outcomes	Expected Detailed Outputs	Grant Amount ($)	Co-financing ($)	Total Amount ($)
			430,936	**950,000**	**1,380,936**
1. India's National Circumstances	1.1 Updating Report on India's National Circumstances	Detailed report with the following information			
		1.1.1. India's development priorities, policies and programmes at national and state level.	130,936	274,966	405,902

[4] *Summary table should include all financing of all kinds: GEF financing, cofinancing, cash, in-kind, etc...*

Project Component	Expected Outcomes	Expected Detailed Outputs	Grant Amount ($)	Co-financing ($)	Total Amount ($)
		1.1.2. Geography, climate, economy and the climate sensitive sectors and communities.	100,000	245,000	345,000
		1.1.3. Existing institutional arrangements relevant to the periodic conduct of GHG inventory.	80,000	190,400	270,400
		1.1.4. Progress on national actions to reduce GHG emissions.	120,000	239,634	359,634
2. National GHG Inventory			**1,479,360**	**3,140,000**	**4,619,360**
	2.1 Information of GHG inventory for 2011, 2013 and 2014, and trend analysis over 2000-2012.	2.1.1. Documented inventory of GHG emissions for (a) Energy (b) Transport (c) Industry (d) Agricultural (e) Land-Use Change and Forestry, and (f) Waste sectors.	900,000	2,280,000	3,180,000
		2.1.2. Completed National Activity Data and establishing Emission Factors database and information for all source categories.	100,000	100,000	200,000
	2.2 Increased accuracy of GHG inventory through the use of tier-III methodologies for most sectors.	2.2.1. Documented national and other methodologies adopted for the GHG inventory.	36,000	40,000	76,000
		2.2.2. Developed and implemented tier II&III methodologies, emission factors and models for inventory of GHG emissions in some sectors, including the adoption of the 2006 IPCC inventory guidelines where relevant.	213,360	500,000	713,360
		2.2.3. Adopted methodological approaches for uncertainty estimation as per the IPCC Good Practice Guidance and other appropriate methodologies.	55,000	75,000	130,000
	2.3. Strengthened and streamlined National institutional structure for long term National GHG inventory and the estimation of GHG emissions.	2.3.1. Established National Inventory Management System (NIMS) through sectoral institutions and network of supporting research institutions	80,000	50,000	130,000
		2.3.2. Established Quality Control and Quality Assurance Procedures.	65,000	65,000	130,000
		2.3.3. Published and disseminated GHG inventory.	30,000	30,000	60,000
3. Impacts and vulnerability assessment and adaptation measures			**1,935,195**	**8,400,000**	**10,335,195**
	3.1. Improved climate change projections with the use of advanced and updated Regional Climate Change models.	3.1.1. Developed and applied advanced models to profile climate variability at sub-regional level (such as state or district)	175,000	735,000	910,000
		3.1.2 Developed climate variability maps at sub-regional level (such as state or district) for India.	150,000	600,000	750,000

Project Component	Expected Outcomes	Expected Detailed Outputs	Grant Amount ($)	Co-financing ($)	Total Amount ($)
	3.2. Availability and clearer understanding of climate and socioeconomic scenarios for India.	3.2.1. Documented climate scenarios (short-, medium-, and long-term) based on Multiple Global climate models (GCM) / Regional Climate Models (RCMs) and climate change parameters at RCM grid level.	100,000	434,065	534,065
	3.3. Improved understanding of projected climate change impacts for all relevant sectors and regions.	3.3.1. Documented projections and results of impact assessments of climate change (based on multiple GCMs) for different sectors in India.	800,000	3,700,000	4,500,000
	3.4. Improved understanding of, and appropriate actions planned for addressing, vulnerability to climate change at different sectors and regions.	3.4.1. Developed multiple impact assessment models for adoption, including integrated assessment	250,000	1,000,000	1,250,000
		3.4.2. Developed sub-regional (state or district) vulnerability assessment report	100,000	410,000	510,000
	3.5. Increased understanding of Adaptation framework, measures and possible projects	3.5.1. Developed Spatial vulnerability profiles in GIS format at sub regional level (such as state or district) based on vulnerability indices for different sectors, sub sectors at sub regional covering parameters such as, cropping systems and watershed level	80,000	344,000	424,000
		3.5.2. Documented raking of most vulnerable natural ecosystem, crops, and water resources at sub-regional level (such as state or district) for India.	100,000	430,000	530,000
		3.5.3. Adaptation framework describing measures currently implemented and proposed measures	80,000	344,000	424,000
		3.5.4. Adaptation action plans, including strategies for implementation and project profiles for key adaptation options.	100,195	402,935	503,130
			1,144,045	**2,500,000**	**3,644,045**
4. Measures to mitigate climate change	4.1. Increased understanding of GHG mitigation policies and measures at national and state level.	4.1.1. Documentation on national climate change mitigation policies.	120,000	276,000	396,000
		4.1.2. Improved future GHG emission projections for India using up-to-date information.	404,045	845,000	1,249,045
		4.1.3. Mitigation potential for energy and land-use change	180,000	405,000	585,000
		4.1.4. National climate change mitigation action plan and state level action plans	100,000	260,000	360,000

Project Component	Expected Outcomes	Expected Detailed Outputs	Grant Amount ($)	Co-financing ($)	Total Amount ($)
	4.2. Increased understanding of gaps and constraints pertaining to financial, technical and capacity needs to address climate change.	4.2.1. Report on the gap analysis and constraints pertaining to (a) access to technologies and technology transfer arrangements, (b) financial assistance needed for technology transfer and capacity development, and (c) investment requirements for mitigation measures based on the national and state climate change action plans.	100,000	210,000	310,000
		4.2.2. Completed technology needs assessment (TNA) for different sectors.	140,000	294,000	434,000
		4.2.3 Documentation on the detailed information of key mitigation-adaptation technology needs, availability of those technologies in the country, national R&D programmes, implementation & monitoring of activities, technology transfer needs, and financial support needed along with limitations.	100,000	210,000	310,000
5. Other information relevant for the preparation of the TNC			**666,818**	**1,470,000**	**2,136,818**
	5.1. Comprehensive description of systematic observations and research on climate change.	5.1.1. Documented the status of and need for research on systematic observations, and technical and financial limitations.	125,000	300,000	425,000
		5.1.2. Documentation on the update of the financial resources and technical support received from national and international resources for activities related to climate change.	85,000	187,000	272,000
	5.2. Strategy for a sustainable national communication process.	5.2.1. Reporting on the planned activities to establish a long term strategy for national communications preparation along with financial, institutional limitations, adaptation and mitigation measures to overcome the limitations.	75,000	165,000	240,000
	5.3. Increased public awareness and understanding of climate change	5.3.1. Strengthened system of information dissemination on climate change through workshops and seminars in various parts of India, training and publications.	250,000	534,591	784,591
		5.3.2. Designed activities for enhancing participation of the relevant stakeholders in the preparation of the national communication	131,818	283,409	415,227
6. Third National Communication report preparation			**403,720**	**1,780,000**	**2,183,720**
	6.1. Government of India-	6.1.1 Published TNC of India to UNFCCC	303,720	1,345,000	1,648,720

Project Component	Expected Outcomes	Expected Detailed Outputs	Grant Amount ($)	Co-financing ($)	Total Amount ($)
	approved TNC Report and submitted to UNFCCC, along with relevant technical document and policy briefs.	6.1.2. Technical reports, such as the GHG inventories, V&A adaptation assessments at the sectoral level, brief summaries of key policy issues relevant for decision making, and brief summaries of the key climate changes issues and findings at the sub-regional (state and district) level	100,000	435,000	535,000
			2,500,000	**7,500,000**	**10,000,000**
7. Other new information required under the aegis of the Convention	7.1. Enhanced understanding of domestic mitigation actions, its need and the level/nature of support required, greenhouse gas emissions inventory and preparation of Biennial Update Reports for submission during 2014, 2016 and 2018	Submitting Biennial Update Reports, which will include the following:			
		7.1.1. Information on national circumstances and instituional arrangements relevant to the preparation of the national communication on a continuous basis.	400,000	740,000	1,140,000
		7.1.2. The national inventory of anthropogenic emissions by sources and removal of sinks of all greenhouse gases (GHGs) not controlled by the Montreal Protocol, including a national inventory report for the years 2010 and 2012	850,000	2,868,750	3,718,750
		7.1.3. Information on mitigation actions and their effects, including methodologies and assumptions	575,000	1,753,750	2,328,750
		7.1.4. Constraints and gaps, and related financial, technical and capacity needs, including a description of support needed and received	200,000	600,000	800,000
		7.1.5. Information on the level of support received to enable the preparation and submission of biennial update reports	50,000	150,000	200,000
		7.1.6. Other information relevant to the achievement of the objective of the Convention and suitable for inclusion in its biennial update report	125,000	387,500	512,500
		7.1.7 Establishment of MRV system for reporting GHG mitigation and NAMAs	300,000	1,000,000	1,300,000
Sub-Total			**8,560,074**	**25,740,000**	**34,300,074**
Project Management Cost			**450,530**	**500,000**	**950,530**
Total Project Costs			**9,010,604**	**26,240,000**	**35,250,604**

Table 4: GEF budget and co-financing (in USD)

Consultants	*Estimated person weeks*	*GEF amount ($)*	*Co-financing ($)*	*Project total ($)*
National consultants*	2349 (GEF) 6347 (co-financing)[5]	1,475,000	3,985,769	5,460,769
International consultants*				
Total	**8,696**	1,475,000	3,985,769	5,460,769

* Details to be provided in Annex C of CEO endorsement request document.

Table 5: Project management budget (in USD)

Cost Items	*Total Estimated person weeks/months*	*GEF amount ($)*	*Co-financing ($)*	*Project total ($)*
National consultants*	750 (GEF) 832 (co-financing)	375,000	416,177	791,177
International consultants*		0	0	0
Office facilities, equipment, vehicles and communications*		20,500	28,594	54,359
Travel*		24,000	26,635	50,635
Others**	Miscellaneous	9,030	28,594	54,359
	UNDP Direct Project Services	22,000		
Total	**1,582**	**450,530**	**500,000**	**950,530**

* Details to be provided in Annex C of CEO endorsement request document.

** For others, it has to clearly specify what type of expenses here in a footnote.

[5]Based on a fee of US$ 628 per week for the consultants paid for by national co-financing.

13. Management Arrangements

India invited UNDP to act as GEF Implementing Agency for the development of the TNC project. UNDP will assist India for the entire project length to implement the activities set forth on behalf of the GEF. On behalf of the Government of India, the Ministry of Environment and Forests will act as the Executing Agency to coordinate and implement project activities.

The Project for Preparation of TNC and other new information to the UNFCCC will be executed by the Ministry of Environment and Forests of the Government of India. The Ministry of Environment and Forests will be responsible for the technical implementation of the project as a whole. The Ministry of Environment and Forests is the nodal ministry for the issue of climate change in India and holds the responsibility for preparing the National Communications to the UNFCCC; the MoEF further houses the Designated National Authority of the CDM in India. The ministry also hosts the GEF operational focal point responsible for all the GEF supported projects in the country. Given the size and complexity of the project, MoEF will coordinate the project activities through a project management unit. Partnerships between key partners and institutions will be facilitated and new partnerships encouraged, especially in areas not sufficiently addressed by the SNC.

Preparation of the Third National Communication and the Biennial Update Report require a comprehensive institutional, technical and administrative arrangement, in addition to stakeholders' consultation/participation in the various tasks and activities. To ensure adequate attention and participation, elaborate implementation arrangements have been devised. A National Steering Committee (NSC) under the chairmanship of Secretary (MoEF) will oversee the preparation and implementation of the work programme of the National Communication and the Biennial Update Report. The NSC will have members from those administrative government Ministries/Departments, which are concerned with the various elements of information in these two reports. Technical consultations are envisaged on multi-disciplinary aspects of the information relating to GHG inventories, impacts, vulnerability and adaptation, climate scenarios, sea level rise etc. Considering the wide range of requirements, it has not been found practical to have a single committee in the preparation of earlier communications. Instead, a number of wide ranging consultations are envisaged for TNC, NAMAs, BURs and for other elements. In order to have the benefit of multifaceted views on various issues, the following exclusive committees have also been envisaged, which will have members from the government, academia and civil society:

- Expert Committee on Nationally Appropriate Mitigation Actions (EC – NAMAs)
- Expert Advisory Committee on Biennial Update Report (EAC – BUR)

Coordination with other GEF funded projects in India that has similar activities and future CTCN of the UNFCCC will be established through involving relevant institutions and experts in the proposed TNC/BUR project, to the extent possible. A National Project Director (NPD) supported by a Project Management Unit (PMU) will be responsible for implementation of the work programme and coordination of the various activities. A schematic representation of the implementation arrangement is provided in Figure 4.

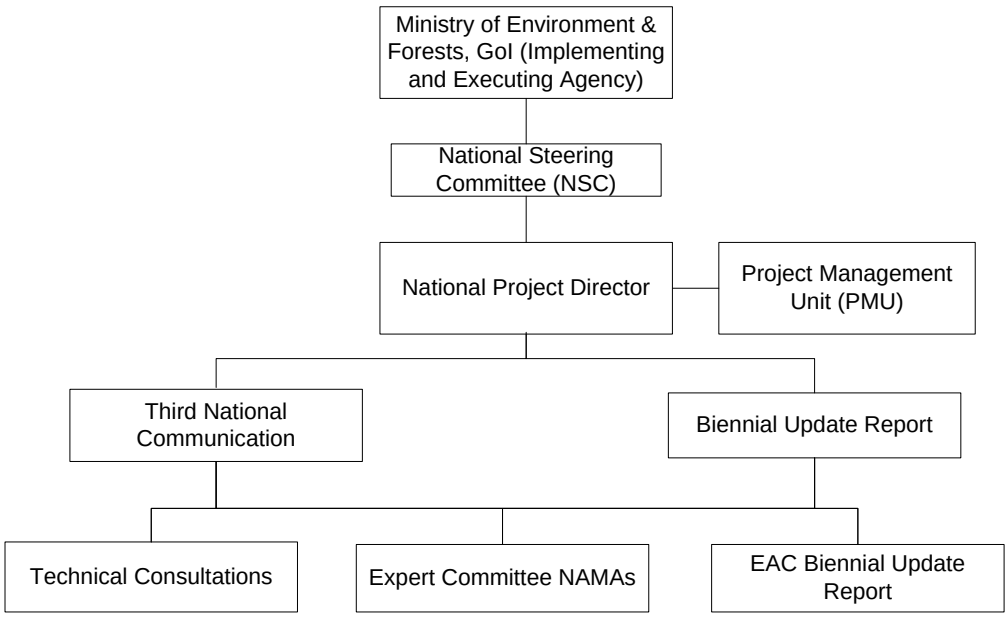


Figure 4: Institutional structure

The National Steering Committee: With a view to oversee and provide guidance on the implementation of the work programme for preparation of the Third National Communication, Biennial Update Reports and the International Consultation and Analysis (ICA) of BURs required to be furnished by the Parties in accordance with the Decision 1-CP/17, an Inter-Ministerial Steering Committee is to be constituted. The terms of reference for the Steering Committee are:

a) The Committee would oversee the implementation of the work programme of preparation of Third National Communication and the Biennial Update Reports.
b) Provide guidance on issues namely activity data and emission factors relating to various sectors and sources of anthropogenic Greenhouse Gases emissions, vulnerability, impacts and adaptation and other related matters.
c) Advice on consideration of Nationally Appropriate Mitigation Actions for inclusion in the Biennial Update Reports.
d) Consider and provide guidance on any matter related to International Consultation and Analysis (ICA) and Biennial Update Reports.

The terms of the Committee will be for a period of three years with effect from the date of notification.

Expert Advisory Committee for Biennial Update Report: The Decision of the Seventeenth Conference of the Parties (COP-17) [Decision 1-CP/17] enjoins upon developing country Parties to the United Nations Framework Convention on Climate Change (UNFCCC) to furnish Biennial Update Report (BUR) in accordance with the reporting guidelines adopted by COP-17. The BUR is required to furnish updates of Greenhouse Gas inventories, including a National Inventory Report (NIR) and information on Mitigation Actions and other related information by December, 2014.

Pursuant to the decision and with a view to provide advice on various issues related to the information to be provided in the BUR, an Advisory Committee is to be constituted. The Committee shall:

a) Consider issues relating to preparation of the Biennial Update Report and National Inventory Report (NIR) in sectors such as Energy, Industrial Process and Product Use (IPPU), Agriculture, Land Use, Land Use Change and Forestry (LULUCF) and Waste.
b) Consider issues relating to use of technical guidelines for preparation of BUR.

Expert Committee on Nationally Appropriate Mitigation Actions (NAMAs): India is a party to United Nations Framework Convention on Climate Change (UNFCCC) the objective of which is to stabilize

concentrations of Greenhouse Gases of anthropogenic origin in the atmosphere at safer levels. The Conference of the Parties to the Convention has been deliberating on matters relating to enhancing implementation of the Convention. In this context Decision 1-CP/16 (Cancun Agreement) Paragraphs 48-51 relate to Nationally Appropriate Mitigation Actions by developing countries.

Terms of Reference

a) The Committee will deliberate on matters relating to Nationally Appropriate Mitigation Actions (NAMAs) with a view to enhance understanding of diversity of mitigation actions.
b) Deliberate on assumption and methodologies, sectors and gases covered and support needs for implementation of NAMAs and outcomes.
c) Consider and advise on general guidelines for domestic Measurements, Reporting and Verifi cation (MRV) of domestically supported NAMAs.
d) Consider issues and devise approaches to address issues relating to international MRV of NAMAs.
e) Any other matter relating to NAMAs.

The initial term of the Committee will be for a period of three years with effect from the date of notification. The Committee may co-opt experts as Special Invitees, as may be necessary. The Committee may, if considered necessary, co-opt expert members as Special Invitee for the meetings of the Advisory Committee. The TA/DA to non-official members will be borne as per the extant rules of the government.

The National Project Director (NPD) will be a senior staff member of the Government executing agency and will be responsible at the highest level for ensuring that the project implementation follows national policy and standards. The NPD will chair the technical committees and represent the project at the annual tripartite meetings. A National Project Advisor (NPA) at the Project Management Unit (PMU) will also be available. The NPA will advise and review institutional arrangements, work program, technical cooperation, monitoring of the progress of implementation of various activities, the work of all Programme Officers and other working groups, including national workshops and consultations. She/He will also provide guidance and assistance to state planning teams as appropriate and upon request. The NPA will be responsible for the preparation of outlines of key project documents and will assign responsibilities for write up to the other Programme Officers. The National Project Advisor (NPA) will be a consultant hired for the duration of the project. It is critical that a highly qualified and motivated person with vast experience and proven track record of implementing and managing similar national projects involving GHG inventory, vulnerability assessment, and multi-disciplinary aspects of climate change be found and selected for this position. The Chairman of the Project Steering Committee should approve the candidate selected.

General

UNDP support service

MoEF may enter into an agreement with UNDP for direct project support services in the form of procurement of goods and services during the project implementation process. In such a case, appropriate cost recovery will be charged as per UNDP rules and regulations. The support services will be outlined in the form of Letter of Agreement signed between MoEF and UNDP. Table below indicates the cost of UNDP direct project services (DPS) anticipated over the project implementation period of five years.

Table 6: Estimate of direct project services (DPS) (US$)

Year	2013	2014	2015	2016	2017	Total (US$)
ISS (support for recruitments, procurement, selection & awarding of sub-contracts, approvals, etc.)	7,000	7,000	3,500	4,000	500	22,000
Total (US$)	7,000	7,000	3,500	4,000	500	22,000

Prior obligations and prerequisites

No prior obligations or prerequisites have been identified

Audit Arrangements

The Government will provide the UNDP Resident Representative with certified periodic financial statements, and with an annual audit of the financial statements relating to the status of UNDP (including GEF) funds according to the established procedures set out in the programming and finance manuals. The audit will be conducted by the legally recognized auditor of the Government, or by a commercial auditor engaged by the Government.

14. Monitoring Framework and Evaluation

Project monitoring and evaluation component will be implemented in accordance with the UNDP-GEF procedures. The Project Results Framework provides indicators for project implementation along with their corresponding means of verification. The project will be monitored through the following M& E activities. The M& E budget is provided in Table 7.

Project start:

A Project Inception Workshop will be held within the first 2 months of project start with those with assigned roles in the project organization structure, UNDP country office and where appropriate/feasible regional technical policy and programme advisors as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan.

The Inception Workshop would address a number of key issues including:

a) Assist all partners to fully understand and take ownership of the project. Detail their roles, support services and complementary responsibilities including those of UNDP vis à vis the project participants. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again if needed.
b) Based on the project results framework and the relevant GEF Tracking Tool if appropriate, finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
c) Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
d) Discuss financial reporting procedures and obligations, and arrangements for annual audit.
e) Plan and schedule meetings of various committees of the Project. Roles and responsibilities of all project organisation structures should be clarified and meetings planned. The first such meeting should be held within the first 12 months following the inception workshop.

An Inception Workshop report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

Quarterly:

- Progress made shall be monitored in the UNDP Enhanced Results Based Management Platform.
- Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS. Risks become critical when the impact and probability are high.
- Based on the information recorded in Atlas, a Project Progress Reports (PPR) can be generated in the Executive Snapshot.

- Other ATLAS logs can be used to monitor issues, lessons learned etc. The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.

Annual Review:

- Annual Project Review/Project Implementation Reports (APR/PIR): This key report is prepared to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July). The APR/PIR combines both UNDP and GEF reporting requirements.

  The APR/PIR includes, but is not limited to, reporting on the following:
  - Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative)
  - Project outputs delivered per project outcome (annual).
  - Lesson learned/good practice.
  - AWP and other expenditure reports
  - Risk and adaptive management
  - ATLAS QPR
  - Portfolio level indicators (i.e. GEF focal area tracking tools) are used by most focal areas on an annual basis as well.

Periodic Monitoring through site visits:

UNDP CO and the UNDP RCU may conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the Project Committees may also join these visits. A field visit report/BTOR will be prepared by the CO and UNDP RCU and will be circulated no less than one month after the visit to the NPD/NPA for appropriate onward distribution to project partners as deemed fit.

Mid-term of project cycle:

The project will undergo an independent Mid-Term Evaluation at the mid-point of project implementation (around August 2015). The Mid-Term Evaluation will determine progress being made towards the achievement of outcomes and will identify course correction, if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the UNDP Evaluation Office Evaluation Resource Center (ERC).

The relevant GEF Focal Area Tracking Tools will also be completed during the mid-term evaluation cycle.

End of Project:

An independent Final Evaluation (also called terminal evaluation) will take place three months prior to the final Project Steering Committee (PSC)/NSC meeting and will be undertaken in accordance with UNDP and GEF guidance. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF.

The Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response which should be uploaded to PIMS and to the UNDP Evaluation Office Evaluation Resource Center (ERC).

The relevant GEF Focal Area Tracking Tools will also be completed during the final evaluation.

During the last three months, the project team will prepare the Project Terminal Report. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also layout recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results.

Learning and knowledge sharing:

Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums.

The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects.

Finally, there will be a two-way flow of information between this project and other projects of a similar focus.

Communications and visibility requirements:

Full compliance is required with UNDP's Branding Guidelines. These can be accessed at http://intra.undp.org/coa/branding.shtml, and specific guidelines on UNDP logo use can be accessed at: http://intra.undp.org/branding/useOfLogo.html. Amongst other things, these guidelines describe when and how the UNDP logo needs to be used, as well as how the logos of donors to UNDP projects needs to be used. For the avoidance of any doubt, when logo use is required, the UNDP logo needs to be used alongside the GEF logo. The GEF logo can be accessed at: http://www.thegef.org/gef/GEF_logo.The UNDP logo can be accessed at http://intra.undp.org/coa/branding.shtml.

Full compliance is also required with the GEF's Communication and Visibility Guidelines (the "GEF Guidelines").The GEF Guidelines can be accessed at: http://www.thegef.org/gef/sites/thegef.org/files/documents/C.40.08_Branding_the_GEF%20final_0.pdf. Amongst other things, the GEF Guidelines describe when and how the GEF logo needs to be used in project publications, vehicles, supplies and other project equipment. The GEF Guidelines also describe other GEF promotional requirements regarding press releases, press conferences, press visits, visits by Government officials, productions and other promotional items.

Where other agencies and project partners have provided support through co-financing, their branding policies and requirements should be similarly applied.

M& E workplan and budget

Monitoring and Evaluation (M&E) will take place in line with UNDP/GEF guidelines. The following table gives a tentative distribution of the budget over the main items:

Table 7: M&E plan

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time frame
Inception Workshop and Report	▪ Project PMU	Indicative cost: 44,000	Within first two months of project start up
Development of M&E system	▪ Project team, MoEF	None	At the beginning of project implementation
Measurement of Means of Verification of project results.	▪ NPD/NPA will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members.	To be finalized in Inception Phase and Workshop.	Start, mid and end of project (during evaluation cycle) and annually when required.
Measurement of Means of Verification for Project Progress on *output and implementation*	▪ Oversight by Project Manager ▪ Project team	To be determined as part of the Annual Work Plan's preparation.	Annually prior to ARR/PIR and to the definition of annual work plans
ARR/PIR	▪ Project manager and team ▪ UNDP CO ▪ UNDP RTA ▪ UNDP EEG	None	Annually
Periodic status/ progress reports	▪ Project manager and team	Part of PMU cost	Quarterly
Mid-term Evaluation	▪ Project management team ▪ UNDP CO and RCU ▪ External Consultants (i.e. evaluation team)	Indicative cost: 50,000	At the mid-point of project implementation.
Final Evaluation	▪ Project management team ▪ UNDP CO and RCU ▪ External Consultants (i.e. evaluation team)	Indicative cost : 50,000	At least three months before the end of project implementation
Project Terminal Report	▪ Project manager and team ▪ UNDP CO ▪ local consultant	None	At least three months before the end of the project
Audit	▪ UNDP CO ▪ Project manager and team	Indicative cost per year: 4,000 (total US$ 20,000)	Yearly
Visits to field sites	▪ UNDP CO ▪ UNDP RCU (as appropriate) ▪ Government representatives	For GEF supported projects, paid from IA fees and operational budget	Yearly
TOTAL indicative COST Excluding project team staff time and UNDP staff and travel expenses		US$ 164,000 (+/- 5% of total budget)	

15. Legal Context

This document together with the CPAP signed by the Government and UNDP which is incorporated by reference constitute together a Project Document as referred to in the Standard Basic Assistance Agreement (SBAA)and all CPAP provisions apply to this document.

Consistent with the Article III of the Standard Basic Assistance Agreement, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner.

The implementing partner shall:

a) put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
b) assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

C. ANNEXES

Annexure 1: Risks Analysis

Table 8: Summary of Risk Log and counter measures.

#	Description	Date identified	Type	Impact and probability (on a scale of 1 (low) to 5 (high)	Counter measures/Mitigation response	Owner	Submitted/ Updated by	Last update	Status
1	Non-availability of regional climate model projections for multiple GCMs and different RCPs. Non availability of multi-model ensemble of RCM outputs from CORDEX for Indian sub-continent.	30 October 2012	Technical	P - 4 I - 3	If no RCM outputs become available, statistical downscaling will be adopted to generate downscaled climate projections. One of the CMIP-5, GCM models such as MIROC which has a finer scale will be validated and adopted.	National Project Director	UNDP CO	Submission date	No change
2	Coordination with a large number of institutions and stakeholders may cause delay in implementing GHG inventory or impact, vulnerability and adaptation activities.	30 October 2012	Organizational	P - 2 I - 4	Formation of Steering Committee and Technical Advisory Committees with the participation of all the stakeholders will ensure coordination and timely delivery of outputs. Networks of scientific institutions formed during SNC will be continued and strengthened to	National Project Director	UNDP CO	Submission date	No change

					ensure timely delivery of outputs.				
3	Lack of cooperation from the state governments leading to delays in preparing mitigation and adaptation strategies	30 October 2012	Organizational	P - 4 I - 2	Periodic stakeholder consultations at regional and state level to ensure participation. Enhanced awareness at the state level on the importance of climate change. Periodic directions from National Steering Committee consisting of highest officials from the Government of India	National Project Director	UNDP CO	Submission date	No change
4	Delay in BUR preparation due to limited time available for the first BUR	30 October 2012	Organizational	P - 1 I - 4	During the preparation of SNC as well as formation of INCCA, has led to network of institutions and capacity development would ensure timely delivery of outputs. Adequate resource will be provided for BUR preparation for hiring technical staff.	National Project Director	UNDP CO	Submission date	No change
5	Limited political support for climate change and preparation of national communication	30 October 2012	Organizational, strategic	P - 1 I - 4	The risk is nearly absent since Govt. Of India is fully committed to the provisions of the UNFCCC. India has formulated INCCA to promote scientific research on GHG inventory and impact modelling.	National Project Director	UNDP CO	Submission date	No change
6	Lack of cooperation from industries,	30 October 2012	Technical	P - 2 I - 3	Industry associations covering industry and transport sectors are	National Project Director	UNDP CO	Submission date	No change

	municipalities, forest departments, transport agencies in generating emission factors or in assessing mitigation costs and potential.				included in the Steering/Technical Advisory Committees to ensure their cooperation. Periodic stakeholder consultations and awareness programmes to ensure their participation.				

Annexure 2: Stakeholder institutions for TNC and BUR

National GHG Inventory	
Sectors : Energy	
Indian Institute of Management, Ahmedabad	National Public Institute, Lead
Central Mining and fuel Research Institute, Dhanbad	National Public Institute, Participating Institution
Central Road Research Institute, New Delhi	National Public Institute, Participating Institution
Indian Institute of Petroleum, Dehradun	National Public Institute, Participating Institution
Cement Manufacture Association, New Delhi	Industry Body, Participating Institution
Jadavpur University, Kolkata	Education and Research Institution
The Energy and Resources Institute, New Delhi	Education and Research Institution
Petroleum Planning and Analysis Cell, New Delhi	National Public Institute, Participating Institution
Others	Other Participating Institutions
Sector: IPPU	
Dr. Sukumar Devotta	Eminent Industry Expert, Lead
National Chemical Laboratory, Pune	National Public Institute, Participating Institution
The Energy and Resources Institute, New Delhi	Education and Research Institution
Central Glass and Ceramic Research Institute, Kolkata	National Public Institute, Participating Institution
Cement Manufacture Association, New Delhi	Industry Body, Participating Institution
Central Mining and fuel Research Institute, Dhanbad	National Public Institute, Participating Institution
Confederation of Indian Industry, New Delhi	Industry Body, Participating Institution
Jadavpur University, Kolkata	Education and Research Institution
Indian Lead Zinc Development Association , New Delhi	Industry Body, Participating Institution
National Environmental Engineering Research Institute, Nagpur	Education and Research Institution
National Metallurgical Laboratory, Jamshedpur	Industry Body, Participating Institution
Indian Institute of Chemical Technology, Hyderabad	Industry Body, Participating Institution
Jawaharlal Nehru Aluminium research development and Design Centre, Nagpur	Industry Body, Participating Institution
C-STEP, Bangalore	Participating institution
Others	Other Participating Institutions
Sector: Agriculture	
Central Research Institute for Dryland Agriculture, Hyderabad and Indian Council of Agriculture Research, New Delhi	Education and Research Institution
Indian Agriculture Research Institute, New Delhi	Education and Research Institution
Institute of Radio Physics and electronics, Calcutta University	Education and Research Institution
Regional Research Laboratory, Bhubaneshwar	Education and Research Institution

Central Leather Research Institute, Chennai	Education and Research Institution
Indian Grassland and Forest Research Institute, Jhansi	Education and Research Institution
Indian Veterinary Research Institute, Izatnagar	Education and Research Institution
Bidhan Chandra Krishi Viswavidyalaya, West Bengal	Education and Research Institution
National Dairy Research Institute, Karnal	Education and Research Institution
Indian Grassland and Fodder Research Institute, Jhansi	Education and Research Institution
National Physical Laboratory, New Delhi	National Public Institute, Participating Institution
Central Rice Research Institute, Cuttack	Education and Research Institution
Others	Other Participating Institutions
Sector: Waste	
National Environmental Engineering Research Institute, Nagpur	Education and Research Institution, Lead
National Physical Laboratory, New Delhi	Education and Research Institution
Others	Other Participating Institutions
Sector: LULUCF	
Indian Institute of Science, Bangalore	National Public Institute
Forest Survey of India, Dehradun	National, Participating Institution
National Remote sensing Agency, Hyderabad	National, Participating Institution
Forest Research Institute, Dehradun	Research Institution
Indian Council of Forest Research Institute, Dehradun	Education and Research Institution
Others	Other Participating Institutions
Impacts and Vulnerability Assessment and Adaptation Measures	
Sector: Climate Scenario	
Indian Institute of Science, Bangalore	National Public Institute
Indian Institute of Tropical Metrology, Pune	National Public Institute
Indian Institute of Technology, Gandhinagar	Nationl Public Institute
Others	Other Participating Institutions
Sector: Extreme Events	
Indian Institute of Science, Bangalore	National Public Institute
Indian Institute of Tropical Metrology, Pune	National Public Institute
Others	Other Participating Institutions
Sector: Socio Economic Scenario	
Indian Institute of Management, Ahmedabad	National Public Institute, Lead
Institute of Economic Growth, New Delhi	Education Institution
Others	Other Participating Institutions
Sector: Future Emission Projection	
Indian Institute of Management, Ahmedabad	National Public Institute, Lead
National Chemical Laboratory, Pune	National Public Institute
The Energy and Resources Institute, New Delhi	Education and Research Institution
Integrated Research and Action for Development, New Delhi	Civil Body
Indian Institute of Science, Bangalore	National Public Institute
Others	Other Participating Institutions
Sector: Public Health	
National Institute of Malaria Research, New Delhi	National Public Institute

Indian Institute of Tropical Metrology, Pune	National Public Institute
National Physical Laboratory, New Delhi	National Public Institute
Indian Institute of Technology, Bombay	National Public Institute
Others	Other Participating Institutions
Sector: Coastal	
National Institute of Oceanography, Goa/ Indian Institute of Bombay, Mumbai	National Public Institute, Lead
Indian Institute of Technology, Bombay	National Public Institute
Jadavpur University, Kolkata	Education and Research Institution
The Energy and Resources Institute, New Delhi	Education and Research Institution
Others	Other Participating Institutions
Sector: Forest & Natural Ecosystem	
Indian Institute of Science, Bangalore	National Public Institute, Lead
Tamil Nadu Agriculture University, Coimbatore	Education and Research Institution
Jawaharlal Nehru University, New Delhi	Education and Research Institution
Jadavpur University, Kolkata	Education and Research Institution
Forest Survey of India, Dehradun	National, Participating Institution
The Energy and Resources Institute, New Delhi	Education and Research Institution
Inspire Network for Environment, New Delhi	Civil Body
National Institute of Oceanography, Goa	National Public Institute, Lead
Kerala Forest Research Institute, Peechi	Research Institute
Others	Other Participating Institutions
Sector: Infrastructure, energy and Industry	
Indian Institute of Management, Ahmedabad	National Public Institute, Lead
Central Mining and fuel Research Institute, Dhanbad	National Public Institute
Maulana Azad National Institute of Technology and School of Planning and Architecture, Bhopal	National Public Institute
International Management Institute, Kolkata	National Public Institute
Adani Institute of Infrastructure Management Ahmedabad	Research Institute
National Council for Cement and Building Materials, Ballabgarh	National Public Institute
Others	Other Participating Institutions
Sector: Water Resources	
Indian Institute of Technology, Delhi	National Public Institute
Remote sensing Application centre, Lucknow	National Public Institute
Global Hydrological Solutions, New Delhi	Civil Body
Indian Institute of Technology, Gandhinagar	National Public Institute
Jadavpur University, Kolkata	Education and Research Institution
Development Alternatives, New Delhi	Civil Body
Jawaharlal Nehru University, New Delhi	Education and Research Institution
Guru Gobind Indraprastha University, New Delhi	Education and Research Institution
The Energy and Resources Institute, New Delhi	Education and Research Institution
Others	Other Participating Institutions
Sector: Agriculture (Rice & Wheat)	
Indian Council of Agriculture Research, New Delhi	Education and Research Institution
Indian Agriculture Research Institute, New Delhi	Education and Research Institution

Tamil Nadu Agriculture University, Coimbatore	Education and Research Institution
Central Rice Research Institute, Bhubaneshwar	Education and Research Institution
University of Agriculture Science, Dharwad	Education and Research Institution
Others	Other Participating Institutions
Sector: Agriculture (Dryland & Rainfed)	
Central research Institute for Dryland Agriculture, Hyderabad	National Public Institute
Indian Agriculture Research Institute, New Delhi	National Public Institute
University of Agriculture Science, Dharwad	Education and Research Institution, Lead
Agriculture universities (As appropriate)	Education and Research Institution, Lead
Others	Other Participating Institutions
Integrated Sector: Water - Agriculture- food security - energy - Livelihoods - Adaptation	
Central Research Institute for Dryland Agriculture, Hyderabad	Education and Research Institution, Lead
Action for food Production, Udaipur	Civil Body
Central Soil water Conservation Reaserch and Training Institute, Dehradun	Education and Research Institution
Institute of Home economics, New Delhi	Education and Research Institution
Indian Institute of Management, Ahmedabad	National Public Institute
M. S Swaminathan Research Foundation, Chennai	Education and Research Institution
Tamil Nadu Agriculture University, Coimbatore	Education and Research Institution
Others	Other Participating Institutions
Integrated Sector: Water- Human Health- Livelihoods - Adaptation	
Jadavpur University, Kolkata	Education and Research Institution, Lead
National Institute of Malaria Research, New Delhi	National Public Institute
INRM Consultants, New Delhi	Civil Body
Others	Other Participating Institutions
Integrated Sector: Forests - Forest Products-Water- Livelihoods - Adaptation	
Indian Institute of Science, Bangalore	National Public Institute, Lead
Inspire Network for Environment, New Delhi	Civil Body
Others	Other Participating Institutions
Integrated Sector: Natural - Ecosystems & Livelihoods	
The Energy and Resources Institute, New Delhi	Education and Research Institution, Lead
Integrated Research and Action for Development, New Delhi	Civil Body
Institute of Mineral and Material Technology, Bhubaneshwar	National Public Institute
Others	Other Participating Institutions
Integrated Sector: Energy - Infrastructure - Adaptation	
Indian Institute of Management, Ahmedabad	National Public Institute, Lead
Maulana Azad National Institute of Technology, Bhopal	National Public Institute
Others	Other Participating Institutions
Integrated Sector: Residential- Infrastructure - Water- Adaptation	
Maulana Azad National Institute of Technology, Bhopal	
Indian Institute of Technology, Bombay	National Public Institute, Lead

Indian Institute of Management, Ahmedabad	National Public Institute
Institute of Economic Growth, New Delhi	Education and Research Institute
Integrated Research and Action for Development, New Delhi	Civil Body
Others	Other Participating Institutions
Sector: Low Carbon Society	
Indian Institute of Management, Ahmedabad	National Public Institute, Lead
Integrated Research and Action for Development, New Delhi	Civil Body
Confederation of Indian Industry, New Delhi	Industry Association
Green Building Council, Hyderabad	National Public Institute
Centre for Policy Research, New Delhi	National Public Institute
Indian Institute of Technology Delhi, New Delhi	National Public Institute
Indian Institute of Tropical Metrology, Pune	National Public Institute
The Energy and Resources Institute, New Delhi	Education and Research institute
Maulana Azad National Institute of Technology, Bhopal	National Public Institute
Madras School of Economics, Chennai	Education and Research institute
Others	Other Participating Institutions
India's National Circumstances	
Sector: National Circumstances	
National Remote sensing centre, Hyderbad	National Public Institute
Madras School of economics, Chennai	Education and Research institute
Indian Institute of Management, Ahmedabad	National Public Institute
Indian Metrological Development, New Delhi	National Public Institute
Indian Institute of Science, Bangalore	National Public Institute
Others	Other Participating Institutions
Measures to Mitigate Climate Change	
Indian Institute of Management, Ahmedabad	National Public Institute, Lead
Bureau of Energy Efficiency, New Delhi	National Bureau for Energy Efficiency
Indian Institute of Technology Delhi, New Delhi	National Public Institute
Indian Institute of Science, Bangalore	National Public Institute
Integrated Research and Action for Development, New Delhi	Civil Body
Confederation of Indian Industry, New Delhi	Industry Association
Green Building Council, Hyderabad	Industry Association
Centre for Policy Research, New Delhi	Research Institute
Indian Institute of Technology Delhi, New Delhi	National Public Institute
Indian Institute of Tropical Metrology, Pune	National Public Institute
The Energy and Resources Institute, New Delhi	Education and Research Institution
Maulana Azad National Institute of Technology, and School of Planning and Architecture, Bhopal	National Public Institute
Madras School of Economics, Chennai	National Public Institute
Price Waterhouse Coopers, New Delhi	Consulting organization
Central Research Institute for Dryland Agriculture, Hyderabad	National Public Institute
Indian Grassland and Forest Research Institute, Jhansi	National Public Institute
C-STEP, Bangalore	Participating Institution
Others	Other Participating Institutions

Other Information relevant for the preparation of TNC	
Sector: Research & Systematic Observation	
Indian Institute of Science , Bangalore	National Public Institute
Forest Survey of India, Dehradun	National Public Institute
Geological Survey of India, Kolkata	National Public Institute
Indian Space Research Organisation, Hyderabad	Government Body
Botanical survey of India, Kolkata	National Public Institute
National Institute of Disaster Management, New Delhi	National Public Institute
Others	Other Participating Institutions
Sector: Constraints & Gaps	
Indian Institute of Management, Ahmedabad	National Public Institute, Lead Institution
Indian Agricultural Research Institute	National Public Institute
Indian Institute of Technology, Delhi	National Public Institute
Indian Institute of Science, Bangalore	National Public Institute
The Energy and Resources Institute, New Delhi	Education and Research Institution
Forest Survey of India, Dehradun	National Public Institute
Indian National Centre for Ocean Information services, Hyderabad	National Public Institute
Indian Council of Forestry Research & Education, Dehradun	National Public Institute
National Dairy Research Institute, Karnal	National Public Institute
Indian Institute of Public Health, Bangalore	National Public Institute
Others	Other Participating Institutions
Sector: Education, Research, and Capacity Building	
Centre for Environment Education, Ahmedabad	Education and Research Institution
Others	Other Participating Institutions
Sector: Steps taken or envisaged to Implement the Convention	
Indian Institute of Technology, Delhi	National Public Institute
Indian Institute of Technology, Bombay	National Public Institute
Development Alternatives, New Delhi	Civil Body
Indian Institute of Management, Ahmedabad	National Public Institute
Others	Other Participating Institutions

Annexure 3: Minutes of Consultation Workshop held on 13-14 September 2012

Report of the Consultation Workshop for the Preparation of Third National Communication (TNC) and Biennial Update Report (BUR) to United Nations Framework Convention on Climate Change (UNFCCC)

September 13-14, 2012, New Delhi

India submitted the Second National Communications Report to the UNFCCC on 4th May 2012. Currently India is developing a full scale project for GEF towards the preparation of the Third National Communication and the Biennial Update Report. In this context, a consultation workshop for preparation of India's Third National Communication and BUR to the UNFCCC was held in New Delhi during September 13-14, 2012.

The main purpose of the workshop was to consult various stakeholders about their perspectives regarding the various elements, approach, methodology, sectors and issues to be covered in the TNC and BUR.

Stakeholders who participated in the workshop included senior officers of the Ministry of Environment and Forests, which is the nodal ministry for the National Communications Project, Representatives of the Ministries, state governments, academic institutions, universities, industry bodies, NGOs and consultants. In all, the workshop was attended by 103 participants, including 25 from the government, 52 from research institutions, 4 from the industry and 15 from NGOs. 7 participants from international agencies also attended the workshop.

The consultation workshop "Towards Preparation of Third National Communication (TNC) and Biennial Update Report (BUR) to United Nations Framework Convention on Climate Change (UNFCCC) consisted of presentations on the initial and second national communication projects that have been completed, lessons learnt from the previous two communication preparation process, limitations in the GHG inventory, climate change projections, impacts, vulnerability and adaptation assessments and plan for preparation of TNC. There was panel discussion on the BURs, NAMAs, and reporting requirement under the BUR and institutional arrangement for sustained long-term GHG inventory.

National Communications Project Director provided an overview of the National Communications project tracing the journey from the First to the Second National Communications. He stressed the need for preparation of an inventory with reduced uncertainties during the TNC. He highlighted the gaps and constraints of the previous National Communications and the process. He also outlined the challenges ahead for the TNC and the possible approaches for addressing the same.

The new challenge of preparing Biennial Update Report as a requirement under the commitment of the Government of India under the Durban agreement was discussed and the reporting requirements were outlined.

Session on "Climate change projections, impacts, vulnerability and adaptation assessment for TNC".

There was an overview presentation of what has been achieved under the Second National Communications, the climate change projections, models and scenarios used, the limitations of the

assessments and the requirements and plan for the Third National Communications. The need for outputs from the CORDEX experiment for enabling assessments at finer scale was highlighted.

Session on "IVA – Sector-wise presentations"

In this session experts from different sectors – Agriculture, Health, Coastal Zones, Forests, Water Resources, Fisheries, and Energy, Industry and Infrastructure sectors presented the key achievements and the limitations of SNC and also discussed potential methodologies and approaches for assessing the impacts of climate change, vulnerability of the sectors to the projected climate change impacts and a framework for adaptation assessment.

Session on "Integrated IVA"

Integrated assessment of impact, vulnerability and adaptation involving multiple sectors for a given spatial unit such as landscapes, ecosystems and watersheds was presented by experts from different sectors. All experts highlighted the need for integrated assessment involving multiple sectors in a given functional spatial unit since the impacts on one sector could lead to direct or indirect impacts on another sector. River basins, landscapes and ecosystem approaches were suggested. Need for integrated impact modeling was suggested.

Session on "GHG Inventory for TNC"

There was an overview presentation of the GHG inventory estimates prepared for the initial national communication and SNC. The overview highlighted the methodological improvements made during SNC. The need to adopt the elements and methods of the latest IPCC Guidelines was highlighted. However, reporting of the inventory will be according to 17/CP.8. The need for improved QA/QC and estimation and reduction of uncertainties was highlighted.

This overview presentation was followed by a panel discussion on the methods and guidelines for GHG inventory in energy, industrial process, agriculture, LULUCF and waste sectors. The experts highlighted the need for improved activity data and emission factors for reliable GHG inventory.

There were presentations on the socio-economic scenarios and GHG projections at the global and national level, followed by presentations on the mitigation opportunities in energy, transport, industry, and forestry sectors, including REDD+. There were two presentations covering the mitigation opportunities in different sectors for reporting under the NAMAs. The reporting requirement under NAMA for the BURs was also discussed.

There was a presentation and discussion on the need for an institutional arrangement for National Inventory Management System for periodic and sustained GHG inventory. The GHG inventory systems in many other countries were reviewed to learn lessons for setting up the system in India.

In the final session, issues relevant to research and systematic observations, education, public awareness and the role for different stakeholders was discussed in a panel discussion.

Key Recommendations of the Consultative Workshop towards Preparation of India's Third National Communication and Biennial Update Report to United Nations Framework Convention on Climate Change.

Climate change projections

i) ***Centralized database and data provider:*** The group expressed the need for identifying a centralized nodal institution that would be responsible for providing climate change projections to the different institutions involved in IVA in the different sectors. The nodal institution would help cater to the varied climate data requirements of the different sectoral institutions.

ii) ***CORDEX:*** Results made available on a public domain for end users of RCM projections at 0.5 X 0.5 degree resolution would help finer scale impact assessments. The need for generating multi-GCM based RCM climate outputs under CORDEX program was highlighted.

iii) ***Climate projections and scale:*** Use of an 18-model ensemble at GCM grid scale, a 3-model ensemble including projections from MRI-CCGM3, CCSM4 and CESM1 models at a grid scale of 1.0 X 1.0 degree was suggested. For finer scale studies, single model projections from MIROC 4h at the scale of 0.56 X 0.56 degree scale for both historical and RCP 4.5 W/m2 was suggested.

iv) ***Climate scenarios:*** Shift from the SRES A1B scenario to Regional Concentration Pathway (RCP)-scenarios – RCP 4.5 and RCP 8.5 was decided.

v) ***Need for quantification of uncertainties/probability of climate change projections:*** There was broad consensus on the need for quantifying the uncertainties of climate change projections so that a range of estimates could be provided along with uncertainty to assist in planning, policy-making and implementation of appropriate actions and programmes.

Impact, Vulnerability and Adaptation (IVA) Assessments – Different Sectors

i) ***Sector coverage:*** Inclusion of agro-forestry and inland fisheries in impact assessment was suggested.

ii) ***Models:*** *Need to e*xplore use of multiple models for assessing the impact of climate change on different sectors was recommended.

iii) ***Stratification:*** Adoption of appropriate stratification procedures to capture the variations in every sector was suggested, since decentralized scale impact assessment will be more useful for decision making.

iv) ***Time-scale:*** There was agreement for providing Short- (2030s), Medium- (2050s) and Long-term (2080s) impact assessments.

v) ***Adaptation assessment:*** Assessment of current 'adaptation deficit' was highlighted since natural ecosystems and production systems such as agriculture are subjected to current climate variability and climate risks.

vi) ***Integrated assessment:*** The need for integrated assessment of impacts involving multiple sectors such as forests-agriculture-water for selected spatial units characterized by interdependencies was expressed. Further, the absence of integrating models or process based models was highlighted.

vii) ***Case studies:*** There was a suggestion to conduct case-studies of critical landscapes or ecosystems or river basins for integrated assessment. Western Ghats and Himalayan ecosystems were suggested as potential options for conduct of integrated assessment case studies. There was also a suggestion to conduct integrated assessment linking ground water use-energy consumption and agricultural production.

viii) ***Economic valuation:*** The need for economic assessment of the damage due to climate change in different sectors and the cost of adaptation to the projected climate change impacts was highlighted.

Vulnerability Assessment

i) ***Approach and methods:*** Need for development of a common methodological framework was highlighted.

ii) ***Sectoral coverage:*** Developing vulnerability index for each sector as well as sub-sectors, including the socio-economic sector was stressed.

iii) ***Vulnerability profile development:*** Need for developing vulnerability profiles at the regional level as well as for the prominent cropping systems, forest type and river basin and other sub-regional and/or sub-sectoral levels was discussed.

iv) ***Scale of assessment:*** The need for vulnerability assessment at the state, district and agro-ecological zone level was suggested.

v) ***Period of assessment:*** Assessment of vulnerability of different sectors to current or baseline climate variability as well as for short-term climate change projections for 2030s was recommended.

vi) ***Assess factors contributing to vulnerability:*** Climate change is only one of the factors determining vulnerability of a natural ecosystem or production system. Thus, experts suggested consideration and assessment of biophysical, socio-economic and infrastructural factors contributing to vulnerability.

vii) ***Assess impact of current policies, programmes and management practices:*** The need for assessing the impact of existing policies, programmes and management practices for their implications to current climate variability and climate change and their implications for enhancing or reducing vulnerability was highlighted.

Inventory

1. A wider, more regionally spread, broader technology coverage and year-on-year measurement of emission factors in key sources was suggested. Further, key source estimation involving both level and trend estimation was recommended.

2. Traceability and standardization of measurements and measuring equipment suggested.

3. Improved emission estimation from medium, small and micro enterprises especially those that are more energy intensive was suggested.

4. Refining emission factors for different types of gasoline and diesel driven vehicles incorporating driving cycles including using on-board analyzers was recommended.

5. Improved segregation of national and bunker fuel consumption in aviation and navigation sector was also suggested.

6. Need for GHG emissions estimates from key sources in Industrial process sector, including key source estimation at national, sectoral and firm level was highlighted.

7. Creating carbon balance for some industries was recommended.

8. Improving estimation of GHG emissions of fluorinated gases in various industries, including verification of historical data, increased use of low GWP HFCs, increased use of R410A in air conditioners replacing R22 and validating IPPU bottom-up energy data with similar data collected in energy sector was recommended.

9. Experts suggested emission factor measurements expansion – to include more livestock species and type of animals, nitrogen content estimation from dung and manure management, measurement diversification to capture wide national diversity in emission factors, comparing measurement techniques across institutions and synchronizing measurements for enteric fermentation, emission factor estimation from crops other than rice and accounting of rice management practices will be done as much as capacities permit.

10. Need to strengthen model based MSW, methane emission measurements was highlighted.

11. Experts recommended the need for improved GHG emission estimates from municipal waste water including sewage treatment plants in municipalities.

Mitigation

1. Experts suggested consideration of enhancing energy efficiency in major energy intensive sectors, fuel switching, cleaner technologies and processes and in addition consider low GWP gas introduction, transport, buildings, water use efficiency, waste to energy.

Annexure 4: Agreements

Co-financing letter cum GEF OFP endorsement letter

XI Conference of Parties
CONVENTION ON BIOLOGICAL DIVERSITY
HYDERABAD INDIA 2012

सत्यमेव जयते

भारत सरकार
पर्यावरण एवं वन मंत्रालय
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT AND FORESTS

D. O. No. 4(2)/5/2011 – IC (GEF)
Dated: 27th November 2012

To: **Mr Yannick Glemarec**
GEF Executive Coordinator
UNDP, New York

Subject: Endorsement of UNDP/ GEF FSP on "Preparation of Third National Communication (TNC) and other new information to the UNFCCC".

This is in continuation to my earlier letter. In my capacity as GEF Operational Focal Point for India, I confirm that the above project proposal (a) is in accordance with my government's national priorities and our commitment to the UNFCCC; and, (b) was discussed with relevant stakeholders, including National Focal Point for UNFCCC.

I am pleased to endorse the FSP developed by the Ministry of Environment and Forests (MoEF), Government of India with the support of UNDP and others for submission to GEF for CEO endorsement. The total GEF financing already allocated for this FSP amounts to USD 9,911,664 including agency fee. The project has a committed co-financing of USD 26,240,000 in cash and in kind from MoEF and UNDP as also indicated in the FSP document.

I request UNDP to ensure a) annual submission of the Project Implementation Reports (PIRs) to GEF OFP India office; b) keep us duly informed and involved in the project's monitoring and evaluation exercise; and, c) ensure that GEF OFP India is a regular member of the Project Steering Committee.

I consent to the utilization of India's allocation under climate change focal area in GEF 5 as defined in the System for Transparent Allocation of Resources (STAR) and submission of this FSP for GEF CEO endorsement.

With warm regards,

Yours sincerely,

(Hem Pande)
Joint Secretary
& GEF Operational Focal Point India

Copy to:

- Dr Subodh Sharma, Advisor, MoEF
- Mr R R Rashmi, Joint Secretary, MoEF and National Focal Point for UNFCCC
- Mr Nilaya Mitash, Director, DEA and GEF Political Focal Point India
- Mr Gordon Johnson, Team Leader, EEU, UNDP Regional Office
- Mr Srinivasan Iyer, Team Leader, EEU, UNDP Country Office

जहाँ है हरियाली।
वहाँ है खुशहाली।।

पर्यावरण भवन, सी.जी.ओ. कॉम्प्लेक्स, लोदी रोड, नई दिल्ली - 110 003
PARYAVARAN BHAWAN, C.G.O. COMPLEX, LODHI ROAD, NEW DELHI - 110 003
Website : moef.nic.in

Letter of agreement between UNDP and the Government for DPS

STANDARD LETTER OF AGREEMENT BETWEEN UNDP AND THE GOVERNMENT FOR THE PROVISION OF SUPPORT SERVICES

HOW TO USE THIS LETTER OF AGREEMENT

- This agreement is used to provide appropriate legal coverage when the UNDP country office provides support services under national execution.
- This agreement must be signed by a governmental body or official authorised to confer full legal coverage on UNDP. (This is usually the Minister of Foreign Affairs, the Prime Minister /or Head of State.) The UNDP country office must verify that the government signatory has been properly authorised to confer immunities and privileges.
- A copy of the signed standard letter will be attached to each PSD and project document requiring such support services. When doing this, the UNDP country office completes the attachment to the standard letter on the nature and scope of the services and the responsibilities of the parties involved for that specific PSD/project document.
- The UNDP country office prepares the letter of agreement and consults with the regional bureau in case either of the parties wishes to modify the standard text. After signature by the authority authorised to confer immunities and privileges to UNDP, the government keeps one original and the UNDP country office the other original. A copy of the agreement should be provided to UNDP headquarters (BOM/OLPS) and the regional bureau.

Dear [*name of government official*],

1. Reference is made to consultations between officials of the Government of *[the name of programme country]* (hereinafter referred to as "the Government") and officials of UNDP with respect to the provision of support services by the UNDP country office for nationally managed programmes and projects. UNDP and the Government hereby agree that the UNDP country office may provide such support services at the request of the Government through its institution designated in the relevant programme support document or project document, as described below.

2. The UNDP country office may provide support services for assistance with reporting requirements and direct payment. In providing such support services, the UNDP country office shall ensure that the capacity of the Government-designated institution is strengthened to enable it to carry out such activities directly. The costs incurred by the UNDP country office in providing such support services shall be recovered from the administrative budget of the office.

3. The UNDP country office may provide, at the request of the designated institution, the following support services for the activities of the programme/project:

(a) Identification and/or recruitment of project and programme personnel;

(b) Identification and facilitation of training activities;

(a) Procurement of goods and services;

4. The procurement of goods and services and the recruitment of project and programme personnel by the UNDP country office shall be in accordance with the UNDP regulations, rules, policies and procedures. Support services described in paragraph 3 above shall be detailed in an annex to the programme support document or project document, in the form provided in the Attachment hereto. If the requirements for support services by the country office change during the life of a programme or project,

the annex to the programme support document or project document is revised with the mutual agreement of the UNDP resident representative and the designated institution.

5. The relevant provisions of the [*Insert title and date of the UNDP standard basic assistance agreement with the Government*] (the "SBAA"), including the provisions on liability and privileges and immunities, shall apply to the provision of such support services. The Government shall retain overall responsibility for the nationally managed programme or project through its designated institution. The responsibility of the UNDP country office for the provision of the support services described herein shall be limited to the provision of such support services detailed in the annex to the programme support document or project document.

6. Any claim or dispute arising under or in connection with the provision of support services by the UNDP country office in accordance with this letter shall be handled pursuant to the relevant provisions of the SBAA.

7. The manner and method of cost-recovery by the UNDP country office in providing the support services described in paragraph 3 above shall be specified in the annex to the programme support document or project document.

8. The UNDP country office shall submit progress reports on the support services provided and shall report on the costs reimbursed in providing such services, as may be required.

9. Any modification of the present arrangements shall be effected by mutual written agreement of the parties hereto.

10. If you are in agreement with the provisions set forth above, please sign and return to this office two signed copies of this letter. Upon your signature, this letter shall constitute an agreement between your Government and UNDP on the terms and conditions for the provision of support services by the UNDP country office for nationally managed programmes and projects.

Yours sincerely,

_____

Signed on behalf of UNDP
[Name]
[Title: Resident Representative]

_____

For the Government
[*Name/title*]
[*Date*]

Attachment

DESCRIPTION OF UNDP COUNTRY OFFICE SUPPORT SERVICES

1. Reference is made to consultations between [*insert name of Designated institution*], the institution designated by the Government of [*name of programme country*] and officials of UNDP with respect to the provision of support services by the UNDP country office for the nationally managed programme or project [*insert programme or project number and title*], "the Programme" [*or "the Project"*].

2. In accordance with the provisions of the letter of agreement signed on [*insert date of agreement*] and the programme support document [*or project document*], the UNDP country office shall provide support services for the Programme [*or Project*] as described below.

3. Support services to be provided:

Support services (insert description)	Schedule for the provision of the support services	Cost to UNDP of providing such support services (where appropriate)	Amount and method of reimbursement of UNDP (where appropriate)
1.			
2.			
3.			

4. Description of functions and responsibilities of the parties involved:

Annexure 5: Terms of Reference

Terms of Reference for key positions at Project ManagementUnit (PMU) or Project Management Unit (PMU).

(a) The National Steering Committee (NSC)

The MoEF will establish the Steering committee with members drawn from other government ministries, departments.

Composition: The steering committee will comprise of (but not limited to) representatives from the Planning Commission, central ministries, departments.

Scope of Work:

- Set general guide lines for the formulation process of the national communication
- Ensure that the national communication is integrated fully with sectoral plans, policies and the current Plan document.
- Ensure UNFCCC obligations are met and guidance from the COP is considered during the implementation of the project.
- Ensure that all necessary steps are taken so that the National Communication eventually becomes a part of the National Policy.
- Monitor the performance of the project by evaluating periodic reports.
- Supervise hiring decisions made under this project, and review arrangements and subcontracts periodically.
- Provide access to data/archives or any other information required by the participating institutions and organizations
- Seek inputs from the Project Advisory Committee.
- Participate in national workshops, consultations and state workshops as appropriate.
- Liaison with the corresponding state departments and catalyse their participation in the planning process.
- Facilitate the inter-sectoral consultations and enhance inter-ministerial collaboration.
- Make their respective organizations aware of the importance of climate change, its impacts and promote commitment at all levels.
- Finalize and approve the draft national communication document.

(b) National Project Director (NPD)

The NPD will be critical in catalysing inter-ministerial and broader stakeholder support towards the objectives of this project and liaising with counterparts in other ministries, state governments and ministries. The NPD will liaison between the steering committee, other committees of the Project and the PMU who will carry out the actual work of this project. The National Project Director will be responsible for communicating to the Steering Committee, the overall management and implementation of the project.

The NPD will be a senior officer of MoEF not below the level of joint secretary or advisor to the MoEF and will be responsible for the overall co-ordination of the project, ensuring that its implementation follows national policy and standards.

Specific Duties of the NPD:

Preparing progress and completion reports as required by GoI and UNDP procedures

- Organizing and convening steering committee meetings
- Leading the organization of national workshops and consultations
- Assist the consultants in carrying out their assignments by facilitating interaction and contacts with other ministries, organizations and institutions.
- Ensure that a transparent and participatory approach is followed; stakeholders are consulted and involved in the project.
- Co-ordinating with line ministries, state governments and institutions (such as the private sector, NGOs, CBOs) involved in the project execution.

- Overall management of the project team (project manager and Programm Officers) and conveying the official position of the steering committees.
- Reviewing project budget revisions and all other administrative arrangements required under GOI and
- UNDP procedures.
- Provide administrative inputs to the project and monitoring arrangements as per GOI/UNDP procedures. Preparing reports and recommendations to the project steering committee.
- Take all the steps necessary to ensure GOI's commitment and support to the approval of the national communication.
- Involve departments and experts in the project
- Attend national workshops, consultations and state workshops as appropriate.

(c) Project Staff

C.1.National Project Advisor

The National Project Advisor (NPA) will be a consultant hired for the duration of the project. It is critical that a highly qualified and motivated person with vast experience and proven track record of implementing and managing similar national projects involving GHG inventory, vulnerability assessment, and multi-disciplinary aspects of climate change be found and selected for this position. The Chairman of the Project Steering Committee should approve the candidate selected.

The NPA will advise and review institutional arrangements, work program, technical cooperation, monitoring of the progress of implementation of various activities, the work of all Programme Officers and other working groups, including national workshops and consultations. She/he will also provide guidance and assistance to state planning teams as appropriate and upon request. The NPA will be responsible for the preparation of outlines of key project documents and will assign responsibilities for write up to the other Programme Officers.

The NPA will advise such that all activities are conducted in accordance with the methodologies outlined in the project document. Among others, she/he will be familiar with the UNFCCC, all IPCC reports including guidelines and recent COP guidance and emerging issues in the field of climate change and ensure these are incorporated in the project and that it conforms to objectives of the project.

Lines of authority for reporting requirements: The NPA will report to the Executing Agency.

Principal Activities of the NPA:

- Supervise co-ordination between the steering committee, thematic working groups, consultants, NPD and UNDP. Co-ordinate all logistical arrangements for steering committee meetings, national workshops, consultations and meetings.
- Supervise and advise on regular contacts as needed with all government, non-government, community-based and international organizations that are concerned in the planning process and ensure smooth functioning of the project.
- Advise on regular contact with state officials involved in preparing state BSAPs, co-ordinate provision of technical and administrative assistance, provision of resources and materials.
- Advise the consultative process with stakeholders including state governments, nodal agencies and co-operating partners.

Technical Inputs and Participation

- Advise on training needs of Programm Officers, and make arrangements for providing the same. Ensure the project is in conformity with objectives of the UNFCCC.
- Ensure that a participatory methodology is followed and effective stakeholder participation is achieved. Obtain technical inputs (material and human resources) to assess and include measures for recent issues in the field of climate change, particularly those emerging from recent COP (such as issues related to sustainable development, response strategies for impacts, abatement and adaptation etc.).

The NPA should be well versed with the UNFCCC planning manuals and guides. He/she will need to have excellent managerial, inter-disciplinary, writing and communication skills. He/she should be bi-lingual in Hindi and English and be proficient in use of computers.

C.2. Programme Officers

Four Programme Officers will be hired to assist the NPD/NPA in carrying out his/her duties. The four Programme Officers will look after (1) GHG inventory; (2) impact vulnerability and adaptations; (3) GHG mitigation; and (4) all other components of TNC and BUR. The Programme Officers will assist in preparing progress reports, financial statements, and liaising with the NPD/NPA, thematic working groups and state planning groups. The Programme Officers will assist in providing technical input to the state planning groups, disseminate materials and information, organize and co-ordinate workshops, meetings and consultations under the project. The Programme Officers will keep in regular contact with the thematic working groups and will facilitate their work as necessary.

It is currently envisaged that the Programme Officers will have experience in working in at least one of the areas to be dealt with in the project as outlined above and have experience in participatory methods and institutional arrangements. The Programme Officers should have excellent inter-disciplinary, writing and communication skills. All the Programme Officers should preferably be bi-lingual in Hindi and English and be proficient in use of computers.

The Programme Officers will report to the NPD/NPA directly. They will assist NPD/NPA in all activities and smooth discharge of responsibilities.

Principal Activities of the Programme Officers:

- Assist NPD/NPA in preparing detailed monthly plans and cost estimates for accounting and timely disbursement of funds as needed
- The NPD/NPA will distribute work between the two consultants for co-ordinating the following activities, such that no overlap occurs.
- Co-ordinate the implementation of project activities as set out in the project document.
- Assist NPD/NPA in co-ordination between the steering committee, thematic working groups, Programme Officers, NPD/NPA and UNDP.
- Co-ordinate all logistical arrangements for steering committee meetings, national workshops, consultations and meetings.
- Maintain regular contacts as needed with all government, non-government, community-based and international organizations that are concerned in the planning process and ensure smooth functioning of the project.
- Maintain regular contact with state officials involved in preparing state BSAPs, co-ordinate provision of technical and administrative assistance, provision of resources and materials.
- Assist NPD/NPA to prepare detailed content of activities in conjunction with the thematic groups. Writing responsibilities for all project documents as assigned by the NPD/NPA.
- Participate and contribute qualitatively to periodic brainstorming sessions with the NPD/NPA and thematic groups, to better define options, priorities and course of action.
- Maintain regular contact with state planning teams, obtain regular status reports and provide assistance and guidance to states as appropriate.
- Assist NPD/NPA in supervising the consultative process with stakeholders including state governments, nodal agencies and co-operating partners.

Technical Inputs and Participation:

Ensure the project is in conformity with objectives of the UNFCCC.
Ensure that a participatory methodology is followed and effective stakeholder participation is achieved. Obtain technical inputs (material and human resources) to assess and include measures for recent issues in the field of climate change, particularly those emerging from recent COP (such as issues related to sustainable development, response strategies for impacts, abatement and adaptation etc.)
Circulate reports, studies and documents prepared to prominent experts for technical reviews. Assist NPA in preparing the draft and final national communication

Qualifications:

The Programme Officers should have an advanced degree and research experience in climate change. The Programme Officers should have experience in undertaking projects related to inventory development, vulnerability assessment and adaptation, GHG mitigation actions, and other aspects of TNC and BURs. The Programme Officers should be well versed with the UNFCCC, UNDP and UNEP guides and IPCC scientific reports. They should have prior experience in organisation, co- ordination and management of international and national workshops and be

familiar with participatory methodologies. He/she will need to have excellent inter-disciplinary, writing and communication skills. He/she should be bi-lingual in Hindi and English and be proficient in use of computers.

C.3. Project Associate

Two Project Associates will be hired to assist the PMU in carrying out the day to day activities. The Project Associate will assist in preparing progress reports and financial statements. The Project Associate will assist in preparation of dissemination materials and information, assist in coordination of workshops, meetings and consultations under the project.

The Project Associate will distribute work between the NPD, NPA and Program Officers for assisting in the following:

- Co-ordinate the implementation of project activities as set out in the project document.
- Assist in organizing the workshops all logistical arrangements for steering committee meetings, working group meetings, national workshops, consultations and meetings.
- Maintain the contracts of each sub contract and update as required
- Assist in preparing the financial statements and maintaining the financial records
- Assist in ensuring timely delivery of each of the deliverables to the PMU by liaising with the project proponents
- Assist in preparing progress reports
- Assist in preparing dissemination material

(d) Others

Capacity Assessment: *Results of capacity assessments of Implementing Partner (including HACT Micro Assessment)*

Special Clauses. *In case of government cost-sharing through the project which is not within the CPAP, the following 10 clauses should be included:*

1. The schedule of payments and UNDP bank account details.
2. The value of the payment, if made in a currency other than United States dollars, shall be determined by applying the United Nations operational rate of exchange in effect on the date of payment. Should there be a change in the United Nations operational rate of exchange prior to the full utilization by the UNDP of the payment, the value of the balance of funds still held at that time will be adjusted accordingly. If, in such a case, a loss in the value of the balance of funds is recorded, UNDP shall inform the Government with a view to determining whether any further financing could be provided by the Government. Should such further financing not be available, the assistance to be provided to the project may be reduced, suspended or terminated by UNDP.
3. The above schedule of payments takes into account the requirement that the payments shall be made in advance of the implementation of planned activities. It may be amended to be consistent with the progress of project delivery.
4. UNDP shall receive and administer the payment in accordance with the regulations, rules and directives of UNDP.
5. All financial accounts and statements shall be expressed in United States dollars.
6. If unforeseen increases in expenditures or commitments are expected or realized (whether owing to inflationary factors, fluctuation in exchange rates or unforeseen contingencies), UNDP shall submit to the government on a timely basis a supplementary estimate showing the further financing that will be necessary. The Government shall use its best endeavours to obtain the additional funds required.
7. If the payments referred above are not received in accordance with the payment schedule, or if the additional financing required in accordance with paragraph above is not forthcoming from the Government or other sources, the assistance to be provided to the project under this Agreement may be reduced, suspended or terminated by UNDP.
8. Any interest income attributable to the contribution shall be credited to UNDP Account and shall be utilized in accordance with established UNDP procedures.

In accordance with the decisions and directives of UNDP's Executive Board:

The contribution shall be charged:

(a) 10% cost recovery for the provision of general management support (GMS) by UNDP headquarters and country offices

(b) Direct cost for implementation support services (ISS) provided by UNDP and/or an executing entity/implementing partner.

9. Ownership of equipment, supplies and other properties financed from the contribution shall vest in UNDP. Matters relating to the transfer of ownership by UNDP shall be determined in accordance with the relevant policies and procedures of UNDP.

10. The contribution shall be subject exclusively to the internal and external auditing procedures provided for in the financial regulations, rules and directives of UNDP.

SIGNATURE PAGE

Country:

UNDAF Outcome (s)/Indicator (s): Government, industry and other relevant stakeholders actively promote more environmentally sustainable development and resilience of communities is enhanced in the face of challenges of climate change, disaster risk and natural resource depletion.

CPAP Outcome (s)/Indicator (s):Government, industry and other relevant stakeholders actively promote more environmentally sustainable development and resilience of communities is enhanced in the face of challenges of climate change, disaster risk and natural resource depletion

CPAP Output (s)/Indicator (s):Management and preparation for climate change and disasters

Executing Entity/Implementing Partner: Ministry of Environment and Forests

Implementing entity/Responsible Partner: Ministry of Environment and Forests/Project Management Unit.

Programme Period:	2012-2017
Atlas Award ID:	70193
Project ID:	4673
PIMS #	4603
Start date:	01 February 2013
End Date:	31 January 2018
Management Arrangements:	National Implementation
PAC Meeting Date	_____

Total resources required	US$ 35,250,604
Total allocated resources:	US$ 35,250,604
• GEF (grant)	US$ 9,010,604
• Government (grant)	US$ 10,302,200
• Government (In-kind)	US$ 15,787,800
• UNDP	US$ 150,000

***Agreed by (Government)**:*

NAME SIGNATURE Date/Month/Year

Agreed by (Executing Entity/Implementing Partner):

NAME SIGNATURE Date/Month/Year

Agreed by (UNDP):

NAME	SIGNATURE	Date/Month/Year