

# India - GEF 5 Programming Plan

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## Acronyms

ABS	Access and Benefit Sharing
ADB	Asian Development Bank
BAT/ BEP	Best Available Techniques/ Best Environmental Practices
BD	Biodiversity
BEE	Bureau of Energy Efficiency, Ministry of Power, Government of India
CBD	Convention on Biological Diversity
CC	Climate Change
DEA	Department of Economic Affairs, Ministry of Finance, Government of India
DDT	Dichloro diphenyl trichloroethane
GEF	Global Environment Facility
GEF OFP India	GEF Operational Focal Point India
GEF PFP India	GEF Political Focal Point India
GOI	Government of India
FAO	Food and Agriculture Organization
FSP	Full Size Projects
IAS	Invasive Alien Species
ISO	International Organization for Standardization
IW	International Waters
LD	Land Degradation
LULUCF	Land Use, Land Use Change and Forestry
MoEF	Ministry of Environment and Forests, Government of India
MoUD	Ministry of Urban Development, Government of India
MNRE	Ministry of New and Renewable Energy, Government of India
MSP	Medium Size Projects
NAP	National Action Plan on Desertification
NAPCC	National Action Plan on Climate Change
NATCOM	National Communication to UNFCCC
NBAP	National Biodiversity Action Plan
NIP	National Implementation Plan on POPs
NTFP	Non Timber Forest Products
PCB	Polychlorinated biphenyls
PCDD	Polychlorinated dibenzodioxins
PCDF	Polychlorinated Dibenzofurans
PIF	Project Identification Form
PIR	Project Implementation Report
POPs	Persistent Organic Pollutants
PVC	Polyvinyl chloride
RAF	Resource Allocation Framework
REDD+	Reducing Emissions from Deforestation and Forest Degradation
SAARC	South Asian Association for Regional Cooperation
SCCF	Special Climate Change Fund on Adaptation
SGP	Small Grants Program
SME	Small and Medium Enterprises
STAR	System for Transparent Allocation of Resources
TEEB	The Economics of Ecosystems and Biodiversity
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNIDO	United Nations Industrial Development Organization
WB	World Bank

## **SECTION I**

### **INTRODUCTION**

#### **I.1 GEF and India: A retrospective**

Sustainable development concerns in the sense of enhancement of human well being are a recurring theme in India's development philosophy. India has a civilizational legacy which treats nature as a source of nurture and not as a dark force to be conquered and harnessed to human endeavor. Different policy documents on environmental management have recognized the need for sustainable development in their specific contexts and formulated necessary strategies to give effect to such recognition. The National Environment Policy (2006) formulated by the Government of India is a response to our national commitment to a clean environment, enshrined in the Constitution. It is intended to mainstream environmental concerns in all development activities and seeks to stimulate partnerships of different stakeholders, i.e. public agencies, local communities, the investment community and international development partners, in harnessing their respective resources and strengths for environmental management. India is a party to the key multilateral agreements and recognizes the interdependencies among and trans-boundary character of several environmental problems. The country stands committed to making a positive contribution to international efforts.

India is one founding member of the Global Environment Facility (GEF), the largest global multilateral funding mechanism providing incremental project grant to the developing countries on global environmental issues with local benefits. Set up in 1991, 182 country governments are its members. India is both a donor and recipient of GEF grant. India's Executive Director in the World Bank chairs and represents the GEF South Asia Constituency (comprising of Bangladesh, Bhutan, Nepal, Maldives and Sri Lanka) in the GEF Council meetings twice a year. The Ministry of Environment and Forests (MoEF) is the GEF Operational Focal Point (GEF OFP) for India for coordination and operational matters. Department of Economic Affairs (DEA) in Ministry of Finance is the GEF Political Focal Point (GEF PFP) for India dealing with policy and governance issues. The GEF Empowered Committee chaired by Secretary (E&F) guides, approves and overlooks GEF operations in the country. Since 1991, India has accessed USD 327 million as GEF grant and of this USD 154 million was accessed during the GEF 4 cycle (July 2006 – June 2010). Since inception, about USD 2 billion has been leveraged as project co-financing. India has contributed USD 51 million to the GEF Trust Fund (1991 - June 2014). The Ministry has actively participated in the GEF 5 replenishment negotiations of the GEF Trust Fund at the global level and was able to facilitate several operational reforms to the GEF.

#### **GEF National Portfolio Formulation Exercise:**

As part of the policy recommendations agreed during the GEF 5 replenishment negotiations was the development of Voluntary National GEF Business Plans for Programming for GEF 5 funding. Countries that choose to identify portfolios through a participatory and consultative process will help raise the awareness of global environmental issues among stakeholders and decision-makers, and help place these issues more prominently on the national sustainable development agenda. The portfolio identification exercise is not mandatory, and not a requirement for accessing GEF grants. At the request of a country, the portfolio identification exercises will be facilitated by the Secretariat, and coordinated with the GEF Agencies, to ensure that planning for GEF programming is undertaken on a level playing field, while maintaining the primary role for countries that will directly manage the resources provided for this exercise.

These plans will have the following elements:

- The step followed during the preparatory process of the national portfolio
- The list (and their description) of the priority projects and/or programmatic approaches that have been identified and that are eligible under the GEF-5 focal area strategies and their estimated costs.
- An outline of how implementation of these projects will contribute to the fulfillment of obligations to the Conventions (CDB, UNCCD, UNFCCC, Stockholm).

These plans will be shared by GEF Secretariat with the Convention Secretariats for information.

For GEF India, in consultation with the GEF PFP India and GEF Council Member office, it was decided to undertake consultative exercise to ensure that the limited GEF resources could be programmed strategically in accordance with identified national needs and priorities as well as GEF founding principles and quality standards. While proposing project concepts in this Plan we have tried to ensure that the GEF funding builds on the existing national activities or those that have already been planned because GEF only funds incremental costs to generate global environmental benefits. The comparative advantage of GEF agencies and the impact the proposed projects are going to make on the ground.

#### **GEF 4 India RAF performance:**

India had received an allocation of USD 76 m (climate change) and USD 30 m (biodiversity) during GEF 4 cycle (July 2006 – June 2010). Following a process of consultations, the indicative allocation was programmed during GEF 4 cycle. Some of the major programs/ projects developed were:

- Three programmatic approaches were developed on Energy Efficiency (Chillers, SME sector, Commercial Buildings, Railways), Sustainable Land and Ecosystem Management (a multi-disciplinary approach to address land degradation and dry land biodiversity concerns from adaptation perspective) and marine conservation (mainstreaming marine conservation with production landscapes in Cooringa and Malvan).
- Sustainable Urban Transport program was developed, Energy Efficiency initiatives were also undertaken in tea processing, brick industry sector amongst others. Low Carbon Strategy for Commonwealth Games 2010, the first communication project was developed. A small project on Solar Concentrators is under preparation.
- Projects on Bio-safety and strengthening Access and Benefit provisions in the Biological Diversity Act were also developed.
- Post NIP projects in Bio-medical waste and PCBs were developed.
- USD 2.4 m was allocated to UNDP/ GEF Small Grants India program.

Programming in GEF 4 cycle was a relatively successful experience as compared to pre GEF 4 cycles primarily because allocations were known upfront and instead of accepting proposals for the first time, the GEF OFP India took a lead in identifying, prioritizing national needs and priorities for GEF programming. This consultative process not only created awareness about GEF amongst the different stakeholders especially Government officials but also developed interest and ownership in accessing and utilizing GEF resources efficiently (both at the programming as well as at the implementation stage). This also resulted in reduced time for preparing GEF India projects. GEF grant is finally being seen as allocation to the country.

On the other side, there were some challenges as well. Some of these were:

- UNDP/ GEF Mokshada project was cancelled after it was endorsed by MoEF and GEF CEO for implementation. The cancellation was at very last stages of GEF 4 cycle and the GEF grant of USD 1 m (part of country's allocation) had to be returned to the GEF Trust Fund;
- UNDP/ GEF Low Carbon Campaign for Commonwealth Games project could not utilize entire approved GEF grant of USD 0.95 m and about USD 0.20 m is being returned to GEF Trust Fund;
- GEF 3 UNDP/ GEF project on Standards and Labeling, whose preparation was delayed was recommended for cancellation when submitted to GEF CEO for endorsement;
- Two of the FSPs were submitted for GEF CEO endorsement without being submitted to GEF OFP India for approval. One was recalled and due process was followed;
- The amount taken in project preparation as well as responding to the GEF Secretariat queries is a matter of concern. The pressure and timelines provided by the proponents and GEF agencies for seeking GEF OFP India's approval was also many a times too short and unreasonable;
- It has been difficult to obtain the Project Implementation Reports (PIRs) and other evaluation reports (Mid Term review and/ or Terminal reviews) from the agencies as these are not automatically shared with GEF OFP India office;
- It was also felt that the representatives of GEF agencies (counterparts in India) also need to be more aware of the GEF procedures and processes to guide and advise the proponents better. The agencies need to manage the GEF projects a little differently from their core operations;
- The leveraging of actual co-financing and the amount of grant spent as administrative costs needs attention; and,
- The communication and outreach component in each of the GEF project needs to be developed strategically and more thoughtfully.

These learning experiences have helped in strengthening GEF India operations further.

#### **GEF India - Operational rules:**

These operational rules have developed over a period of time based on our experiences with the objective of streamlining the GEF India operations to deliver effectively and responsively. Some of these rules were there already and others have been added. These are as follows:

- GEF OFP India requires co-financing commitment letters at the PIF approval stage without which the PIFs are not entertained. This is important as we see co-financing not only in financial terms (which is a very important aspect) but also a) how the project has linked with the national needs, priorities and programs and what is incremental financing required; and, b) national ownership. From GEF 5 cycle, we will also require the detail calculations of the GEF grant and co-financing figures at the PIF stage;
- Both at the PIF and FSP/ MSP stage the endorsement of GEF OFP India will be required. PIF is just 8 page concept note whereas the detailed proposal provides an implementation plan;
- Submissions to GEF OFP India for approval, first needs to be technically and financially reviewed and approved by the concerned GEF agency (ies) (Regional and/or Headquarters level). The processing time at GEF OFP office ranges from 20 to 30 days after submission, something both the proponents and GEF agencies need to take into account;
- During the project preparation, implementation (including, procurement, audit, additional services provided) and monitoring, the project proponents mostly follow the templates, procedures and process of the GEF agencies. In this regard, the agencies will be expected to develop an Operational

Manual for their GEF operations in India, and share it upfront with the proponents at the time of initiating PIF preparations; and,

- A 2 – 3 days of portfolio review meeting will be organized (15 days before the timeline of submission of PIRs to GEF SEC). This review will be done by GEF OFP and PFP along with the National Convention Focal Points and the projects will be reviewed on the basis of their financial delivery and most importantly on the qualitative achievements as per national priorities and GEF criterion. This year the timeline for submitting PIRs to GEF SEC is 30<sup>th</sup> September 2011.

**GEF 5 India STAR allocations:** India has received an allocation of USD 93.75 m (climate change), USD 30.58 m (biodiversity) and USD 5.1 m (land degradation) for the GEF 5 cycle. Of this USD 5.0 m has been allocated to UNDP/ GEF Small Grants India program through GEF FSP modality, which has been approved by the GEF Council in November 2010.

## **I.II Preparatory process of GEF 5 STAR portfolio**

The preparations for GEF 5 programming commenced in December 2009 when the focal area strategies for GEF 5 was in final shape after year long replenishment negotiations. Taking the lead the GEF OFP India chaired three consultation meetings with the concerned officers of the Ministry of Environment and Forests (MoEF)<sup>1</sup> and other concerned Ministries of the Government of India (GoI) to discuss GEF 5 focal area strategies, GEF 5 operational procedures with the objective of initiating the process of identifying national priorities for programming under GEF 5 cycle. These three consultations focused on the following focal areas:

1. Biodiversity, Land Degradation and International Waters
2. Chemicals
3. Climate Change

During these consultations, the concerned officers were requested to provide project concept notes in a specified format (provided by GEF OFP India office) while identifying and prioritizing national priorities for GEF 5 programming.

The zero draft of India – GEF 5 Programming Plan was ready for discussion sometime in July 2010. This was shared with the GEF agencies working in India (including, WB, UNDP, UNEP, UNIDO, FAO and ADB). On August 6, 2010 a day long consultations was organized. It was attended by the senior officials from the Government and GEF agencies. During this consultation, all the project concepts thus received were discussed threadbare and any other interesting project idea (in accordance with national and GEF 5 priority) was invited. The possible outcomes of this day long consultations were discussed internally.

On October 8, 2010, the GEF agencies were also requested to share the following information:

- Agencies were requested to indicate their formal preference for the projects listed in the zero Action Plan (discussed on Aug 6) with justification;
- Any additional project ideas/ concepts were welcomed;
- To indicate the amount of co-financing agencies could generate for the chosen project (in addition to one from government sources);
- To indicate the optimum GEF grant against the chosen project idea as per the project outcome and project time frame; and,
- To provide a detailed profile of your core team, which will execute these chosen projects and also, their present profile and workload.

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<sup>1</sup> Ministry of Environment and Forests, Government of India has thematic divisions on Biodiversity, Climate Change, Chemicals, and Desertification Cell etc. These divisions are headed by the National Convention Focal Points.

The information thus received was examined and internally discussed. The programming process was halted for sometime in view of the CBD COP-10 at Nagoya (in October 2010) and UNFCCC COP at Cancun (in November - December 2010) to take into account the decisions and agreements of these meetings into GEF 5 India programming. After these two COPs, the programming plan of GEF 5 India was modified/ updated in consultation with the concerned officers in MoEF and other Ministries of Govt. This Plan was further revised after CRICK-9 and CST-2 meetings of UNCCD in February 2011.

On the zero draft of the Plan the comments of GEF CEO were received and were discussed in the GEF Empowered Committee chaired by Secretary (E&F) in March 2011. Thereafter, the Plan was further revised with the support of the concerned GEF agencies.

**While going through the thematic sections some of the following aspects may be kept in mind:**

- The entire GEF grant available to India under climate change focal area has not been programmed. The concepts for the remaining grant are under discussion and development.
- The proposed GEF grant for a project is inclusive of the GEF agency fee and PPG (if requested).
- For some projects we have been able to quantify co-financing and this is mostly in cash. For some other projects we have been able to identify the source of co-financing and while developing the PIF the details will have to be worked out.
- India is opting to direct access of GEF grant for national reporting to the Convention related activities as per the new procedures (GEF/C.38/6/Rev.1) which were approved by the GEF Council at its 38th meeting in July 2010.
- The concepts presented here are at pre PIF stage and will be developed further in accordance with the national as well as GEF 5 priorities and requirements.

The following are the proposed project concepts in line with India's national needs and priorities, which will be strengthened and programmed with the guidance and support of the GEF Secretariat.

## **SECTION II**

### **PROGRAMMING PLAN**

#### **II.I BIODIVERSITY, LAND DEGRADATION and INTERNATIONAL WATERS**

##### **Introduction**

###### Biodiversity perspective:

India is one of the recognized mega-diverse countries of the world. With an area of about 329 mha, India is 7th largest country in the world. The varied edaphic, climatic and topographic conditions have resulted in wide range of ecosystems and habitats such as forests, grasslands, wetlands, coastal and marine ecosystems, and deserts which in turn have contributed to immense biological diversity with large variation in species of plants, animals and microbes. The various facets of biodiversity related richness of the country can be gauged from the following salient features:

- With only 2.4% of world's land area, India accounts for about 8 % of the recorded plant and animal species of the world.
- India has ten bio-geographic zones, namely, Trans Himalaya, Himalaya, Indian Desert, Semi-Arid, Western Ghats, Deccan Peninsula, Gangetic Plains, Coasts, North-East and Islands. The country also encompasses four global biodiversity hotspots.
- India is endowed with vast forest resources. The total forest and tree cover of the country is estimated at 23.39% of the geographic area, of which forest cover accounts for 21.02% (69.09 mha). The forests in India have been classified into 16 major types and 251 subtypes on the basis of climatic and edaphic features.
- India ranks among the top ten species rich nations with high degree of endemism.

India with strong institutional, legal and policy framework has the potential to emerge as one of the leaders in biodiversity conservation, and to play an important role in setting the global agenda on biodiversity in this UN Decade on Biodiversity. India is hosting the eleventh Conference of the Parties (CoP 11) to the Convention on Biological Diversity (CBD), to be held in October, 2012 (the Rio+ 20 year). This provides India an opportunity to showcase her strength and initiatives before the world. India is committed to conservation of its rich biodiversity not only because it provides several goods and ecosystem services, but also because it is directly linked to providing livelihoods to millions of local people and contribute to sustainable development and poverty alleviation.

The Global Biodiversity Outlook 3 released during COP 10 at Nagoya, Japan presents a grim scenario. The pressures leading to biodiversity loss are either constant or increasing in intensity, bringing us closer to potential tipping points (also, due to climate variability). This would reduce the capacity of ecosystems to provide essential services, thereby adversely impacting food security, poverty eradication and human well being in general. This would most adversely affect the subsistence of the rural poor, who depend most directly and immediately upon ecosystem services for their livelihoods. There is an urgent need to recognize and integrate the contributions made by biodiversity services to poverty alleviation efforts and to national economic growth. The intrinsic nature of biodiversity and multiple nature of stakeholders underline the need for forging partnerships at various levels to improve conservation and sustainable use of biodiversity in India.

There has been some recent interesting developments relating to biodiversity including, the release of global study on The Economics of Ecosystem and Biodiversity (TEEB) during COP 10; adoption of Nagoya Protocol on Access and Benefit Sharing (ABS) for implementation of the third pillar of CBD; and, adoption of the revised Strategic Plan (SP) for the CBD for the period 2011 – 2020. The Strategic Plan contains 20 targets to help achieve the three objectives of the CBD and the Millennium Development Goals. COP-10 has urged the Parties to develop

national targets in line with the Strategic Plans, and also to review, update and revise, as appropriate, their national biodiversity policy and action integrating these targets. Accordingly, India too would have to develop national targets and update its National Biodiversity Action Plan (NBAP 2008) by integrating these targets. It has also been decided to undertake an India TEEB study.

#### Land Degradation perspective:

India has a total geographical area of 328.2 million hectares (mha) with drylands covering 228.3 mha (69.6%) of the total land area. Within the drylands, arid area is 50.8 mha (15.8%), semi-arid is 123.4 mha (37.6%) and dry sub-humid is 54.1 mha (16.5%). It is estimated that about 32% of India's total land area is affected by land degradation and 25% is affected by desertification. The degradation of these lands adversely affects the country's ecosystem health, economy and most importantly the livelihood and food security of millions of rural as well as urban households.

Though India does not have a specific policy or legislative framework for combating desertification as such, the concern for arresting and reversing land degradation and desertification gets reflected in many of our national policies (for e.g., National Water Policy 1987; National Forest Policy 1988; National Agricultural Policy 2000; Forest (Conservation) Act 1980; Environment (Protection) Act 1986; National Environmental Policy 2006; National Policy for Farmers 2007; National Rainfed Area Authority (NRAA)- 2007) which have enabling provisions for addressing these problems. It is also implicit in the goals of sustainable management of forests (SMF), sustainable agriculture, sustainable land management (SLM) and the overarching goal of sustainable development which the country has been pursuing. The subject has in fact been engaging the attention of Indian planners and policy makers since the inception of planning and programming. The first five year plan (1951-1956) had 'land rehabilitation' as one of the thrust areas. In the subsequent plans too, high priority has been consistently attached to development of the drylands through various programs/ projects. Combating desertification and land degradation is a multi sectoral task and, poverty of the masses has long been known to be a key driver of desertification and land degradation, which needs to be addressed.

In GEF 4 cycle, India has developed "the Sustainable Land and Ecosystem Management Country Partnership Program (SLEM CPP)" to promote sustainable land management and use of biodiversity as well as maintain the capacity of ecosystems to deliver goods and services. Seven projects that were developed under SLEM CPP are currently operational.

#### International Waters perspective:

India is faced with a very complex challenges ranging from pollution, loss of habitat, and ship waste, to intensive and conflicting uses of surface and over-harvesting of fisheries, and adaptation to climatic fluctuations in its international waters, which needs urgent attention.

Large amount of sewage which is generated from coastal cities and towns are discharged in the coastal waters and several instances without treatment. Many of the towns located in coastal areas do not have a STP. Further the industrial and sewage discharge in the estuaries and rivers finally find their way into the coastal waters. These pollutants destroy the flora and fauna in the coastal waters which are considered to be one of the more productive zones on which the local communities depend for their livelihood. Sand mining, reclamation, dredging, deep sea disposal are some of the negative activities that have a serious impact on the coastal and marine waters. In order to address these issues the Ministry has issued the Coastal Regulation Zone Notification, 2011 and IPZ Notification, 2011 on 6<sup>th</sup> January, 2011. For the first time the water area has been included in this notification and all the activities that have a detrimental effect on the coastal and marine waters are regulated. Further, under the said notification the fishing areas, fish breeding, spawning, migratory routes of fish and shell fish are to be demarcated and notified as protected zones. The Ministry has initiated a project on ICZM project with the assistance of World Bank. Under the said project, a National Centre for Marine Biodiversity is being set up in

Jamnagar, Gujarat which will exclusively study and carry out research on the flora and fauna including the habitats of in the marine and coastal areas.

## **India and GEF 5 priorities**

As per the identified national priorities and after the review of programs/ projects developed under biodiversity and land degradation focal area in previous GEF cycles, 11 projects (excluding, SGP India) have been proposed for development during the GEF 5 cycle.

The overall aim is to support and strengthen India's efforts in meeting its national priorities and Convention guidance (both CBD and UNCCD). These projects will generate both global and local environmental benefits. The objective for 9 projects under biodiversity focal area is as follows:

- To demonstrate and mainstream conservation measures in various ecosystems (urban, mountains, wetlands, agro-ecosystems) for continued and improved provisioning of ecosystem goods and services and maintaining ecosystem resilience against retrogressive factors including, climate change;
- Implement Invasive Alien Species Management Frameworks;
- To promote biodiversity-friendly goods and services;
- Economic evaluation of ecosystems and biodiversity for improved management and sustainable livelihoods; and,
- Integrating CBD obligations under national planning process.

To conserve critically endangered species of India (about 19 of these are in IUCN Red List) from extinction, India plans to collaborate with Saves our Species (SOS) program of the GEF, WB and IUCN to benefit from the international experiences. The Ministry is working with IUCN India team in this regard.

The proposed GEF intervention on land degradation aims at enhancing the capacity to develop, adapt and implement adaptive management tools for the sustainable land management in the country. This proposed project is in alignment with LD focal area strategy for the GEF 5 cycle.

The proposed programmatic approach on International Waters for the GEF 5 cycle aims to build a program on improved management of marine protected areas along with several capacity building activities which will benefit India, Sri Lanka and the Maldives eventually. The programmatic approach is to tie in the international objectives to improve the health of the coastal and marine ecosystems, and to build initial platform for collaboration of shared trans-boundary waters and capacity building for creating a congenial ambience for legal reform which will specifically aim for ensuing livelihood security of coastal communities (especially fishing communities) who depend on shared marine resources.

The following matrix presents the priority areas for India:

### Programming matrix

S No	Project title (Details at the end of this table)	GEF grant (In USD M)			Co-financing (In USD M)	GEF agency	National executing agency
		STAR BD & LD	STAR CC & Non STAR	Total			
1	Small Grants Program	1.5 (BD) 0.5 (LD)	3.0 (STAR CC)	5.0	Being worked out	UNDP	Ministry of Environment and Forests (MoEF), Government of India (GoI)
2	<ul style="list-style-type: none"> <li>Revision of National Biodiversity Action Plan (NBAP)</li> <li>Preparation of fifth National Report to CBD</li> <li>Preparation of 2<sup>nd</sup> National Report to Cartagena Protocol on Bio-safety</li> </ul>	X	0.260 (From BD Focal Area Set Aside through Direct Access)	0.260	0.5	Direct access by MoEF through NBA	MoEF & National Biodiversity Authority (NBA)
3	Integrated Biodiversity Hotspots Conservation and Improvement Project	14 (BD)	STAR CC (3)	17	250 – 300 + GoI and State Governments	WB <sup>2</sup>	MoEF
4	Integrated management of wetland biodiversity and ecosystem services for water and food security and climate change adaptation	5.0 (BD)	X	5.0	20.0	UNEP	MoEF
5	India Mountain Landscape Project	7.0 (BD)	X	7.0	39.0	UNDP	MoEF
6	Mainstreaming biodiversity conservation and utilization in agricultural sector to secure ecosystem services and reduce vulnerability	3.5 (BD)	X	3.5	14.0	UNEP	Indian Council of Agricultural Research (ICAR)
7	Mainstreaming conservation and use of wheat biodiversity through public-private partnership	5.0 (BD)	X	5.0	20.0	UNEP	ICAR and National Bureau of Plant Genetic Resources (NBPGR)
8	Increase Capacity to Develop and Demonstrate Adaptive Management Tools in Sustainable Land Management in India	4.6 (LD)	X	4.6	20.0	WB	MoEF
9	Integrated Ecological Management of the Lakshadweep Sea	X	30.0 (IW)	30.0	60.0 (WB) + GoI and State Governments	WB	MoEF

<sup>2</sup> The three GEF/ WB biodiversity projects (proposed in this programming matrix) will be linked with a bigger project being jointly developed by MoEF and Bank. The incremental cost of these projects is being proposed to be accessed from GEF.

## Concept details

### **Revision of National Biodiversity Action Plan (NBAP), Preparation of 5<sup>th</sup> National Report to CBD and Preparation of 2<sup>nd</sup> National Report to Cartagena Protocol on Bio-safety**

In accordance with the CBD notification no 2011-015 on “Updating National Biodiversity Strategies and Guidelines and preparation of the 5<sup>th</sup> National Report to the CBD” are proposed to be funded from GEF 5 Biodiversity focal area set aside provision, which allows up to USD 500,000 for such enabling activities through direct access. Further, in accordance with the CBD notification no 2011-035, the GEF has been requested to fund the preparation of 2<sup>nd</sup> National Report to Cartagena Protocol on Bio-safety.

These three activities are:

- In its decision, X/10, the COP requested Parties to submit its 5<sup>th</sup> national report by 31<sup>st</sup> March 2014 as these reports will be very crucial for a mid term review of the implementation of the Strategic Plan for Biodiversity (2011 – 2020) to be undertaken at COP-12. The guidelines for undertaking this exercise are now available. Additional tools and guidance to support this preparatory process shall be made available by the CBD Secretariat in due course. India had accessed GEF grant for the preparation of the first, third and fourth national reports.
- Regarding India’s NBAP, we had developed National Policy and Macro-level Actions Strategy on Biodiversity in 1999 within five years of ratifying the Convention. Thereafter, this document was updated and revised as NBAP, and approved by the Indian Cabinet about two years back in November 2008. Following the adoption of Strategic Plan (2011 – 2020) by COP-10, we are now required to develop targets in line with this Plan and update the NBAP by integrating these national targets among other things as per COP-10 decisions.
- In accordance with COP-MOP decisions BS-1/9 (paragraph 5) and BS-V/14, the 2<sup>nd</sup> National Reports on Bio-safety should be submitted to the CBD Secretariat by 30 September 2011, i.e. at least 12 months before the sixth COP-MOP, which is scheduled to take place from 1-5 October 2012 in India. This is crucial as a number of other important processes under the Protocol, including the second assessment and review of the effectiveness of the Protocol and the comprehensive review of the capacity-building Action Plan to be undertaken by COP-MOP 6, will depend on the information provided by Parties in these reports. The 2<sup>nd</sup> national reports will also be used to establish the baseline data against which progress with the implementation of the recently adopted Strategic Plan of the Protocol will be measured. Thus, it is very critical that Parties submit their reports in a timely manner.

### **Integrated Biodiversity Hotspots Conservation and Improvement Project**

To conserve globally significant biodiversity and improve ecosystem quality through management of invasive species and establishing sustainable NTFP extraction approaches in select hotspots.

Hotspots are globally significantly bio diverse areas facing high degree of threats. The prominent threats identified, among others, include spread of invasive species, uncontrolled extraction of resources and lack of awareness due to undervalued ecological goods and services provided by these ecosystems. Put together, these result in significant erosion of native biodiversity and diminishes the quality of the forest ecosystems. Despite research on the biology of specific invasive species and other economically important biological resources, their management is beset with challenges. There is an urgent need to develop frameworks for managing invasive species and promote sustainable and equitable extraction of biological resources and to provide matching financial resources, which have remained rather low to deal with these critical threats to biodiversity. The

proposed project fits well with the: (i) objective 2 of the BD strategy that supports the *Implementation of IAS Management Frameworks*; (ii) CBD COP-10 Strategic Priorities for 2011 - 2020 Target 9; and (iii) CBD COP-10 Strategic Priorities for 2011 - 2020 Target 14.

The proposed project will result in conservation of many globally threatened and endangered species as well as result in improved ecosystem quality that results in higher carbon sequestration potential, which is a direct global public good. It will also help develop models for managing invasive species and promoting equitable *Access and Benefit Sharing (ABS) Protocols* for extracting NTFPs that could be used in other landscapes with similar challenges.

The hotspots are facing diverse threats ranging from habitat fragmentation through infrastructure projects to poaching. But the two medium to long term pressures that are impacting habitat quality in the hotspots are the issues related to invasive species and unsustainable extraction of NTFP. It is, therefore, critical to develop an approach combining these two critical threats for developing a model for conserving biodiversity and improving habitat quality in the hotspots. Also missing is the economic valuation of hotspots, which is crucial, as the true range of ecological goods and services provided by these is not only poorly understood but has not been evaluated with particular focus on the contribution of ecosystem services to livelihoods, food security, water security, energy security and citizens health. Such valuations are very important from a policy perspective. The proposed project could consist of following two components:

#### ***Component 1: Invasive Alien Species and their management***

Among the major threats faced by native plant and animal species (and their habitats), invasive species are considered second only in importance to habitat loss. A total of 173 invasive alien plant species has been recorded in India impacting various ecosystems. For example, *Chromolaena* and *Mikania* species have over-run the native vegetation in the North-East Himalayan region and the Western Ghats. Grazing and fallow land has been lost to woody invasive species such as *Prosopis juliflora* and *Lantana camara*. In India, a multi-agency and multi-program approach, involving several Ministries and agencies, is being followed for regulating introductions and managing invasive alien species. Whereas mechanisms for regulation of introduction of exotic living materials, their quarantine clearance and release for research and direct use is generally in place, restoration of ecosystem quality through *in situ* management of invasive species is inadequate. The GEF intervention proposes to ensure the prevention and control measures for invasive alien species in India enhanced through strengthening of the regulatory, scientific and technical framework. In particular, the investments will include:

- Strengthening regulatory measures for IAS and developing science-based policy guidelines, preventive measures, risk assessment and early warning systems
- Building institutional capacity for species wise and ecosystem wide mapping of key invasive species and restoration of native species
- Identifying control measures as models for IAS management in different ecosystems, and addressing research agenda on specific IAS vis-à-vis climate change
- Preparation of an integrated invasive species management plan that builds on regulatory, preventive and restorative aspects management of invasive species
- Piloting innovative approaches for managing invasive species, including biological control and restoration of indigenous flora and fauna post invasive control
- Knowledge Management of IAS by developing information management systems and human resource development
- Awareness generation on IAS in India among all stakeholders

#### ***Component 2: Sustainable utilization of Non-Timber Forest Produce (NTFP) to provide incentives for conservation of high biodiversity areas***

This component will not only look at the value and extent of NTFP provided by these hotspots, but will also assess the impact on the potential of these ecosystems to sustainably provide these resources in the wake of invasive species competing with native species. It is estimated that 275 million poor rural people in India i.e. 27% of the total population depends on NTFPs for at least part of their subsistence and cash livelihoods. This dependency is particularly intense for half of India's 89 million tribal people living in forest fringe areas. Despite the scale of dependence on NTFPs, these continue to be consumed with very little value addition and are extracted in unorganized and unsustainable ways. Promoting sustainable utilization is key to conserve native biodiversity that provide these resources and for improving the forest quality. This is also true for the biodiversity hotspots.

Further, the potential economic value of NTFPs is poorly understood and therefore little attention has been paid for their conservation. In India, there are about 17,000 higher plant species out of which nearly 3,000 (20%) yield NTFPs. However, only about 0.8% of this 20% have been commercially developed so far. The markets for many of these species are regional, national or even global. The markets for these commodities are poorly studied and remain opaque to local communities, policy makers, administrators and researchers. This further compounds their conservation. In addition, there have been several policy and institutional issues affecting the NTFP sector particularly on its collection, processing, marketing and benefit sharing aspects. Yet a concerted effort is missing to conserve these valuable resources that play an important ecological role within the ecosystems.

There is a need to protect the forests from unsustainable exploitation of NTFP and simultaneously support livelihoods of the forest-dependent communities. As a means to achieving sustenance and conservation of such native species, building capacity of the communities through skill sets and value additions to the NTFP through technology support for extraction, storing and packaging and setting up of a market mechanism is of utmost importance. In order to harnessing the potential of NTFP resources as a means to raise the income standards, it is essential to explore and establish a community participation model through Joint Forest Management Committee (JFMCs) and other existing community initiatives. Better incomes from NTFP would also result in building stakeholder ownership for conserving these native species. The Centrally Sponsored Scheme of National Afforestation Programme (NAP) has since its inception been supporting more than 100,000 JFMCs. As a part of exit strategy two new components have been introduced in the "Revised Operational Guidelines for the NAP (2009) viz. Training and Capacity Building and (b) Value Addition and Marketing of Forest Produce. At present, there is no budgetary allocation available to undertake these activities.

This proposed project aims to develop commercial enterprise model that builds on the strength of strengthens local communities knowledge and experience in sustainable natural resource management, sustained and enhanced livelihoods and providing a system by which Government of India's Afforestation Programme could exit sustainably. This component will undertake the following:

- Assessing the extent and volume of trade in select NTFP that directly support livelihoods of millions and have the potential for value addition in unorganized and/or organized markets and understanding the impact of such extraction on their conservation status
- Documenting practices for NTFP extraction and estimating sustainable yields from natural ecosystems
- Undertaking economic valuation of select ecosystems in the hotspots with an objective to increase policy attention and budgetary allocations within the Ministry and for developing a coordinated approach in addressing the twin issues of invasive species and NTFP
- Developing framework for equitable access to and benefit sharing from NTFP based on ecosystem's capacity to provide sustainable yields to ensure preventing ecosystem degradation through over extraction and improving quality of forests
- Explore mechanisms to integrate sustainable utilization of NTFPs to the Green India Mission with the objective to build a bigger stake and stronger partnerships of local communities who depend on forest resources to lead to improved quality of forests
- Explore mechanisms to link NTFPs with REDD+ initiative to develop an independent revenue stream for local communities

The intended project would leverage co-financing from the proposed Programmatic Project on Biodiversity Conservation amounting from \$250 to \$300 million. It would also leverage funds from the Green India Mission.

The expected project outcomes are:

- At least 100,000 ha (exact area to be confirmed) area rid of invasive species and restored with indigenous flora and fauna in select hotspots
- Control methods piloted and ready for replication for at least two invasive species
- At least 100,000 ha (exact area to be confirmed) brought under *Access and Benefit Sharing Protocol* for sustainable utilization of NTFP in select hotspots
- Value added products developed for at least 3 NTFPs
- Economic valuation completed for at least three ecosystem types in select hotspots

The GEF agency proposed for this project is the World Bank. Not only it is by far the largest financier of biodiversity, but is also expected to lead the proposed Programmatic Project on Biodiversity Conservation. World Bank is also engaged in technical preparations for the next CBD COP scheduled to be held in India in October 2012 and this presents a good opportunity to align the GEF investments with COP objectives. The World Bank is currently financing the landscape based biodiversity conservation approach and the proposed GEF financing could result in selection of two additional sites for the BCRLI project thereby further enhancing the leveraging of resources and complimentary working among various initiatives of the Ministry of Environment and Forests.

### **Integrated management of wetland biodiversity and ecosystem services for water and food security and climate change adaptation**

India has extensive and diverse wetland regime, ecosystems services of which form an integral part of its ecological and economic security through sustaining human health and wellbeing, as well as supporting a range of national, regional and global significant biodiversity. As per assessments made by Space Application Center using remote sensing data (at 1: 50,000 and 250,000 scales), there are 27,403 inland and coastal wetlands in the country covering an area of 7.6 million ha. Recognizing their ecological and socioeconomic importance, a range of wetland research, management and conservation policies and programs have been developed and are under implementation, the flagship being the National Wetland Conservation Programme of the MoEF. The programme currently covers 115 wetlands and provides financial support for their integrated management, including conservation of catchments, management of hydrological regimes, biodiversity conservation, sustainable livelihoods of wetland dependent communities, communication and awareness generation and institutional development. Wetland management authorities at site as well state levels have been constituted for several states. A National Wetland Regulatory Authority has also been constituted at national level to enforce a regulatory regime for regulating developmental activities.

Despite the implementation of these plans and achievements made in the conservation and improved management of wetlands in India over the past years, wetlands continue to be degraded and converted for alternate uses, their biodiversity stressed (e.g. Siberian Crane), and livelihoods of communities dependant on their ecosystem services for sustenance under rapid decline. Sectoral approaches to developmental planning form the most significant challenge for wetland management. Efforts made to improve water and food security without recognizing the role of wetlands have led to development decisions that tend to fragment wetland regimes or favor alternate uses. Management efforts made are largely focused on short-term site level drivers and thereby weakly address the indirect drivers, which include but are not limited to long-term changes in hydrological regimes, agriculture intensification, and urbanization. The role of wetlands as suppliers of water, regulator of flows, providers of food security, supporters of livelihoods especially for the poor, and climate benefits have not been well recognized and integrated into sectoral policies and action plans. Wetlands in the Himalayan region

remain underrepresented or weakly managed relative to the rest of the country. The opportunities wetlands provide for climate change adaptation and mitigation remain to be fully harnessed and integrated into relevant policies and action plans in India. Given the fact that most of the impacts of climate change in the country would be water-mediated, the role of wetlands in climate change demands urgent attention and integration into local and regional adaptation strategies.

Some of the key factors that limit management effectiveness of wetlands are:

- a) Limited knowledgebase on wetland biodiversity and ecosystem services to support integrated management planning at river basin scales.
- b) Limited capacities of wetland managers to design and implement management plans which can address drivers of wetland degradation at multiple scales, including the 'agriculture-wetlands' interface.
- c) Limited recognition of full range of wetland ecosystem services within developmental planning and decision making
- d) Lack of sufficient integration of wetlands in water management planning and decision making leading to insufficient water allocation to wetlands to maintain their ecological integrity
- e) Limited investment into wetland conservation, especially in Himalayan wetlands which have a high significance in regulating the hydrological regimes, supporting biodiversity and providing opportunities for climate change adaptation.

This proposed project complements the investment made by the Government of India under its National Wetland Conservation Programme. The current (baseline) investment portfolio includes support to site level management plans, research and evaluation, capacity building of wetland managers, institutional development and awareness generation. The GEF financing would complement the above activities with focus on enhancing the effectiveness of wetland management in the country by mainstreaming conservation of wetland biodiversity and ecosystem services into landscape planning (*GEF BD-2*) and improving sustainability of current management efforts in the targeted wetlands (*GEF BD-1*).

Specific reference to complementarity and incremental change expected within the various project components is discussed below:

**Wetland knowledge base:** Within the ambit of the current national plan, the central government supports national inventory of wetlands, which includes assessing wetland extent as well as information on some features (wetland turbidity, extent of vegetation etc) that can be extracted through remote sensing data. At site levels, state governments and wetland authorities are supported to undertake baseline investigations on wetland features. *However*, there is no systematic attempt to link datasets and information related to various drivers of wetland degradation (for example water resources projects, land use changes) at a management relevant scale (e.g. river basin, landscape level) to enhance effectiveness of management planning. It does also not incorporate or support an ecosystems services-based planning and management mechanism, whilst the economics of ecosystems and biodiversity need to be build into national as well as local government accounts. This in order to enhance the understanding and support of local governments and other stakeholders in wetland conservation and sustainable utilization of their ecosystems services such as water, recreational values or wildlife (genetic resources) to name a few. The *proposed GEF project* would assist in development of hierarchical and ecosystem services-based inventory, assessment and monitoring systems that could be used for prioritizing wetlands as well as enable identification of relevant drivers and pressures on wetlands at river basin / landscape level. The investment would also seek policy relevant assessments on the extent of benefits provided by wetlands at regional and national scales, their role in food and water security, and the cost of inaction for allowing degradation of wetland ecosystem services and biodiversity. These assessments would strengthen additional leveraging of funds for wetland conservation in general and also allow cross sectoral integration, particularly into

developmental planning processes, industrial investments, and community participatory approaches in poverty alleviation.

**Integrated wetland management and restoration:** The *GEF investment* would be used to develop management plans for priority wetlands with emphasize on the Himalayan region. These wetlands, despite playing an important role in securing downstream benefits as well as being key to climate change adaptation, have had insufficient investment and need a much larger scale of funding. Implementation of these plans is proposed to be jointly taken with the central and the state governments. A key incremental advantage of GEF investment would be to support integration of wetlands into river basin management. Replicable restoration projects which highlight pathways of assessing the role of wetlands in river basins, determination of (minimum) environmental flow requirements for balancing human requirement with ecological requirements, negotiating protection of ecosystem services flows within the existing institutional arrangements, ensuring the role of wetlands as natural infrastructure in water management objectives and promoting stakeholder led water management, would enable mainstreaming of wetlands in water management. The built capacity of wetland managers in the field of wetlands and integrated water resources management, practical skills that could be applied in national contexts and enhanced cross sectoral communication would leverage further investments within the various sectoral plans for integration wetlands into water resources management.

One of the key components of the project work programme would be addressing *agriculture – wetland interactions*. Most of the wetlands, especially those located within rural landscapes, have gone through and are undergoing changes in land use to permanent agriculture, which creates an imbalance in ecosystem service provision enhancing the provisioning function at the expense of regulating and supporting functions as flood regulation, water provision etc. On the other hand wetland ecosystems are frequently crucial rich natural resources bases on which the poor depend for food security and livelihoods. With increasing rainfall variability and climate change, this dependency on wetland ecosystems is bound to increase. Given the current rapid degradation and loss of wetland ecosystems, the programme would, within the river basin level planning processes, aim to guide the use of wetland ecosystems and wetland-based agricultural practices into a sustainable practices that: (i) ensure the sustainability of the ecosystem and the preservation of the natural resources base, including biodiversity; and (ii) fosters the adoption of multiple good wetland agricultural practices that are geared towards optimizing food security and agricultural production while sustaining the ecosystem.

**Wetland Managers' Capacity Building:** The current national programme has focused on building nodal agencies for wetland conservation at site and state levels to design and implement the management plans. With an increase in scope and coverage of the national plan, as well as increased emphasize on decentralized planning and management, there is an increasing need for trained local/state wetland managers to effectively implement the integrated programmes. However, a review of the management plans submitted by various state government agencies indicates that the requisite integration and professionalism is yet to be achieved. The proposed GEF investment would enhance the capacity of these wetland managers by enhancing their skills for assessment of wetland values and diagnosis of threats to the ecosystems at both site and landscape level, increase their ability to apply standard methods, procedures and tools for sustainable wetland restoration, provide knowledge and skills for mainstreaming wetlands into developmental planning, enable sharing of successful experiences and best practices, and maintain built capacity through follow up support and networking.

The expected **global environmental benefits** arising from this intervention include:

- progressive reduction in rates of natural resource degradation in protected wetlands in India, specifically in the Himalaya
- maintenance of the flow of (transboundary) ecosystem goods and services, especially hydrological and climatic regulating, pollinating services, carbon sequestration and preservation of genetic diversity, wildlife and migratory bird habitat
- effective protection of globally threatened and endemic bird species, including e.g. the Siberian Crane and other migratory species. To be expanded upon ...

- Strengthening conservation capacity applied to the various wetlands targeted under the National Wetland Programme of the MoEF, incl. 115 wetlands (with 25 Wetlands of International Importance under Ramsar Convention). Additionally strengthened management in 40 lakes and 38 mangroves and coral reefs areas under the National Lakes Conservation Plan and National Programme on Mangroves and Coral Reefs.,
- restoration of globally significant forest, grassland and wetland habitats through field level activities in and around the targeted protected areas

The project would support implementation of several key national strategies and plans, key being the National Environment Policy (2006), National Biodiversity Action Plan (2008) and National Climate Action Plan (2008). Conservation of wetlands has been identified as a high priority area under the National Environment Policy. The policy recognizes wetlands, their biodiversity and ecosystem services as “entities of incomparable value” and recommends their integration into river basin management and sectoral development plans for poverty alleviation and livelihood improvement. The Ministry of Environment and Forest (MoEF) has identified conservation and sustainable use of wetlands as one of the key areas under natural resources management. Under the National Wetland Programme of the MoEF, 115 wetlands (including 25 Wetlands of International Importance under Ramsar Convention) have been identified for priority management actions. Similarly 40 lakes and 38 mangroves and coral reefs areas have been identified for priority conservation under the National Lakes Conservation Plan and National Programme on Mangroves and Coral Reefs. National Climate Action Plan identifies Conservation of Wetlands as a component of the National Water Mission, which is one of the 8 missions identified by the government as a response strategy to climate change mitigation and adaptation. National Biodiversity Action Plan identifies wetlands as key components of biodiversity and thereby seeks their integrated management as one of the key pathways for achieving national biodiversity conservation objectives.

The MoEF has notified the Wetland (Conservation and Management) Rules in 2010 under the Environmental Protection Act which will apply to all Ramsar sites, wetlands within ecologically sensitive and important areas, UNESCO Heritage sites, high altitude wetlands with an area of 5 ha and above, and other wetlands having area of 500 ha and above. The rules prohibit various developmental activities which degrade wetlands. A Central Wetland Regulatory Authority at national level has also been constituted to ensure implementation of the rules. The proposed project would provide support to strengthen implementation of the regulatory regimes by enhancing management effectiveness for conservation and sustainable use of wetlands.

The project would also support national level implementation of the Convention on Wetlands (Ramsar Convention) and Convention on Biological Diversity (CBD). Wise use of wetlands is one of the three pillars of the Ramsar Convention, and also forms the core implementation strategy of this project. The various component of the project will support implementation of several resolutions of the Conference of Parties to the Convention, most notably Resolution X.19 on wetlands and river basin management; Resolution VIII.14 on integrated management planning for wetlands; Resolution X.15 and X.16 on describing and detecting change in ecological character; Resolution X.24 on climate change and wetlands; and series of resolutions related to communication, education and participation and awareness (CEPA). Within the CBD Strategic Plan 2011-20, the project would contribute to meeting target 2 (integrating biodiversity into national and local development and poverty reduction strategies); target 11 (effective management of inland waters); and target 14(restoring ecosystem service including those related to water).

Project objective: “Enhanced management effectiveness of Indian wetlands of national and international importance, through building the economic case, capacity, and integration in landscapes”

Project outcomes:

Project Component	Expected Outcomes	Expected Outputs
<p><b>I. Wetland knowledge base - economic value &amp; building the case for adaptation</b></p>	<p>1. Improved national knowledge base to support science -policy interface on wetlands biodiversity and ecosystem services</p> <p>2. Enhanced understanding of climate change vulnerability, adaptation needs, capacity and management options</p>	<p>1.1 Established partnerships and built capacity for applying a multiscale and hierarchical wetland inventory, assessment &amp; valuation, and monitoring system (integrating UNEPs IEA, TEEB and ESR methodologies)</p> <p>1.2 Integrated national scale assessments on the role of wetlands in water and food security, climate change adaptation, and costs of inaction</p> <p>2.1 Local scale vulnerability to climate change modeled and predicted (with specific focus on Himalayan wetlands)</p> <p>2.2 Capacity of existing wetland management institutions to adapt reviewed and stakeholder capacity development programme designed</p> <p>2.3 Wetland management needs and options under climate change stress designed for 6-7 pilot sites</p>
<p><b>II. Capacity &amp; Awareness building for integrated wetland management</b></p>	<p>3. Enhanced capacity and trained human resources for integrated wetland management</p>	<p>3.1 Skills development of wetland managers and stewards for assessing wetland values and functions, drivers and pressures and response strategies</p> <p>3.2 Capacity building on effective CC adaptation measures in wetlands</p> <p>3.3 Established learning networks for feedback into state government policy and site management planning</p> <p>3.4 Establish high-level seminars to target policy &amp; decision</p>

	<p>4. Strengthened stakeholder involvement, specifically on ES-based wetland management, restoration, and applied science</p>	<p>makers (on wetland economics &amp; ES-based approaches)</p> <p>4.1 Support local science centers for applied wetland science to test and introduce site -specific wetland restoration techniques</p> <p>4.2 State and site level stakeholder communication, education, participation and awareness building to support effective wetland management</p>
<p><b>III. Integrated wetland management and restoration</b></p>	<p>5. Wetlands integrated into river basin management planning and decision making in 3 river basins</p> <p>6. Enhanced stakeholder led ecosystem services- based wetland management in 6-7 wetlands</p>	<p>5.1 Role of wetlands in food and water security and climate change adaptation assessed in 2-3 basins</p> <p>5.2 Minimum environmental flows - balancing human needs with ecological requirements of wetlands, maintained within the 2-3 river basins (focus on agriculture-wetlands)</p> <p>6.1 Integrated management plans developed and supported for 6-7 wetland sites, including pilots on wetland restoration (with particular emphasis on Himalayan wetlands prioritized under National Wetland Programme )</p> <p>6.2 Established multi-disciplinary public- private partnerships on wetland (applied) research and ES-based site management, including formalized co-management at 6-7 wetland sites</p> <p>6.3 Small grant investments in alternative resources management and utilisation options with local stakeholders</p>
<p><b>IV. Project Monitoring and Evaluation</b></p>	<p>7. Project impacts and performance measured</p> <p>8. Evidence-base on benefits of ES-based wetland management</p>	<p>7.1 Project monitoring and reporting systems established</p> <p>8.1 Monitoring systems established to assess</p>

	established	maintenance and restoration of wetland ecological character, and generation of community benefits at project sites
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The project has strong prospects for replication and sustainability of outcomes given the already established national wetlands programs, infrastructure, policies, and core government budgeting over the past and coming years. The increment through significantly increasing the capacity of wetland managers, the enhanced mainstreaming of wetlands, their economic values & minimum ecological flows, as well as strengthened and decentralised wetland management models into state and site programming will establish a strong base for sustainability.

The project’s participatory ecosystem approach towards the management of wetlands in India, specifically those in the Himalaya region, is aligned with UNEP’s Medium Term Strategy 2010-2013 and Programme of Work for 2012-2013. Specifically, it addresses PoW Sub-programme 3 on Ecosystem Management Objective: “To ensure countries utilize the ecosystem approach to enhance human well-being”. In particular, it will contribute towards PoW Accomplishment a): Enhanced capacity of countries and regions to integrate an ecosystem management approach into development planning processes; b) Countries and regions have the capacity to utilize and apply ecosystem management tools; and c) Strengthened capacity of countries and regions to realign their environmental programmes to address degradation of selected priority ecosystem services.

In addition, the project intervention is strongly geared towards strengthening the scientific knowledge base for ecosystem services-based analysis and management, developing the mechanisms for sharing and applying scientific knowledge (science-to-policy), and to build national and local capacity through training, communications and piloting enhanced wetland management in 6-7 demonstration sites, and 2-3 integrated river basin areas. This is consistent with PoW Sub-programme 4 on Environmental Governance, which aims “to ensure that environmental governance at the country, regional and global levels is strengthened to address agreed environmental priorities”, Achievement d) Improved access by national and international stakeholders to sound science and policy advice for decision-making.

UNEP has gained extensive experience in wetland water resources management and biodiversity conservation, monitoring of wetland biodiversity and its connectivity along a network/flyway of wetland sites (including national scale), participatory management approaches, and wetland restoration in recently concluded projects such as The Siberian Carne Wetland Project (China, Russian Federation, Iran and Kazakhstan), the Africa-Eurasian Wetlands Project (or Wings over Wetlands project), the Peatland, Biodiversity and Climate project (SE Asia), and many others. UNEP has a large portfolio in India of GEF funded Agro-biodiversity projects, most of which have on the ground participatory management pilots, national monitoring components, as well as science-to-policy work to mainstream biodiversity conservation in state and national government policies. UNEP has a considerable portfolio in the field of ecosystem services, valuation, incorporation on policy and strategies, as well as capacity building in applicable tools such as Invest, TEEB Integrated Ecosystems Analysis, and related works. UNEPs work under the TEEB program, as well as its recent adoption of the global Green Economy Initiative gives it a definite advantage on making the case, building the capacity, as well as develop local sector specific policy and management models to enhance protection of wetland goods and services, strengthened local economies, as well as protected globally significant biodiversity.

**India Mountain Landscape Project**

To strengthen adaptive planning, management, governance and know-how for multiple-use management of mountain landscapes that secures Protected Areas, other critical habitats, improve local livelihoods, mainstream

conservation considerations into production sectors, and maintains continuous flow of multiple ecosystem services including climate resilience.

India with 2.4% of the world's surface area and 16.7% of the world population, is one of 17 “mega-diversity” countries in the world (350 species of mammals, 1,224 birds, 408 species of reptiles, 197 amphibians, 2,546 species of fish, and 15,000 flowering plants). Of the 34 global ‘biodiversity hotspots’, India have four, i.e., Himalaya, Indo-Burma, Western Ghats and Sri Lanka and Sundaland<sup>3</sup>. India’s mountain landscapes are key harbingers of biodiversity and play a crucial role in maintaining ecosystem integrity, provisioning of goods and services (including water security of the plains) and supporting livelihoods. Mountains offer special niches for highly sensitive biodiversity elements, which include endemic, endangered and globally significant species such as Tiger, Elephant, Snow leopard, Musk deer, Hangul, Tibetan antelope, Hoolock Gibbon, Nilgiri Tahr, Lion Tailed Macaque, Nilgiri Langur, etc. The Western Ghats and the Himalayas are two key mountain biodiversity hotspots in India. The Western Ghats<sup>4</sup>, occupying an area of about 16 million ha, contain around 27% of India’s total flora. There are 14 endemic mammal species (eg. Nilgiri langur), and 16 endemic birds (eg. Great Indian hornbill). Similarly, the Himalayas<sup>5</sup>, occupying an area of about 31.98 million ha, have very high levels of biological diversity including species endemism (over 40%)

Over 45 million people depend on the Western Ghats for livelihoods and approximately 245 million people who live in the peninsular India receive most of their water supply from rivers originating in the Western Ghats. Similarly, about 40 million people (including over 175 indigenous communities) living in the Himalayas depend directly on the region’s globally significant ecosystems for their subsistence and sustenance. Over the years, India’s mountain landscapes have been affected by retrogressive anthropogenic interventions in the form of land use change, habitat loss, degradation & fragmentation, poaching, river valley projects, roads, excessive subsistence dependency, grazing and forest fire etc. The emergence of large scale production sectors and entry of market forces in the mountain landscapes (monoculture plantations of tea, coffee, rubber, oil palm, teak, eucalyptus, etc, tourism, etc) compounds the existing threats. As a result, the mountain landscape in the country currently is a mosaic of various (often competing) land-use practices (Protected Areas, production forests, forest fragments, pasture lands, agricultural plantations, tourism destinations, other production sectors, etc).

Considering the importance of mountain landscapes, several programmes and policy initiatives have been undertaken. Conservation of mountain biodiversity is a key priority in the National Biodiversity and Action Plan, 2008 and the National Action Plan on Climate Change, 2008. Establishment of Protected Areas, Biosphere Reserves, and providing technical and financial support to conservation initiatives, etc are other prominent initiatives in this regard. In spite of all these, the mountain landscapes are still (i) poorly understood for its ecological and life support values; (ii) under tremendous pressure due to anthropogenic and global climate change induced perturbations (iii) yet to be mainstreamed for improving quality of life of mountain inhabitants (iv) governed largely based on individual sectoral growth objectives. This has significant impacts on the overall ecological integrity of the mountain landscapes. Most of the existing conservation initiatives in the mountain landscapes are based largely on ‘Protected Area’ centric logic. There is increasing realization that Protected Areas alone will not be able to secure the health and integrity of mountain landscapes and there is need for managing the mountain areas on a landscape perspective particularly by mainstreaming conservation considerations into the production sector operations and practices and with greater involvement of local communities, while strengthening the management of Protected Area systems.

In view of the above, it is proposed to develop a strategy for the adaptive planning and management of multiple-use mountain landscapes of India for improving the sustainability of Protected Area systems, ensuring continued and improved provisioning of ecosystem goods and services and maintaining ecosystem resilience against retrogressive factors including climate change. The strategy will build on the baseline and establish the necessary

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<sup>3</sup> Fourth National Report to CBD; National Biodiversity Action Plan, 2008.

<sup>4</sup> Ecosystem profile: Western Ghats & Sri Lanka, Biodiversity Hotspot. Critical Ecosystem Partnership Fund., 2007

<sup>5</sup> National Forest Commission Report, 2005., Fourth National Report to CBD

governance systems, know-how and capacities necessary for a multiple use planning and management of the mountain landscapes – that nests PAs within a mosaic of conservation –compatible land uses in order to maintain biodiversity, ecosystem functions and resilience with the active involvement of local communities and production sectors. Under the project, apart from addressing issues that requires attention at the national level; one representative landscape will be selected at the sub-national level that has the characteristic attributes of India’s mountain biodiversity. The selected landscape would have key Protected Areas, high value biodiversity outside the Protected Area systems, highly threatened species (eg.tiger), operations of production sectors (e.g. tea gardens), agricultural systems, markets, communities, etc. One of the hallmarks of the project will be the possibility of active involvement of private production sectors including leveraging co-financing. Other sources of co-financing include various national and state level schemes both for the national component, and for site level implementation. In the table below is the indication of the schemes and co-financing available for the national component as well as for the specific project site.

Global environment benefit (in accordance with GEF 5 focal area strategy and relevant COP decisions): The objectives and expected outcomes of this project are consistent with the strategic priorities for GEF-5 under the Biodiversity (BD): Objective one: Improve Sustainability of Protected Area Systems. Objective two: Mountain Biodiversity Conservation and Sustainable Use into Production Landscapes/Seascapes and Sectors. Further this initiative will also strengthen the Programme of Work on protected Areas of the Convention on Biological Diversity.

Linkage with national priorities: The project is directly relevant to, supportive of, and consistent with India’s national priorities and policies related to global environmental issues and development priorities. Of particular mention in this regard is the National Biodiversity Action Plan, 2008 that aims at mainstreaming and integrating biodiversity concerns in economic and social development. Other relevant national policies, legislation and guidelines relevant to this project are: the Biological Diversity Act of 2002, National Environmental Policy, 2006 National Forest Policy of 1988, Indian Forest Act of 1927 and related state legislation, Forest (Conservation) Act of 1980, Wildlife (Protection) Act of 1972, Environmental Act of 1986, The Environment Impact Assessment Notification of 2006, National Wildlife Action Plan (2002-16), National Water Policy (2002), National Conservation Strategy and Policy Statement on Environment and Development (1992), National Tourism Policy (1998), National Agricultural Policy (2000), National Action Plan on Climate Change, 2008, The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, National and State Joint Forest Management orders and rules. India has also signed the UN Convention on Biological Diversity (UNCBD), UN Framework Convention on Climate Change (UNFCCC) and also the UN Convention to Combat Desertification (UNCCD).

Expected Project outcomes: The broad elements of the project will include strengthening the Protected Area network, mainstreaming biodiversity conservation into production sectors, improving the knowledge base, vulnerability assessment of Protected Areas and natural resources including climate change, identifying and securing key corridors and dispersal areas, augmenting sustainable livelihoods based on ecosystem based enterprises, etc.

An indicative list of Project Outcomes, Proposed project Activities and Outcome level co-financing is given below:

Expected Outcomes	Proposed Outputs/ Activities
Component 1. Developing national capacities for planning adaptive management strategies for multiple-use Mountain landscapes (MUML). GEF Budget USD 1 million and indicative co-financing - USD 5 million (Centrally Sponsored Schemes of Integrated Development of Wildlife Habitats, Project Tiger, Intensification of Forest Protection, Biosphere Reserves)	

<p>Existing capacities (technical, financial and managerial) on the planning and management of MUML understood and critical gaps identified.</p> <p>Potential impacts of climate change on the mountain landscape understood, potential for 'Carbon capture' and provisioning of ecosystem goods and services by MUML quantified.</p> <p>Critical connectivity between existing Protected Areas in MUML (key ecological corridors and dispersal areas) identified. .</p> <p>Strategies for mainstreaming and replicating adaptive planning and management programmes for MUML developed.</p> <p>Policies, regulations, institutional and human capacities reviewed and developed for optimized multiple use zoning, planning, financing and management of forest landscapes.</p> <p>Interministerial institutional mechanisms harmonizing the activities of line departments/ agencies in the MUML established.</p>	<p>Undertake the Management Effectiveness Evaluation (MEE) of Protected Areas in the MUML. .</p> <p>Review the activities and interventions of various agencies (Government, Private sector, NGOs, Communities, etc) operating in MUML.</p> <p>Undertake vulnerability assessment of high value biodiversity areas in the MUML.</p> <p>Identify, prioritize and secure key ecological corridors and dispersal areas.</p> <p>Estimate the carbon capture potential of MUML.</p> <p>Estimate the ecosystem goods and services provided by MUML.</p> <p>Prepare Compendium of 'Best practices of community based sustainable natural resource based business models'.</p> <p>Develop State and national guidelines and policies for MUML planning, management and conservation that build on the lessons learned from the pilots at the demonstration sites.</p>
<p>Component 2. Multiple Use Mountain landscape Planning management demonstrated at pilot sites. GEF Budget USD 5.5 million and indicative co-financing USD 30 million (Centrally Sponsored Schemes of Integrated Development of Wildlife Habitats, Project Tiger, Intensification of Forest Protection, Biosphere Reserves, and various state Schemes and from Private production sector)</p>	
<p>Improved management of Protected Areas in the pilot landscape.</p> <p>Improving the management efficiency of forest fragments, forest plantations, pasture lands and other key high value biodiversity areas in the pilot landscapes.</p> <p>Mainstreaming biodiversity conservation into other production sectors in the pilot landscapes.</p> <p>Inter-sectoral institutional mechanism developed for the cross-sectoral and planning and management of the select MUML.</p> <p>Capacity of communities/ stakeholders/ institutions improved to plan and implement adaptive management programmes.</p> <p>Establishment of an operational institutional mechanism for leveraging and sustainable finances for the management of MUML beyond the project period.</p>	<p>Establish a multi-sectoral platform for ensuring effective MUML planning and management within the project demonstration area</p> <p>Establish a working model for integrating the management of Protected Areas and wider production landscapes.</p> <p>Secure key wildlife corridors.</p> <p>Activities in the production sectors harmonized with the objectives of the Protected Area management and biodiversity conservation.</p> <p>Prepare and implement Landscape-level management plan based on optimal combination of land uses.</p> <p>Prepare and implement sectoral plans by mainstreaming elements of biodiversity conservation into the activities of other production sectors.</p> <p>Establish/ strengthen community based user groups and promote alternate livelihoods that reduce unsustainable dependency on natural resources.</p> <p>Key ecosystem services maintained, improved and accounted for resource planning.</p> <p>Integrate appropriate good practices indicators into intrusive management activities (eg tourism, tea garden operations).</p>

	<p>Promote value addition and supply chains for resources produced under biodiversity friendly production systems and new sustainable market opportunities mobilized.</p> <p>Enhance the capacities of staff within relevant Government departments, agencies and CBOs to design, implement and manage landscape-level management process including enhanced capacities to monitor ecosystem service markets and options.</p> <p>Enhanced, cost-effective systems for compliance monitoring and enforcement of multiple use forest regulations.</p>
<p>Component 3: Documentation and Knowledge Management - GEF Budget USD 0.50 million and indicative co-financing USD 4 million (Centrally Sponsored Schemes of Integrated Development of Wildlife Habitats, Project Tiger, Intensification of Forest Protection, Biosphere Reserves, and various state Schemes).</p>	
<p>Best practices documented and replication strategies developed to adopt these practices in other MUML</p>	<p>Documentation of lessons learnt and good practices</p> <p>Strategies for the replication of pilot demonstration in other sites.</p> <p>Knowledge sharing modules (audio-visual and print based) developed for sharing and replication.</p>

Activities to be provided at PIF and/ or FSP stage: The detailed baseline, situational analysis, key barriers, project strategy (including components, outcome, output, indicators, activities and budget), Project Results Framework, Threats and assumptions, Management Arrangements, etc shall be developed during PIF/ FSP stage through expert/ stakeholder consultations.

Sustainability / replicability of the GEF intervention: It is expected that by piloting a landscape level management approach in the mountains, an integrated functional model for the better conservation of mountain landscapes in India can be demonstrated. Such an approach will strengthen the ongoing efforts of the Government, communities and other stakeholders for augmenting the resilience of mountain landscapes, one of the most vulnerable and fragile eco-regions on earth. Further, such an approach can also help in enhancing the national capacities for identifying the critical gaps in current management practices, planning adaptive management programmes in mountain landscapes, etc. It has very high replication potential too with clear global, national and sub-national level incremental benefits for conservation.

**Mainstreaming biodiversity conservation and utilization in agricultural sector to secure ecosystem services and reduce vulnerability**

This proposed project aims at making Indian agriculture more resilient to climate change while mainstreaming and promoting biodiversity conservation across different agro-climatic zones. This will help in improving the ecosystem resilience; nutritional, food and livelihood security; and, access and benefit sharing capacity for sustainable agricultural production in India. This proposed GEF intervention will develop linkages with the proposed National Mission on Sustainable Agriculture being developed by the Ministry of Agriculture, GoI as part of the NAPCC. The proposed GEF intervention is consistent with BD focal area strategy for GEF 5 cycle.

India is one of the 12 mega-biodiversity countries of the world possessing globally significant agricultural biodiversity (agro-biodiversity) central to the lives and livelihoods of small scale farmers and rural communities. Despite some genetic erosion, most of the traditional landraces of crops and fruit species have been collected and conserved at Indian national gene banks. Additional landraces can still be found with a diversity of traits and qualities including, nutritional status, adaptability to climatic conditions and maturity characteristics. However, substantial threats exist to this genetic diversity.

India has a strong commitment to conservation of biodiversity and its use for sustainable agricultural production and income generation for marginal farmers. India also has well-established research and advisory services. Key organizations within the environmental and agricultural communities have come together and collaborated on a number of specific initiatives. However, agricultural and environmental sectors remain poorly linked in their approach to conservation and are not well coordinated. The different organizations, responsible for different aspects of production, often work in isolation from each other. GEF involvement will support the necessary integration, coordination and collaboration between stakeholders, adding value to the project in terms of linking mainstreaming actions at the community level to wider policy perspectives and initiatives. Climate change adaptation strategies in India are under development, but so far these do not adequately consider the use that can be made of local agro-biodiversity and the need to take specific measures to maximize adaptability, resilience and, where necessary, transformation in production systems. The project will add these dimensions. There will be further environmental benefits in terms of integrated management of agro-biodiversity and the development of specific tools and management practices for providing adaptability and resilience across different agro-climatic zones of India. Linking biodiversity to improved nutrition can be a powerful driver to enhance the conservation and sustainable use of unique biodiversity of global significance. India has a commitment to mobilizing local agricultural biodiversity to address nutritional problems. However, they lack the capacity to carry out the complex cross-sectoral work required to mobilize the nutritional value of biodiversity for its sustainable use and conservation through full integration into national nutritional policies. Without the components proposed in this project, countries risk losing an opportunity for a globally relevant, systematic mainstreaming of biodiversity into nutrition policies and international nutritional guidelines. Ecosystems particularly rich in diversity will continue to face the threat of genetic erosion and the loss of valuable species, and these valuable resources will not be conserved and integrated into addressing Millennium Development Goals to reduce hunger, poverty, and malnutrition. An additional benefit of valuing, conserving and mainstreaming biodiversity for food and wellbeing is that India would directly contribute to the approved COP8 work programme for a cross-cutting initiative on biodiversity for food and nutrition. Furthermore, implementation of the project will also help meet national priorities and will provide means for both organizations and countries to benefit through shared best practices and experiences in the sustainable management of biodiversity.

Further, the proposed project, through its assessment of nutritional and livelihood benefits from local food products derived from the rich agricultural biodiversity in India, will contribute to international efforts to address global food concerns such as the response to soaring food prices across the globe, the effect of globalization of diets on health and the increasing realization of the need for a global assessment of agriculture. These efforts include the CBD's Cross-cutting Initiative on Biodiversity for Food and Nutrition, the Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture, the Implementation of the International Treaty on Plant Genetic Resources for Food and Agriculture, Millennium Development Goals 1 and 7, the WHO/FAO strategy on Fruits and vegetables and Diet related Chronic Diseases; and the UN Standing Committee on Nutrition's Call to Combat the Double Burden of Malnutrition. Through its establishment of cross-sectoral policy platforms to promote the mainstreaming of biodiversity, the proposed project will create synergies among these global initiatives and will provide linkages with national programmes. Synergies will also be developed with FAO's programme of work in nutrition, which incorporates biodiversity.

Some of the proposed components of this project are:

1. Mainstreaming adaptive management that enhance food and nutrition security while maintaining ecosystems functioning and resilience
  - Diverse sets of varieties identified using GIS and climate modelling tools adapted to buffer against unpredictable temperature and precipitation change across six climatic zones.
  - Participatory variety selection programme in place that use suitable local and introduced diversity to produce cultivars that are superior in marginal environment and at the same time continue to have wide genetic base.
  - Strengthened supply of important local cultivars by national genebanks back to farming communities.
  - Local genetic resources and knowledge included in national extension packages and local seed system strengthened.
2. Develop policies and regulatory frameworks for mainstreaming biodiversity across environment, nutritional and development programmes
  - Documentation of loss of options for food and nutritional security resulting from the degradation of the targeted ecosystems and erosion of biodiversity loss.
  - Database on traditional knowledge on sustainable use practices for agricultural biodiversity including neglected and underutilized species that are important to local food system and nutritional security.
  - Income generation options through the sustainable production, processing and marketing of biodiversity foods with high nutritional value for low income rural producers.
  - Training modules on best practices for ecosystem service programmes that can be adapted for use across the six climatic zones of India and more widely.
  - Improved capacity of producers, processors, users and researchers to deploy and benefit from agro-biodiversity.
  - Cross-sectoral national policy platforms with incentives (market and non-market) for mainstreaming biodiversity into nutrition and agriculture programmes.
  - Documentation and dissemination of tools and methods for mainstreaming biodiversity activities that can be up-scaled and adapted for use in other local, national and regional circumstances.
3. Promoting and enabling environment for access and benefit sharing of local agricultural biodiversity planting materials
  - Ecosystem services from agricultural biodiversity management practices valued and utilized in agricultural extension packages.
  - Leadership and capacity built to enable a higher level of involvement of indigenous and local communities in local and national decision-making fora.
  - Information system in place that is applicable for indigenous and local communities for data access and data sharing on locally adapted materials.
  - Increased national release and registration of farmers' varieties with Protection of Plant Varieties and Framers' Rights Authority (PPVFRA) of India.
  - Recommendations to put policies and laws in place that ensure access to local crop biodiversity is compatible with national laws promulgated to comply with international treaties.

### **Mainstreaming conservation and use of wheat biodiversity through public-private partnership**

The project objective is to mainstream wheat diversity and enhance its use through change in production and business practices involving public-private partnership, such that the wheat diversity is being conserved in its production landscape, provide greater long-term stability to all value-chain participants and increases income for smallholder farmers for their better livelihoods. The project will work across major wheat growing states of India.

Wheat is pre-eminent among the world's crops in regard to its antiquity and its importance as a staple food of mankind. In prehistoric times, it was cultivated throughout Europe and was one of the most valuable cereals of ancient Persia, Greece and Egypt. India, one of the greatest success stories of Green Revolution, is the second largest producer of wheat in the world after China and contributes more than 12% of the global wheat basket. Wheat is the second most important crop after rice in India and occupies approximately 27.8 m ha area under cultivation. On the other hand India is also second largest wheat consumer after China. Thus wheat and its various products play an increasingly significant role in managing India's food and nutrition security at the same time income source of millions of marginal farmers. The technological advancements have made India the wheat surplus nation as against wheat deficient nation during 1960's.

Wheat in India is cultivated in almost every state except Kerala, thus representing diverse crop growing conditions and situations. The wheat species grown on commercial basis in India are of spring type but cultivated during winter season. Among the wheat species, *Triticum aestivum* (Bread wheat), *Triticum durum* (Macaroni wheat), and *Triticum dicoccum* (Emmer or Khapli) are grown in India. Of these species, *T. aestivum* continues to be the most important species accounting about 95% of total wheat production of the country and is grown in almost all wheat growing states. *T. durum* is next in importance with approximately 4% of total wheat area and confined to central and southern parts of India. It is primarily grown under rainfed conditions but in recent past, its cultivation under high fertility and irrigated conditions has extended its cultivation in new areas of Punjab based on increase market demand of its products. The cultivation of *T. dicoccum* is confined to the southern region mainly Karnataka and southern Maharashtra that contributes less than 1% of total national wheat production. The Indian wheat improvement programme has contributed to the release of 373 varieties suitable for different agroclimatic zones along with relevant production technology. These include 316 bread wheat, 49 durum wheat and only 5 dicoccum varieties. Beside this, 119 wheat genetic stocks have been registered with National Bureau of Plant Genetic Resources (NBPGR) and are available for use for Indian national programmes. The increasing trend of wheat productivity in Northwest Plain Zone (NWPZ) has now reached to the saturation level which is a major concern for enhance wheat production and income generation for wheat farmers in the country. At the same time wheat is sensitive to high temperature (both early and late heat) but magnitude of damage depends on the existing ambient temperature, stage of crop development and variety. The rise of temperature during December, the period of tillering and subsequent higher temperatures above 30°C during February and March at the stage of anthesis, grain formation and filling has led to decreased productivity during the last 4-5 years. Therefore, the existing yield plateau coupled with changing climate variation in main wheat growing areas is a major concern and enhanced efforts are needed to break this yield barriers. In this context, use of genetic diversity will continue to be the key factor and new approaches need to be adopted for both enhanced productivity and diversifying its products for better market value, both for domestic and international.

Regarding wheat products a number of physical and biochemical parameters are associated with the quality of wheat. The quality requirements differ for various products like chapatti, bread, biscuit, and pasta. Hard wheat with strong gluten is required for making good bread, whereas weak and soft wheat low protein and weak gluten is required for biscuits industry. Good pasta products can be prepared from hard durum wheat. Based on these quality wheat varieties for different products, a wheat quality atlas of the country was prepared by national research programmes and potential regions have been identified for products specific varieties.

There has been great concern in the recent years regarding the efficiency of marketing of agriculture produces in India. It is believed that poor linkages in the marketing channels and poor marketing infrastructure are leading to high and fluctuating consumer prices, and to only a small proportion of the consumer rupee reaching the farmers. In this context, Contract farming is emerging as an important form of vertical coordination in the agrifood supply chain in India, and its socioeconomic consequences are attracting considerable attention in public policy debates.

The Public-Private Partnership (PPPs) are also viewed as an innovative vehicle for achieving sustainable development objectives such as those outlined in the Millennium Development Goals (MDGs). Agribusiness companies are developing new models to reach out to farmers and consumers, providing new technologies,

investing more in modern supply chains and in organized food retailing that sells more and more processed food. Improved rural infrastructure is also playing a key role behind the agri sector's comeback trail. With better rural infrastructure, is comparatively easier and cost-effective to bring farm produce to the market. In the back ground of above scenario, the project will focus to identify suitable wheat varieties and landraces with specific products traits and trait combinations and suitable in different agroclimatic zones of India. These identified varieties/landraces will be further tested for quality products with high market values, both domestic and export, and will deploy on-farm and will link its marketing with public-private partnership. This approach will help to bring the traditional wheat varieties back to farming system, which in turn will lead to sustainable conservation and use and income generation for small and marginal farmers in the country.

Global environment benefit (in accordance with GEF 5 focal areas strategy and relevant CoP decisions): The proposed proposal is consistent with FA Objectives 2 (Mainstreaming biodiversity conservation and sustainable use into production landscapes, seascapes and sectors).

Linking with national priorities: India has a long history of conservation measures and sustainable use of natural resources. Formal laws, policies and programmes for conservation and sustainable utilization of bioresources date back to several decades. Over the years, India has developed a stable organizational structure and a strong legal policies framework for protection of environment in the country. India is a Party to the Convention on Biological Diversity (1992), recognizing the sovereign rights of States to use their own biological resources and recognizes contributions of local and indigenous communities to the conservation and sustainable utilization of biological resources through traditional knowledge, practices and innovations. It provides for equitable sharing of benefits with such people arising from the utilization of their knowledge, practices and innovations. Pursuant to the CBD, a first major step was the development of the National Policy and Macro level Action Strategy (1999) that called for consolidating existing biodiversity conservation programmes and initiating new steps in conformity with the spirit of the convention. This was followed by the implementation of a United Nations Development programme (UNDP)/ Global Environment Facility (GEF) for the preparation of National Biodiversity Strategy and Action Plan (NBSAP). Besides a number of policy mechanisms as relevant to the Convention include National Forestry Policy, National Agricultural Policy. National Seed Policy, Marine Fishing Policy, National Environment Policy, National Biotechnology Development Strategy, The Protection of Plant Variety and Farmer's Rights Act (PPV & FRA) and National Action Plan on Climate Change has been brought into public domain for implementation. After an extensive and intensive consultation process involving the stakeholders, the Indian Government enacted the Biological Diversity Act, 2002 with the following salient features: (i) to regulate access to biological resources of the country with the purpose of securing equitable share in benefits arising out of the use of biological resources and associated knowledge relating to biological resources; (ii) to conserve and sustainably use biological diversity; (iii) to respect and protect knowledge of local communities related to biodiversity; (iv) to secure sharing of benefits with local people as conservers of biological resources and holders of knowledge and information relating to the use of biological resources; (v) conservation and development of areas of importance from the standpoint of biological diversity by declaring them as biological diversity heritage sites; (vi) protection and rehabilitation of threatened species; and (vii) involvement of institutions of state governments in the broad scheme of the implementation of the Biological Diversity Act through constitution of committees. The Government of India also recognizes the problem of malnutrition which is particularly acute in India and the need to address it by providing nutrient rich food products. India currently carries almost half of the world's burden of children who are chronically undernourished. Food-based approaches to solve this burden are becoming critically important as a part of the solution.

There is no overlap between the Biodiversity Bill and Plant Varieties Protection (PVP) Act. The scope and objectives of these two legislations are different. The PVP legislation accords intellectual property rights to a person for developing a new plant variety. On the other hand, the Biodiversity Bill is primarily aimed at regulating access to biological resources and associated knowledge so as to ensure equitable sharing of benefits arising from their use.

The India Forest Act and Forest (Conservation) Act deal with management of forests and conservation of forestland, respectively. The Wildlife (Protection) Act is for the protection of wild animals, birds and plants, and basically aims at protecting, propagating or developing wildlife or its environs through national parks, sanctuaries etc. In addition, the Act has a provision to prohibit picking and uprooting of specified plants. In the context of Public-Private Partnership, the Confederation of Indian Industry (CII) is shifting focus to public-private partnership in agriculture. Pushing many states for passing the Agricultural Produce Marketing Committee (APMC) Act. This will reduce the dependence of farmers on mandis and middlemen. Contract farming and crop diversification are other issues are being worked out. Pepsi is a good example, where the company went into contracts with farmers in Punjab for growing tomatoes for commercialisation purposes. The CII are conducting many “Agro-Tech expo” to showcase agri-services and capabilities in dairy, food, farm technology, poultry, and livestock. This is expected to generate both interest and investment in the sector. According to CII, the surge in private investment is due to increased demand for food and other agricultural commodities. With the income level rising, demand for milk, meat or fish, fruits and vegetables is also increasing. With more urbanisation, Indian families also consume more processed foods, more ready-to-eat foods, etc. India is becoming a medium-sized agricultural exporter, selling tea, fish, spices and now rice and wheat to foreign countries. According to CII, smart businesses have realized that it is a growing opportunity to be present in any part of the agricultural value chain, which has led to more investment not only by big companies but even by first-generation entrepreneurs. Indian farmers are learning to take on the challenge of producing better quality produce at internationally competitive prices. They are willing to use new technologies, and become organized. It is believed that agricultural reforms and increased private investment must, benefit farmers, especially small farmers. 'The Indian Farmers and Industry Alliance' that the CII has set up to bring companies and farm leaders together is only the first step to greater cooperation between these two natural allies. This development was a significant step towards bringing the farmers and corporate sector together.

The proposed project is fully consistent with the above national commitments and directly addresses its concern with the promotion of the increasing use of agrobiodiversity, strengthening capacity to support maintenance of agrobiodiversity, enhancing benefit-sharing and the promotion of conservation and use, particularly with consumption, through sustainable management. The project will support India to accelerate the implementation of the national priorities and policies outlined above, including those highlighted in the India’s National Action Plan on Climate Change (NAPCC). The NAPCC reflects the importance given by the Indian government to the maintenance of diversity in production systems, livelihoods and income generation and related policy development, which is further enabled through the three components of this project.

Project outcomes: The following project outcomes are expected:

Outcome 1: Increase in sustainably managed landscapes and seascapes that integrate biodiversity conservation.

Outcome 2: Measures to conserve and sustainable use biodiversity incorporated in policy and regulatory frameworks.

Project activities: The key project activities includes:

- Identification of key market products, both for local, domestication, and international consumption.
- Identification of suitable quality genetic traits required for these products
- Screening of wheat varieties and landraces and identification of trait specific varieties
- Identification suitable climatic zones for the cultivation of these selected varieties
- Identification promising nodal farmers who are willing to undertake growing of these varieties with contract farming
- Establishment of public-private partnership for marketing of various products.
- Implementation of project activities at project sites
- Identification of market potential for each product
- Strengthening farmers and local communities capacity for processing products
- Establishment of local seed bank and strengthening local seed system

The project supports the biodiversity focal area BD-2: “Mainstreaming Biodiversity Conservation and Sustainable Use into Production Landscapes, Seascapes and Sectors” of the GEF-5 strategy.

UNEP’s comparative advantage derives from its mandate to coordinate UN activities with regard to the environment, including its convening power, its ability to engage with different stakeholders to develop innovative solutions and its capacity to transform these into policy- and implementation-relevant tools. UNEP’s comparative advantages in the GEF are aligned with its mandate, functions and Medium Term Strategy and its biennial Programme of Work (2010-2011 and 2012-2103). The proposed project is consistent with the following 4 of 6 thematic priorities outlined in UNEP’s Medium-term Strategy: Ecosystem management, Environmental governance, Climate change, and Resource efficiency. Functionally, the projects is aligned with the following mandates as described in UNEP’s Programme of Work 2010-2011: Assisting science-based inventories and assessments (at the global, regional and national scales), and building capacity for environmental information management and decision support systems, as well as providing early warning of emerging issues; Providing environmental policy advice based on sound science, through among others stronger mainstreaming of environment into other sectors; Delivering technology support and capacity building services in line with country priorities, including innovative methods, tools and technologies; Institutional capacities; demonstrating best practices; Barrier removal for market transformation; and Awareness raising, knowledge generation/dissemination, and environmental education. This proposed project is in line with UNEP’s role in the GEF to catalyze the development of scientific and technical analysis and advancing environmental management in GEF-financed activities. In particular, the project further complements UNEP’s aim to promote specific methodologies and tools that could be replicated on a larger scale by other partners.

### **Increase Capacity to Develop and Demonstrate Adaptive Management Tools in Sustainable Land Management in India**

India has a total geographical area of 328.2 million hectares (mha) with drylands covering 228.3 mha (69.6%) of the total land area. Within the drylands, arid area is 50.8 mha (15.8%), semi-arid is 123.4 mha (37.6%) and dry sub-humid is 54.1 mha (16.5%). It is estimated that about 32% of India’s total land area is affected by land degradation and 25% is affected by desertification. The degradation of these lands adversely affects the country’s ecosystem health, economy and most importantly the livelihood and food security of millions of rural as well as urban households.

There is a need to regularly monitor scientifically the trend of land degradation in the country so that timely interventions could be initiated at the national level as well so as to reflect the same in performance and impact indications, during National reporting to UNCCD. India has already reported to UNCCD, under Performance Review and Assessment of Implementation System (PRAIS) in 2010, for 4<sup>th</sup> National report, submitted in 2010. In the 4<sup>th</sup> national report submitted to UNCCD, India reported report on 14 of the 18 performance indicators of the 10 year strategy. Every 2 years the Parties are expected to report on performance indicators and every 4 years on the 11 impact indicators. India’s 5<sup>th</sup> National report to UNCCD, during which impact indications are also to be reported, is due in 2012.

The national level environmental monitoring system of India covers the monitoring of Desertification, Land Degradation and Drought (DLDD), which needs to be strengthened to address the diverse and dynamic challenges. The institutional and human capacity needs to be build, strengthened and regularized at different levels to plan, program, implement, monitor and report on DLDD issues in a holistic manner.

In view of the above, the proposed GEF intervention aims at enhancing the capacity to develop, adapt and implement adaptive management tools for the sustainable land management in the country. This proposed project is in alignment with LD focal area strategy for the GEF 5 cycle.

Some of the main components are as follows:

Component: I

- Enhance institutional and human capacity to revise align and update India's National Action Programme (NAP) on land degradation and desertification, which was developed (2001), in the context of national needs, priorities, changing dynamics as well as UNCCD's 10 year strategy (2008 – 2018);
- Enhance institutional and human capacity for aligning national reporting with UNCCD 10 year strategy while mainstreaming synergy with CBD and UNFCCC at the national level. This will also include developing and strengthening capacity for results based-monitoring of UNCCD action programs (develop baseline on targets and indicators) both at the national as well as state level while developing a robust monitoring network on DLDD issues;
- Developing Desertification Status Mapping of India on 1:50,000 scale using satellite based remote sensing with the collaboration of 16 to 20 institutions/ agencies across the country. This will be a state wise Atlas of Desertification Status Maps (DSM) and a comprehensive report;
- Undertake the economic assessment of DLDD to promote the better land use science, policies and enhance funding for DLDD concerns both at the national as well as international level;
- Piloting institutional mechanism for dissemination and capacity building to improve decision making for holistic planning in sustainable land management through integration of soil and water conservation technologies and improved livelihood options; and,

Component: II

- Mainstream Sustainable Land Management practices with ongoing / proposed major Government of India projects/ programs on providing employment and poverty alleviation like National Rural Employment Guarantee Program (NREGA). In 2011 -2012 Union budget, a total allocation for key rural development programs is Rs 74,143 crores of which NREGA is receiving Rs 40,000 crores;
- Pilot sustainable land use planning at village level for management of natural resources and livelihood enhancement; and,
- Pilot innovative agro-ecosystems in drylands to reduce vulnerability to climate change, reduce pressure on natural resources, from competing land uses in the wider landscape and improving livelihood options.

This project is submitted as a sub project of WB/ GEF India's Sustainable Land and Ecosystem (SLEM) Country Partnership Program of GEF 4. The project will also draw lessons and develop appropriate linkages with FAO's Land Degradation Assessment in Drylands (LADA) project. This project will also strengthen the implementation of the National Water Mission, National Mission for Sustainable Agriculture and Green India mission – 3 of the 8 national missions of National Action Plan on Climate Change launched by Government of India.

### **Integrated Ecological Management of the Lakshadweep Sea**

The project aims

- (a) To support regional collaborative institutional mechanisms for improved ecological management of the Lakshadweep Sea;
- (b) To support establishment of initial knowledge, capacity and demonstration investment such that the health of the Lakshadweep Sea and its marine resources are protected, and such that the livelihood and wellbeing of the large dependent communities are sustained.

The Lakshadweep Sea, located in the eastern corner of the Arabian Sea, is one of the world's most ecologically important, and stressed, bodies of water, and important to Maldives, Sri Lanka, and India. The limits<sup>6</sup> of the

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<sup>6</sup> International Hydrographic Organization (1953)

Lakshadweep Sea includes parts of the *Konkan* coast and *Malabar* coast in India, the entire Lakshadweep and Maldives archipelagos, all west coast of Sri Lanka including all southern atolls, and the Adams Bridge between India and Sri Lanka.

Biodiversity: The Lakshadweep Sea (surface area 786,000 square kilometers, average depth 1,929 meters and maximum depth is 4,131 meters) is one of the few warm seas of the World, with water temperature rather constant throughout the year, averaging 26-28 degrees in summer and 25 degrees in the winter. Because of this constant and warm temperature, the Lakshadweep Sea supports enormous endemic biodiversity.

The Lakshadweep archipelago forms the northern most segment of the Chagos – Maldives – Laccadive oceanic ridge, and has 36 islands, 12 atolls and 5 submerged sand banks – all surrounded by 4,200 square kilometers of lagoon rich in marine wildlife including 603 species of fishes with abundance of tuna fishes and giant clams, 97 species of echinoderms, 424 mollusks, 45 crustaceans, 7 sea grasses, 91 sponges and 91 species of hard corals.

On the mainland India, the tropical marine ecosystems of *Konkan* and *Malabar* coasts include lagoons, mangrove swamps, sandy and rocky shores and open sea front. The 590 kilometer long *Malabar* Coast in particular is endowed with beaches, estuaries and lagoons; interspersed with extensive backwaters; and the richness is denoted by pearls, copepods zooplanktons, foraminifers, radiolarians and 291 species of phytoplankton, sea grasses in small shallow beds, the *Halophila ovalis* mangroves – all of which in turn support some 300 species of fish, 300 species of mollusks, 80 echinoderm, 25 sea weeds, 177 species of migratory birds, abundant oil sardines (*Sardinella longiceps*) and *Fragilaria oceanica*. The Gulf of Mannar is regarded as one of the richest marine biological resources in the World; and is protected in India as a Marine national Park covering an area of 10,500 square kilometers of ocean, islands and adjoining mainland coasts. The reported diversity of the Gulf of Mannar includes about 110 square kilometers of mangroves, 112 square kilometer of corals supporting 802 species of fishes, 7 turtles, 1008 sponges, 13 sea grasses, 33 sea fans, 27 soft corals, 99 echinoderma, 140 crustaceans, 240 mollusks, 11 sea snakes, 4 dugongs, cetaceans and pearls.

The Sea around Maldives is naturally known to host many levels of from planktons to sharks. The reported diversity includes 1000 species of fishes, 5 turtles, 51 echinoderms, 241 species of corals, 5 sea grasses, 285 species of algae. The western coasts of Sri Lanka are equally bio-diverse, even if the exact share of the western coast among the richness of the offshore areas of Sri Lanka is not known. It is anticipated that the west coasts have a substantial share of 350 species of marine and ornamental fishes, 210 crabs, 10 shrimps, 5 turtles, 13 snakes, 38 mammals, a few dugongs, 171 corals and 390 species of birds that are found in offshore of Sri Lanka.

Economic values and dependence for livelihood: There are about 48.9 million people living in low elevation coastal areas and islands of the Lakshadweep Sea, with 38 million (78%) in India alone. Of these, about 2.8 million (1.7 million in India) are fisher persons and depend directly on the ecological health of the Lakshadweep Sea for their entire livelihood. There are 1,081 fishing villages (684 in India) producing about 1.17 million tons of fishes (9.95 million tons or 81% in India). The fish processing, boat making, transportation industries are estimated to employ another 3 million people (2.4 million in India). There are several other occupations, such as in the tourism industry (with number of tourists approaching 1.5 million, 50% in India) which is entirely sea dependent. Some minor but precious occupations include extraction of natural pearls and mollusk shells. The Lakshadweep Sea is a major shipping route, with 6 major ports and 37 other ports located at the edges of the Sea. Overall, one-third of all workers derive their employment from their close dependence on the resources of the Lakshadweep Sea.

Threats and pressures on the ecological resources: Mangrove vegetation in Kerala reduced from an area of 70,000 ha to about 4,200 ha during the twentieth century. Although this decline has been arrested in the last 10 years, this reduction in mangrove cover is a generic indicator of the pressures on the edges of the Lakshadweep Sea. The mangroves and the associates continue to be threatened by land clearing and urban-industrial expansion and high deposition of suspended sediments. In addition, a lot of mangrove cover has been destroyed due to cyclones, floods, notably by the 2005 tsunami. Expansion of plantations of exotics, such as of *casurina*, has also impacted

the quality of the mangroves. Corals of the Lakshadweep Sea are among the most threatened in the World, damaged by bleaching, sedimentation, bio-erosion and coral mining. Additionally, most corals (especially in the Gulf of Mannar) is impacted by uncontrolled flow of untreated municipal sewage and industrial effluents. About 90% of the municipal sewage in the *Konkan* and *Malabar* Coasts and in the Gulf of Mannar is released to the sea without any treatment.

Anthropogenic activities such as unplanned disposal of untreated sewage, industrial effluents and solid wastes, and increased sediments due to unsuitable agricultural and irrigation practices have resulted in very high levels of bleaching, eutrophication and generally worsening health of the phytoplankton and sea weeds. In the recent years, a few “king” species of turtles and dolphins had attracted a lot of attention in India and the other countries; and several government initiatives were initiated. Notwithstanding these initiatives, exploitation of turtles and dolphins continue at alarming rates (particularly because there is no coordination among countries on surveillance and trade), in addition to the ever increasing threats from disposal of wastes, oils and chemicals; impacts from ballast water; pollution from the expanding fleet of low-quality mechanized fishing boats and trawl fishing nets; and unprecedented number of small impacts on nesting sites which when accumulated have large destructive impact on the turtles and dolphins. Similarly, almost all bird nesting grounds (except for possibly the interior lagoons in remote islands) are experiencing increased pollution loads. On the whole, all of these have very direct dwindling impacts on the fishing sector, on which 10% of the people depend directly or strongly for their livelihood. Recent studies have pointed out the rapid reduction in fish catch, especially in the near-shore areas. The mechanized fishing sub-sector could probably suffer less, by venturing into high seas and by building high sea fishing infrastructure. However, impacts are and will be much adverse for the people who practice the traditional fishing practices, are unorganized, and do not have sufficient capital to build capacity and infrastructure to venture into the high seas.

Traditional synergetic relationships are withering away: The traditional communities enjoy a synergetic relationship with the environment and ecology. Specifically in and around the Lakshadweep Sea, such relationship has been augmented over a period of a few thousands of years by seafaring (seafaring had been traditionally very limited on the eastern side of the Indian peninsula) and exchange among the surrounding communities. As much as it is important to conserve the ecology of the Lakshadweep Sea for sustaining the overall economic growth in South Asia, it is also important to support the traditional coastal and island communities such that these communities can use their wisdom and tradition in conserving the sea, the islands and the coasts. If the traditional communities migrate wholesale to non-traditional activities (such what is happening at a few places, where they are rapidly turning into upwardly mobile large real estate developers, or downwardly into daily wage earners in mechanized fishing industry) a lot of harm could happen to the remains of the synergetic relationship that exists.

Incremental uncertainties brought by climate change: Climate change has now exacerbated the pressures on the ecological resources in multiple ways; and also threatening the very existence of the island and the coastal communities. Sea level rise might cause large-scale inundation along the coastline and recession of flat sandy beaches. The ecological stability of mangroves and coral reefs would be at risk. Studies already notice a significant acceleration in sea level in Asia, an average rise of 3.1mm/year over the past decade, compared with 1.7–2.4mm/year over the 20th century. A one meter sea level rise would flood nearly 2000 square kilometers in the India portion of the Lakshadweep Sea alone, and destroy parts of Maldives, Sri Lanka and the Lakshadweep archipelago. Several scientists include an effect of ice-sheet dynamics and suggest a 3-5m rise in sea levels by 2100. Such an increase, if probable, would have a devastating impact on the entire coastal and island communities of the Lakshadweep Sea. Even a relatively moderate rise in average sea level could effectively de-urbanize the Lakshadweep Sea region. Further, the large infrastructure investments in the ports, industries and other facilities are at greater risks due to rising sea levels; and need to be protected including by mangrove and bio-shields.

Sea level rise will affect the communities of Lakshadweep Sea in multiple ways, including the inundation and displacement of wetlands and lowlands, coastal and island erosion, increased storm floods, increased salinity in estuaries and freshwater aquifers, alteration of tidal ranges, as well as change sediment and nutrient transport. Rapid urbanization has led to the enlargement of natural coastal inlets and dredging of waterways for navigation, port facilities and pipelines - all of these exacerbate saltwater intrusion into surface and ground waters. Of course, the areas protected by mangroves, the deltas, the low-lying coastal plains, the coral islands, sand beaches and barrier islands are less likely to be impacted by sea level rise compared to the built up areas. However, these areas and resources are already under stress. Most of the sandy beaches are eroding; the sand dunes are disappearing due to anthropogenic activities, such as the stoppage of supply of freshwater and sediments in the coastal estuaries. All such degradation of coastal ecosystems will aggravate the climate change induced sea level rise, by increasing shoreline retreat, or by coastal flooding. The combined extreme climatic and non climatic events have already caused coastal flooding resulting in substantial losses and fatalities. The frequency of cyclonic events has increased by 100% over the Lakshadweep Sea over a period of about 100 years (1877-1998). Salt water is reported to have penetrated 50km or more inland on the *Malabar* Coast along tributary channels during the dry season. Climate change has the potential to exacerbate water resource stresses in all islands and coasts, reducing arable land area and food supply for fish.

The most vulnerable communities will include those having maximum exposure to the stresses as well as those with the least capacity to respond and ability to recover. The physical changes will themselves take place in abrupt, non-linear ways as thresholds are crossed. In turn, the least resilient communities (e.g., those dependent on subsistence fishing) will be the first to experience 'tipping points' in their life systems, so that the only livelihood option available to them will be to abandon their homes and search for better prospects elsewhere.

Need for an integrated management approach: India has now adopted a sustainable and integrated management approach to the management of the coastal and the marine areas, and the required action to build national capacity is underway. However, given the challenges of resources and capacities, as well as the acute need to build capacities and institutional arrangements that work across sectors and levels of governance, the initiatives have focused on small areas in the Sundarban and Bhitarkanika mangrove ecosystems (on the Bay of Bengal) and the Gulf of Kachchh. These initiatives are supported by World Bank financing. Additional and separate focus on the Lakshadweep Sea will be required if the livelihood of the 10 million strong coastal and island communities need to be guaranteed.

Current Initiatives for integrated management of coastal and marine areas: The World Bank support for the INDIA Integrated Coastal Zone Management Project includes: (i) map and delineate a hazard line and the ecologically sensitive areas as a basis of preparing integrated management plans for all coastal zones in the country; (ii) help build capacity in integrated coastal zone at state/national level, including setting up of a national coastal zone management institute; and, (iii) invest in promoting state level approaches to integrated coastal zone management. Similarly, in Maldives, the Environmental Management Project financed by the World Bank is supporting improved governance of coastal and marine resources through: (i) establishment of a regional solid waste management program; (ii) strengthening the regulatory and community capacity for environmental management; (iii) expanding the knowledge base for monitoring critical marine resources, such as fisheries and coral reefs; and a (iv) regional strategic environmental assessment. In addition, India is helping, including grant financing; the Maldives based SAARC Center for Coastal Zone Management to prepare adaptation strategies for part of the Lakshadweep Sea.

This Project is clearly and distinctly related to the stated objective of the GEF in the focal area of International Waters. The proposal includes:

- (a) Promotion of collective management of the Lakshadweep Sea while considering climate variability and incremental changes;

- (b) Preparing a platform for subsequent implementation of the full range of policy, legal, and institutional reforms and investments contributing to sustainable use and maintenance of ecosystem services of the Lakshadweep Sea. Such a platform is aimed to catalyze cooperation to rebuild and enhance marine fisheries and pollution of coasts and marine areas;

It is important to note that India has already initiated the process of policy and legal reform; and will take lead in setting up the institutional arrangements and capacity that would be needed by all countries of the Lakshadweep Sea. India will also take lead in piloting management of catchments of important estuaries, such as the Vembanad Lagoon and the Gulf of Mannar landscape, so that these examples could be replicated by all countries eventually.

Apart from the above, the proposed activities have a focus on vulnerable coastal and island communities, and will promote the communities institutions to take leadership roles; consistent with the long-standing GEF focus on sustaining community well being dependent on international waterways. Likewise, this proposal clearly emphasizes concerns related to coastal climatic variability, sea-level rise, ocean warming, protection of coastal carbon sinks as well as ecosystem resilience that will be addressed, especially by helping building capacity of community institutions for integrated management.

Management of marine and coastal areas is one of the declared national priorities. The National Environment Policy, 2006 (NEP) stresses the need for an integrated approach to coastal environmental regulation and preparation of ICZM plans. The NEP recognizes the need for technical and financial support for the states for preparation of ICZM plans. The NEP also recommends (i) mainstreaming sustainable management of mangroves into the forestry sector regulatory regime, ensuring that they continue to provide livelihoods to local communities; (ii) dissemination of available techniques for regeneration of coral reefs, and support for activities based on application of such techniques; (iii) explicit consideration of sea-level rise and vulnerability of coastal areas to climate change and geological events, in coastal management plans, as well as in infrastructure planning and construction norms; (iv) adoption of a comprehensive approach to integrated coastal management by addressing linkages between coastal areas, wetlands, and river systems, in relevant policies, regulation, and programs; and, (v) development of a strategy for strengthening regulation, and addressing impacts of ship-breaking activities on human health, and coastal and near marine resources. Most aspects of these are included in the Climate Change Missions in India.

Initially led by the Prime Minister's Office, the Ministry of Environment revised the regulatory processes and arrangements for managing the coastal and marine areas. The Coastal regulation Zone Notification, 2011 is based on the twelve guiding principles for management of coastal and marine areas recommended by Prof. Swaminathan Committee: (i) ecological, cultural, livelihood and national security; (ii) integration of sea bed and landward areas; (iii) participatory and sustainable coastal zone management; (iv) protection and sustainable development of the marine and coastal environment and resources; (v) scientific and ecological principles and safeguarding natural and cultural heritage; (vi) precautionary approach for potential threats of serious or irreversible damage to ecologically fragile critical coastal systems and to living aquatic resources; (vii) non-acceptance of significant or irreversible risks and harm to human health and life, critical coastal systems and resources including cultural and architectural heritage; (viii) gender and social equity as well as intra-generational and inter-generational equity; (ix) 'polluter-pays' principle(s) and 'public trust' doctrine; (x) application of principles contained in the Biodiversity Act 2002; (xi) implementation of actions yielding short and long-term ecological and livelihood benefits; and (xii) cohesive, multi-disciplinary approaches. The objective of the ICZM approaches adopted by India is to protect, with people's participation, the livelihood security of the coastal fisher and other communities and the ecosystems which sustain productivity of the coastal areas while promoting sustainable development that contributes to the nation's economy and prosperity.

It should be seen that the proposed activities are closely related to the national priorities described above.

## Project Outcomes & Activities

It is expected that the project will focus on the following activities:

- (OUTCOME 1)** International collaboration to rebuild marine fisheries and reduce pollution of coasts of the Lakshadweep Sea while considering climatic variability and change.  
The activities will include
- (a) Identification of the marine resources including identification of the stocks of sea grass and sea weeds in the entire Lakshadweep Sea through a partnership of the expert institutions from Sri Lanka, Maldives and India, to be hosted at the Indian National Institute of Marine Biodiversity;
  - (b) Establishment of sentinel sites with collaboration of NOAA, USA. This will support India's joining the international collaborative efforts on sentinel sites and providing inputs to international strategies for adaptation to climate change.
  - (c) Operation of the sentinel sites to contribute to scientific understanding of ecosystem changes; assess impacts on human and estuarine communities; assess capability for adaptation.
  - (d) Preparation of a oil-spill risk management plan, and emergency response plan (levels 2 and 3) for oil spills in the Lakshadweep Sea as a joint initiative of expert institutions of Sri Lanka, Maldives and India, to be coordinated by the Indian National Centre for Sustainable Coastal Management.
- (OUTCOME 2)** Capacity building, targeted and shared research for ecosystem-based management of Lakshadweep Sea  
The activities will include:
- (a) Supporting augmentation of the SAARC Centre for Coastal Zone Management in Maldives (a partnership of the South Asian Countries) in understanding and devising programs related to protection of coastal environmental resources taking into consideration the climate change effects. This support will include: (i) building knowledge partnership with Indian National Centre for Sustainable Coastal Management and other knowledge institutes in the World, particularly focusing on protection of island ecosystems from sea level and temperature rise; (ii) establish knowledge sharing program and platform with national institutes in Sri Lanka and India, (ii) Improved outreach program to SAARC countries including setting-up regular training programs, with training inputs from global knowledge providers.
  - (b) Targeted Research through the Indian National Centre for Marine Biodiversity, in partnership with global knowledge leaders in the respective fields, including (i) life cycle and climate change reliance characteristics of Dolphins and Sea Dugong – two characteristic species signifying health of seascape; (ii) coastal hypoxia; and (iii) regeneration rates for sea weeds and sea grass. This activity will also include dissemination of research results; preparation of policy briefs and technical notes to inform the medium-term legal reform in India with relation to regulations on fishing, use of off-shore water, and overall marine area and coastal zone management.
  - (c) Targeted research through the Indian National Centre for Sustainable Coastal Management, in partnership with global knowledge leaders in the respective fields, on (i) protecting livelihood of the coastal communities, especially focusing on coastal agriculture resilient to sea level and salinity rise, so as to reduce pressures on the mangrove ecosystems, marine habitats, and protected areas of the marine national park; and (ii) mapping the loading and concentration of chemical pollutants including persistent chemicals and toxics in the Lakshadweep Sea. This will also include dissemination of research results; preparation of policy briefs and technical notes for overall management;

but more importantly to build a program for using science and technology as important part of the adaptation agenda in the coastal areas in India and other countries of the Lakshadweep Sea.

- (OUTCOME 3)** Promoting effective management of Lakshadweep Archipelago for conservation coral biodiversity and enhancement of marine fisheries  
The activities will include
- (a) Investments in augmenting the fishing practices and infrastructure in the Lakshadweep islands to prevent damage to crucial marine ecosystems such as coral reefs, and monitoring of the quality of coastal waters;
  - (b) Investment in regeneration of corals, and strategizing up-scaling the techniques for coral regeneration;
  - (c) Investment in improved angling and establishing improved market linkages towards improved sustainable livelihood options and opportunities for the island communities.
- (OUTCOME 4)** Pilot demonstrations of ecological management and pollution reduction in the Gulf of Mannar and the Vembanad Lagoon Catchment.  
The activities will include:
- (a) Pilot investment in improving management of the Gulf of Mannar Marine National Park: (i) improvement of the management practices for the marine national park including better enforcement of the fishing regulations; (ii) identification of the sources of land-based chemical pollution including concentration of persistent toxics; and identification of options to reduce such flows into the marine protected areas; (iii) implementing a plan to reduce flows of land-based chemical pollution to the entire marine protected area.
  - (b) Pilot Investment in catchment management of Vembanad Lagoon including treatment of inflowing sewage; management of chemicals and pesticides in the urban-industrial complexes within the catchment to reduce pollution of the lagoon.

**Sustainability & Replicability of the GEF interventions:** The activities planned under this project fit seamlessly with the ongoing and proposed projects of Government of India (with financing from the World Bank). It is expected that this inter-sectoral collaboration through the existing projects will facilitate not only sustenance of the GEF-financed interventions, but will also ensure replicability, as new initiatives that would be designed by the Governments. The GEF-financed interventions are aiming to establish the necessary policy and institutional mechanism; and once such mechanisms are established, the impacts will be large and explicitly noticeable.

The Bank's experience in India with multiple sectors and agencies will help in demonstrating an institutionally sustainable model, genesis of which will be through the Project, but which will aim for wider replication. Bank is well-placed to bring international knowledge and experience which will be required to strengthen GOI's capacity to conceptualize and implement integrated and ecological management of high seas, such expertise being otherwise limited worldwide. Bank's support will also strengthen GOI's objective in engaging and coordinating the roles of multiple stakeholders, particularly in this case as this initiative will require seamless cooperation among a number of 'Central' and 'State' agencies, each of which have their sector expertise but need strengthening of the ability to work and deliver outcomes across the sectors.

This project will build up on the ongoing INDIA Integrated Coastal Zone Management Project financed by the World Bank; and will be supported by initiatives that will be undertaken by the Government of India while preparing the second ICZM project that will also be proposed to be financed by the World Bank. Experience of preparation and current implementation of the INDIA Integrated Coastal Zone Management Project will be helpful, both in terms of engaging the stakeholders, as well as to use the ongoing canvas of inter-sector cooperation at multiple levels as platforms for basing the ambitious agenda for integrated and ecological management of the Lakshadweep Sea.

The project is consistent with the Bank's strategic focus and Country Strategy (CAS) for the period FY 2009 - 2012 which recognizes that *while India needs to grow to reduce poverty and create employment, it has an opportunity to do so in a way that is sustainable and preserves the country's natural heritage*. Further, the project addresses the specific provisions in the CAS related to "sound environmental management and sustainable use of natural resources", "impacts due to rising sea levels", and "challenge of climate change". The Strategy Outcome matrix of the CAS clearly identifies lending to support coastal zone management and biodiversity conservation, as a priority.

## **II.II CLIMATE CHANGE**

### **Introduction**

India has adopted a low carbon growth path to ensure that Indian economy grows fast and responsibly. Even though our per-capita emissions are low and would continue to be so, we recognize that there are options in our development strategy that could make it less carbon-intensive than at present and we plan to utilize such options. Innovations in low carbon technologies for energy efficiency, renewable energy, urban systems, agriculture and other areas is being pursued through domestic initiatives as well as international cooperation. In 2008, the National Action Plan on Climate Change (NAPCC) was launched by the Government of India (GoI), which identified eight national missions (solar mission, energy efficiency, sustainable habitat, Himalayan eco-system, green India, eco-green agriculture and knowledge) to accelerate development while addressing the climate change related objectives of adaptation and GHG mitigation.

Some of the recent actions (major) being taken by the GoI domestically and voluntarily to respond to the climate change challenge in a proactive manner are as follows:-

1. Reduce the emissions intensity of India's GDP by 20-25% by the year 2020 on a 2005 reference level, through proactive policies. India's Twelfth Five Year Plan, to be launched on April 1, 2012 will have, as one of its key pillars, a low-carbon growth strategy.
2. Concrete steps undertaken to diversify energy fuel mix. 20,000 Mw of solar power generating capacity will be set up by 2022 and the present share of nuclear power in our energy mix, which is 3% today, will be doubled over the next decade. A major market-based programme has been put in place to stimulate energy efficiency. A clean energy cess has been imposed on coal for funding R&D of clean energy technologies, even though coal will continue to play a key role in our future energy strategy. GoI has aggressively expanded the use of natural gas in power production.
3. Elaborate Indian Network for Comprehensive Climate Change Assessment has been set up. This network of some 250 scientists and 120 research institutions has already published India's greenhouse gas inventory for the year 2007. It has recently released a 4x4 assessment of climate change impacts on four key sectors and four key regions of the country for the 2030s, a time frame for which decisive interventions can be made now. This network is soon going to be putting in place a programme for measuring, monitoring and modelling the impact of black carbon which could have climate change and public health impacts.
4. Five of the eight missions of NAPCC focus on adaptation related interventions. The Ministry of Environment and Forests is aggressively pursuing strategies on forestry and coastal management.

### **India and GEF 5 priorities**

The proposed 10 projects for GEF Trust Fund (excluding, SGP India) and 2 projects for SCCF under GEF 5 funding aims to support and strengthen India's initiatives towards achieving low carbon-intensive path of development. These projects will generate both global and local environmental benefits.

The programming (BD, LD, IW and CC focal areas) for the GEF 5 cycle aims to facilitate the implementation and/or achievement of the objectives of most of the eight missions of NAPCC. Under climate change focal area, the focus has been on 3 of the 8 NAPCC missions. The Jawaharlal Nehru National Mission on Solar Energy (JNNMSE) launched in 2010 has the aim of deploying solar energy technologies in the country to achieve parity with grid tariff by 2022 and to achieve a capacity addition of 20,000 MW by then. The National Mission on Enhanced Energy Efficiency (NMEEE) launched recently, over the next five years, is likely to achieve about 23 million tonnes of oil equivalent (MTOE) of fuel savings in coal, gas and petroleum products along with an expected avoided capacity of over 19,000 MW. Moreover, the CO<sub>2</sub> emission reduction is estimated to be 98.55 million tonnes annually. The

National Mission on Sustainable Habitat (NMSH) launched recently aims to make habitats more sustainable through a threefold approach that includes: a) improvements in energy efficiency of buildings; b) promote urban public transport; and, c) management of waste and promoting waste to energy initiatives. There is a need to address the barriers (financial, technical, capacity, policy and regulatory amongst others) and support the effective implementation of these national missions so that the targets and sub targets are timely achieved.

The overall aim of the proposed 10 mitigation projects is:

- To promote demonstration, deployment, and transfer of innovative low carbon technologies;
- To address the barriers and promote market transformation of critical low carbon technologies and systems;
- Capacity building under the Convention; and,
- To support LULUCF and REDD + activities while developing a multi-focal program on forest biodiversity.

The following matrix presents the priority areas for India:

### Programming matrix<sup>7</sup>

S No	Project title (Details at the end of this table)	GEF grant (In USD M)			Co-financing (In USD M)	GEF agency	National executing agency
		STAR CC	STAR BD& LD and Non STAR CC	Total			
1	Small Grants Program	3.0	1.5 (BD) 0.5 (LD)	5.0	TBD	UNDP	MoEF
2	Strengthening institutional and analytical capacities for enhancing the climate change related knowledge base and policy support system including the preparation of the National Communication to the UNFCCC	7.5	0.5 (From FAS)	8.0	40.0	UNDP	MoEF
4	Partial Risk Guarantee Mechanism to Promote the Adoption and Implementation of Innovative Low Carbon Technologies	35.0	X	35.0	150.0	WB	Ministry of New and Renewable Energy (MNRE), GoI and Bureau of Energy Efficiency (BEE)
5	Market transformation and removal of barriers for effective implementation of the state level climate change action plans	6.0	X	6.0	1:4 (TBD)	UNDP	MoEF
6	Network for Climate Change Technology Innovation	10.0	X	10.0	50.0	WB	MoEF & BEE
7	Promoting Energy Management Systems Standard 50001, and Technology Platforms, Benchmarking and Incubators for Innovation in Industry in India	5.0	X	5.0	15.0	UNIDO	BEE
8	Promoting Efficient and Sustainable Bus Transport System in India	10	X	10	1:4 (TBD) MoUD, States and IBRD	WB	Ministry of Urban Development (MoUD), GoI
9	Up scaling access to clean energy for rural productive and domestic uses in India	5.0	X	5.0	60.0	UNDP	MNRE
10	Promoting business models for increasing penetration and scaling up of solar energy in India	5.0	X	5.0	21.1	UNIDO	MNRE
11	Climate Resilience through Community-Based Approaches to Livelihood Adaptation in Semi-Arid States of India	X	25.0 SCCF	25.0	100.0	WB	Ministry of Rural Development (MoRD), GoI
12	Climate Resilient Coastal Protection and Management in India	X	2.0 SCCF	2.0	50.0	ADB	Ministry of Water Resources (MoWR), GoI

<sup>7</sup> About USD 7.5 million of GEF 5 grant allocated to India under CC focal area is under programming and the concepts for the same are not included in this matrix.

## Concept details

### **Strengthening institutional and analytical capacities for enhancing the climate change related knowledge base and policy support system including the preparation of the National Communication to the UNFCCC**

The project aims to strengthen analytical and institutional capacities to enhance the climate change related knowledge base and policy support system in India through scientific analysis, technical assessments and capacity building. The aim is to develop adequate capacities and tools to integrate climate change considerations into the national, sub-national and sectoral development priorities while fulfilling obligations to the UNFCCC. This will also support the formulation and submission of India's Third National Communication (3NC). The project objective is in line with the GEF's climate change mitigation strategic objective (SO-6) under GEF-5: "Enabling Activities: Support enabling activities and capacity building under the Convention.

India has prepared its First and the Second National Communications, and through this proposed full size project intends to prepare its 3NC with the financial assistance from the GEF. 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, strong networking, capacity building and involvement of research organizations. The 2 previous NCs followed the IPCC guidelines as appropriate to developing countries 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 district level. There is scope for further improvement in the application of the guidelines and enhance the scientific rigour of data estimation originating from a large diversity of industries, settlements, natural and socioeconomic systems. There is a need for involving more local institutions, building technical and infrastructural capacities and stakeholder participation in climate change related activities relevant to NC preparation.

The Cancun Agreements have also put additional commitments on the developing countries to increase the frequency of NATCOMs and submit biennial reports on their mitigation activities. This requires significant additional capacity enhancement for compliance.

At the same time, the Indian government has also set up a network-based programme called the Indian Network for Climate Change Assessment (INCCA) that brings together over 120 institutions and over 220 scientists from across the country to undertake scientific assessments of different aspects of climate change. The INCCA has already prepared two path breaking reports on estimation of emissions and the assessment of the impact of climate change on key sectors and regions of India.

This network is expected to undertake critical future activities related climate change scientific and policy support in India. For this, the network has to be further strengthened, nodalized and augmented with institutional support to enable the Government to meet its obligation in terms of frequent NATCOMs – including it is envisaged to support preparation of the Third NATCOM, climate change assessments for adaptation, inventory management system for emissions and monitoring through an appropriate regime of measurements, support and verification. In this context the proposed project aims to develop and establish an institutional structure which will include networks and forums. Subsequently, the MOEF would contribute resources from budget to make it sustainable in the long run.

The proposed project would enable India to prepare improved climate change adaptation and mitigation strategies, enhanced technology transfer for adaptation and mitigation, sustained institutional capacity for developing future national communications and other climate relevant work including an appropriate regime of measurement support and verification. These would enable India to meet the obligations under the UNFCCC and ultimately enable India to shift to a low carbon sustainable development path keeping in mind the primary goals of economic development and conservation of environment and natural resources.

Project activities include three main components:

Firstly, adequate institutional, technical and policy support framework will be established for undertaking climate change actions and capacity building at all levels. This will be based on INCCA network and extended to a climate change node in each state/UT such that the climate change actions can be considered adequately at the national as well as the sub-national levels. This will also draw on the recommendations following a review of the existing institutional arrangements relevant to the periodic conduct of GHG inventory and progress on national actions to reduce GHG emissions conducted during the Second NATCOM and planned under the Third NATCOM. UNDP is also in the process of commissioning a study to work out the mechanics of establishing such an institutional framework and/or centre.

Secondly, a comprehensive capacity building programme will be undertaken to create awareness and establish capabilities to address climate change issues at different levels and range of stakeholders. The detailing of specific activities under the first and second components will be undertaken at the PIF stage.

Thirdly, a detailed Third NATCOM report will be submitted to UNFCCC Secretariat. The report will comprise: 1. India's development priorities, policies and programmes at national and state level, its geography, climate, economy and the climate sensitive sectors and communities. 2. Documented inventory of GHG emissions for energy, transport, industry, agricultural, land-use change and forestry, and waste sectors. 3. Variability maps and vulnerability assessment reports prepared at district level. 3.2 Documented GHG emission scenarios based on Multiple Global climate models (GCM) / Regional Climate Models (RCMs) and climate change parameters at RCM grid level. 4. Documentation on national climate change mitigation policies, including National climate change mitigation and state level climate change action plans and documentation on estimated investment requirements for mitigation measures based on the national and state action plans. 5. Report on the gap analysis and constraints pertaining to access to technologies and technology transfer arrangements, and financial assistance needed for technology transfer and capacity development.

Co financing: The GEF grant requested for this project is USD 11.5 million. A co-financing amount of at least four times the GEF grant is expected from the Ministry of Environment and Forests.

The 2 previous NCs of India were prepared with the support of UNDP in partnership with the Ministry of Environment and Forests, 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 implementing the CC action plans. Synergies between the state action plans on climate change and the 3NC will contribute to improved capacities and better coordination among different stakeholders at the national and state levels.

### **Partial Risk Guarantee Mechanism to Promote the Adoption and Implementation of Innovative Low Carbon Technologies**

This partial risk-guarantee (PRG) facility will address financial barriers to effective deployment of new technologies in Energy Efficiency (EE) and Renewable Energy (RE).

Slow adoption of commercially-available and proven-at-scale alternative energy options can have several factors, not the least of which is higher costs of debt. Financial institutions and commercial banks are averse to investing in projects whose technologies or processes have not been deployed widely due to their perceived higher-risks in construction and operation, leading to higher costs of debt and smaller allocation in their lending portfolios. The

proposed PRG mechanism covers specified technology and associated commercial risks for new technologies in EE and RE that are not usually priced by commercial banks. To help extend the reach of private financing by mitigating perceived risk and encourage private sector involvement in these sectors, this facility will act as a risk-sharing mechanism that will provide commercial banks with partial coverage of their risk exposure, thereby helping investors get lower cost debt. The fund would be available in case of default only, i.e., it will be paid out to participating banks in the event of a loss or default, as specified in the structure of the PRG mechanism. The mechanism is intended to address the key barriers of (i) availability of long term finance at reasonable rates of interest to solar and energy efficiency applications; (ii) build capacity within financial institutions to assess commercial risks in these businesses. Lower cost financing would help make more projects financially viable, bringing advanced renewable energy investments closer to grid-parity faster and reducing payback periods of energy efficiency investments.

Similar risk sharing projects prepared by the World Bank Group in other countries like Chile, Hungary, China, etc. have shown leveraging of four to nine times the guarantee fund. Given India's deep capital markets, a risk-sharing facility that reduces cost of financing would encourage far more capacity installation than direct investments.

Accelerated deployment of low-carbon energy technologies in the rapidly growing Indian economy would help to bring down the trajectory of growth in global carbon dioxide emissions. The Integrated Energy Policy Report, 2006, estimates that India will need to increase primary energy supply by three to four times and electricity generation by five to six times from 2006 to meet the lifeline per capita consumption needs of its citizens and to sustain an eight percent growth rate. The government plans to provide universal access and to increase per capita consumption to 1,000 kWh by 2012. This translates to an installed generation capacity requirement of approximately 800 GW in 2031-32 compared to the installed capacity of 160 GW in 2010 (at 8% GDP growth rate). In the backdrop of this unprecedented growth in energy demand, the Government of India's Nehru Solar Mission (NSM) and National Mission on Enhanced Energy Efficiency (NMEEE) under the National Action Plan on Climate Change have provided policy goals to achieve a higher penetration of low carbon options. The NMEEE aims to increase the energy efficiency of the country by 20% while the NSM aims to achieve solar energy installations of 20GW by 2020. Under the NMEEE, the Bureau of Energy Efficiency (BEE) is currently setting up a small PRG facility, which has been seeded with an initial capital of USD 20 million from the Government's own budget. It is expected that the Gol-funded Phase I of the PRG will leverage EE investments of 30 times<sup>8</sup> the initial corpus value. Phase II of this PRG would be supported with GEF funds.

Large RE capacity investments and enhanced EE equipment in an economy the size of India will bring down unit costs of new technologies for other emerging countries of the world as well, providing for global benefits.

This GEF-supported activity would provide a pool of capital of a total amount of USD 35m that would be leveraged in targeted and selected energy efficiency and renewable energy investments. Indicatively, it is expected that the EE investments would be supported by USD 20m of this amount and RE projects would benefit from the remaining USD 15m. This corpus will be further leveraged by IBRD loans and other sources of finance. From the World Bank Group's experience in similar GEF-supported guarantees around the world, the leverage is expected to be between USD 140m and USD 315m. Given the uncertain nature of investments, India's deep and sophisticated capital markets variation in types of risk that the market might offer for this facility, this leverage can vary substantially, though the upside likelihood is expected to be higher than the downside.

The World Bank Group has vast experience of various kinds of risk sharing instruments like Partial Risk Guarantees and Partial Credit Guarantees across its several entities. Drawing from these global experiences, the India program can magnify the impact of GEF funds using innovative structures. Also given the World Bank's ability to leverage substantial co-financing, it can provide significant investments and leverage additional investments from

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<sup>8</sup> Assuming the payment to be 10% of the PRGF corpus, a debt to equity ration of 2:1, the PRGF would leverage energy efficiency investments which are 30 times the corpus value.

other sources coupled with its substantial on-the-ground expertise, especially in designing PRGs around Energy Efficiency and experience on both the sectors overseas. The World Bank is uniquely placed to demonstrate GEF-based guarantee projects in India, building on its deep financial, private and energy sector engagement in India. The proposed risk-sharing facility would be hosted at the World Bank, providing the comfort of our consistent AAA+ ratings and supranational financial institution status.

### **Market transformation and removal of barriers for effective implementation of the state level climate change action plans**

To support the effective implementation of the State Level Action Plans on Climate Change for select states in India by addressing market barriers for specific energy efficiency and renewable energy related mitigation actions identified during the planning process.

India is pursuing significant climate change relevant actions at the domestic level to address climate change. The National Action Plan on Climate Change (NAPCC) launched in 2008 through its eight Missions provides a multi-pronged and integrated framework for addressing climate change.

While the national Government remains the key player in shaping the climate change policy and creating the necessary institutional mechanism for its implementation, it is evident that involvement of sub-national governments in tackling climate change is equally crucial. The climate change actions would have to be taken at the state and more specifically local levels. Unless adequate actions are taken at the sub-national levels, climate change may become a major impediment to the endeavor of realizing national development priorities. Hence, the state governments are also in the process of preparing State Level Action Plans on Climate Change (SAPCC), which will enable them to address the existing as well as future climate change and reduce the associated risks and vulnerabilities. Recognizing the importance, it is now recommended that all states in India (28 States and 7 Union Territories) prepare their SAPCC in line with the NAPCC objectives and the state priorities. The State governments have been advised to submit the drafts by March 31, 2011 to the Central government. The SAPCCs are intended to be dynamic plan documents which will follow a continuous review process to reflect the latest scientific knowledge, changes and developments happening at the national, state and local levels.

After the preparation of the SAPCCs, the challenge is effective implementation of the state level plans – including designing and implementing relevant programs, well as their monitoring, review and evaluate progress (and adjust their strategy and action plan accordingly). The level of implementation among states will depend on their institutional capacities, enabling policy and incentives structures, technical capabilities and market forces. Diversity will exist among the states depending on the maturity of their markets, investment environment and related barriers (information, technical and institutional). Networking between states and information exchange would be a critical in cross learning between state level institutions and stakeholders.

The proposed project will support the state governments in implementing identified strategic mitigation activities which require extensive market transformation. This will include specific interventions in major GHG emitting sectors such as the critical industrial sectors identified under the National Mission on Energy Efficiency, agriculture, transportation, buildings and municipal services. The project interventions will lead to increased use of renewable energy and energy efficiency technologies.

The focus will be formulation and implementation of pilot projects aimed at mobilization of private and public investment for addressing climate change concerns in accordance with the mitigation strategies identified by the SAPCCs. The project will result in wider adoption of improved technologies, strengthening of supply chain of services and equipment, establishing commercial viability of technologies, improving access to finance and increasing investor interest. The project will involve intra-state capacity building, cross-learning and exchange of

information and technology dissemination to mainstream, implement and monitor climate change actions at the state and local levels.

It is thus envisaged that the GEF supported activities under the proposed project would help effective implementation of the SAPCC. It will kick start the mitigation activities in the selected states in line with the options identified in their SAPCC leading to substantial reduction in emissions intensity. The selection of the states and the areas of interventions that require market transformation and removal of barriers for mitigation activities in the energy sector through pilot demonstrations will be undertaken at the PIF stage based on the review of the submitted draft state level action plans.

The proposed project is clearly in line with the GEF strategic priorities – more specifically CCM-2 and CCM-3 (will be detailed at the PIF stage) as well as the national priorities.

The co-financing for the project, which will be at least four times the GEF grant, will be obtained from the central government and state governments. The SAPCC will include budgetary allocations for specific sector and activities. The GEF project will align itself with specific budgetary provisions once the sectors and states are finalized.

UNDP would also provide a small quantum of co-financing through the MOEF-UNDP project on “Capacity Building for Climate Change” which is currently underway to support states in climate change planning and actions.

There is a need to specify further details which will be provided at the PIF stage. MoEF will be leading the process of selection of the priority sectors and the states based on the review and consultations following the submissions of the SAPCC. The PIF will provide information on specific activities and GHG benefits.

UNDP is supporting the Government of India in coordination for the preparation of the SAPCC across all the states and UTs. UNDP facilitated in developing a Common Framework for the Preparation of the SPACC, and also providing technical support to ten state governments directly in preparation of their plans. The implementation of the plans is only the next logical step in the process of developing low carbon development pathways at all levels. UNDP’s strong partnerships with specific state governments and close involvement with nodal agencies at the state level will enable effective implementation of the proposed project.

UNDP has also facilitated the NATCOM preparation process which has led to enhancement of knowledge base on emission sources and climate vulnerabilities. UNDP is supporting the Government of India as well as the state governments in several initiatives aimed at removal of market barriers to energy efficiency improvements in select energy intensive sectors such as SMEs (such as steel-re-rolling, brick making and tea processing), buildings, transport (including urban transportation and in the Railways sector), and adoption of renewable energy technologies particularly biomass, solar (solar water heaters and solar concentrators) and hydro. The experience and lessons from these initiatives will directly feed into the integrated regional approach envisaged in this project. For instance, the GOI-UNDP initiative on energy efficiency improvements in the commercial buildings sector is aimed at removal of barriers for the adoption of the ECBC (energy conservation building codes), the actual implementation of which will be dependent on actions at the state level.

### **Network for Climate Change Technology Innovation**

The main activity under this GEF grant would be to establish Climate Innovation Network for India. This Network would be seed-funded by USD 10 million using GEF resources, which would be leveraged by Government of India and other donor funds. This network would be the hub for technology development/adaptation, transfer, dissemination and commercialization.

Technology can play a central role in an integrative approach in meeting climate challenges. There is more to successfully deploying a technology, than technical issues. Innovation, the process of translating knowledge to commercial application, is a highly complex and lengthy process and success at this is easier said than achieved. The proposed network would bring different stakeholders together, internationally as well as domestically, at a virtual platform to exchange information about technologies and innovations using market and other mechanisms. It would be an enabler (or enhancer) of networks and ecosystems that are needed for advancing specific climate technologies.

An Indian Climate Innovation network, supported by a GEF grant and initially hosted at the Bureau of Energy Efficiency (BEE), would be based on the following principles:

- successful technological innovation that is underpinned by well-functioning and robust 'systems of innovation' that comprise a range of actors and institutions that support various activities along the innovation chain,
- different countries have different technology needs,
- different technologies may require different kinds of interventions and support, and
- different countries have different innovation gaps/needs (this being a function of the both the local technology needs as well as the local financial, organizational, institutional, market, and policy landscape) and therefore any solution has to be tailored accordingly.

This network would be a facilitator and coordinator that is able to take a bird's eye view of the innovation process specific to a technology. This will allow it to understand the gaps/needs at the various stages of innovation and then help ensure that there are adequate resources (technical, financial, institutional) and processes in place to make sure that there is progress at each stage of innovation. This proposed network would be on the lines of and using lessons from several such innovation centers, like the Bank-facilitated *Consultative Group of International Agricultural Research (CGIAR)*, the UNIDO-UNEP *National Cleaner Production Centers*, the *Baoding National New and Hi-Tech Industrial Development Zone* in China, and the *Centro de Inovacao, Empreendedorismo e Tecnologica in Brazil* (The last two are incubators that also provide a wide range of services and so can be seen as broader 'innovation facilitating' networks.)

The savings resulting from a successful technology transition in emerging economies like India might be substantial, given the IEA estimate that reducing energy-related emissions by 50% in 2050, compared to 2007 levels, would entail additional investments of USD 46 trillion, almost two-thirds of these in non-OECD countries.<sup>9</sup> By working with local organizations, it would build on and enhance developing-country capacity with concomitant long-term gains. Once an eco-system of innovation and technology adoption is seeded, the returns for India and the world would exponential, driving its own growth and momentum.

The required outcomes from this network would include: (a) basic and/or applied research; (b) Technology development and early product prototyping; (c) North-South and South-South technology transfer; (d) market-focused product and business development; (e) early deployment; (f) commercialization. To achieve these outcomes in the long run, market creation activities would need to be initiated through an institutional mechanism.

The activities of this network would include (a) promoting technical research; (b) supporting enterprises by helping them procure finance to develop products or setting up manufacturing facilities; (c) designing policies, business models and financial instruments to assist the development and diffusion of technologies under local market conditions; (d) providing a platform for sharing of practices and experiences locally as well as with CICs in other countries and regions; (e) coordinating the actions of various stakeholders like governments and financial institutions to promote policies and financial instruments, even as products are being developed and refined.

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<sup>9</sup> Energy Technology Perspectives 2010, IEA/OECD: Paris (2010).

The GEF resources would support (a) identification of innovation needs for specific applications; (b) technical assistance for innovations; (c) partial support for first few pilot projects; and (d) capacity building for the Centre and for the private sector involved in innovation. Each industry has a unique set of needs; the knowledge network will streamline the processes for better financial growth and reduction in energy use and CO<sub>2</sub> emissions. Given the nature of the intervention, it is too early to estimate the CO<sub>2</sub> emissions reductions.

With substantial proven technical, economic and international collaboration expertise across the world, the Bank's support will provide the initial impetus to bring several stakeholders networks like industries, universities, innovators and financiers together to foster early cooperation. Harnessing skills and innovation for climate development would build on the Bank's traditional strengths to pull together resources in order to achieve higher-order outcomes.

### **Promoting Energy Management Systems Standards 50001, and Technology Platforms, Benchmarking and Incubators for Innovation in Industry in India**

To enhance energy efficiency of Indian industries in the selected industrial sub-sectors through energy benchmarking and promotion of energy management system based on ISO 50001, adoption of system optimization and technology innovations.

India is one of nations with a fast growing economy and energy demand. Indian industry grew well above 9% in the year 2009-10 in line with recovery in its economy following the world financial crisis in 2008. The share of industry to the GDP remained around 28% in the last three years from 2007-08 to 2009-10. Indian industry consumed 38% of the total final energy consumption in 2007 and became the fourth largest industrial energy consumer behind China, the US and Russia. The industrial final energy mix is led by coal followed by oil, biomass and waste, electricity and natural gas.

Recognizing the importance of energy efficiency in terms of its role that can play on lowering energy consumption and reducing carbon emissions, the Government of India and various state governments have taken a number of policy measures to promote the adoption of energy efficiency. The Government of India has enacted the Energy Conservation Act, 2001 which provides the legal framework, institutional arrangements and regulatory mechanisms at the Central and State Government levels to upscale energy efficiency adoption in the country.

In June 2008, the Government of India released the 'National Action Plan on Climate Change' (NAPCC) to address both development and climate-related objectives. It is being implemented through eight National Missions, one of which is the 'National Mission for Enhanced Energy Efficiency'. This Mission specifically focuses on enhanced energy efficiency, and attaches importance to the development and use of new technologies as well.

Due to increasing energy demand accompanying industrial development and increasing greenhouse gas emissions arising from fossil fuel combustion in industry and power consumption, the Government of India is concerned about inefficiencies with the way industry currently uses fuel and power. It still remains a challenge to translate the government policies into actual action at the ground levels.

While widespread deployment of best available technology and practices is important, this alone is not sufficient to achieve a substantial acceleration of industrial energy efficiency. New technologies must be developed and technologies must be transferred from abroad. Technology platforms constitute a policy instrument that has been widely deployed in Europe. Technology developers, supply industries and users cooperate as to develop a conducive framework, exchange ideas and develop suitable technologies. Benchmarking is an important tool to assess and compare present status of performance, technologies and processes in selected industrial sectors with that of best technologies and practices world-wide. Incubators are cells within Technical Universities that work on

making technologies suitable for application in India and help to overcome industrial companies and clusters to overcome technical efficiency barriers.

As in other countries, both markets and policy makers in India tend to focus more on individual components despite of the larger energy savings potential in a system approach. Energy efficiency programs have not delivered comprehensive capacity building focused on the industrial sector. There is limited implementation of energy efficiency programmes/projects by the industrial enterprises leading to limited penetration of energy efficiency measures, technologies and systems.

The generic barriers to adoption of industrial energy efficiency options are listed below:

- The industry management emphasizes more focus on production and energy efficiency is not a core mission for them resulting less commitment from management on the promotion of industrial energy efficiency.
- There is lack of information about available options, best practices, and benchmarks within enterprises.
- Industrial markets focus on components rather than systems.
- There is a limited access to financial services to support industrial energy efficiency investment projects.
- There are limited government financial incentives to support industrial enterprises on the uptake of industrial energy efficient options.

The implementation of energy benchmarking, energy management systems based on ISO50001 and system optimization projects on steam, compressed air and pumping systems will lead to a reduction of energy usage and thereby lower greenhouse gas emissions through the avoided use of fossil fuels.

The project is consistent with the Government of India's National Action Plan on Climate Change (NAPCC). The NAPCC outlines steps that will be taken to address both development and climate-related objectives in keeping with regional and global priorities in reducing fossil fuel consumption and GHG emissions.

Specifically, the project objectives and envisaged outcomes are in tune with the National Mission for Enhanced Energy Efficiency' (NMEEE) – one of the eight Missions under the NAPCC – which lays emphasis on the planned actions of market based mechanism to enhance energy efficiency in industry through the Perform Achieve and Trade (PAT) scheme and capacity building of industries through the Market Transformation for Energy Efficiency (MTEE). The Bureau of Energy Efficiency (BEE) will be the principal project partner, the nodal agency at the Union government level responsible for implementing the NMEEE.

The proposed project is designed to address the above barriers through the implementation of different components dealing with policy, benchmarking, capacity building, technology innovations and demonstration projects. It will cover the following activities:

- Supporting policies and standards: Assist in strengthening policy framework including incentives for speedy implementation of EMS standards.
- Capacity building for Energy Management Standards ISO50001 and systems optimisation: Develop and implement training programmes on energy management systems and system optimization covering steam systems, compressed air, pumping systems and process heat including training the trainers, management executives, and enterprise engineering expert level training programmes. With the adoption of energy management systems based on ISO50001, energy efficiency will be integrated with the

enterprise management systems and energy efficiency will become a continuous process for the management.

- Technology innovation: Technology platforms and technology incubators will be established at technical universities and technology institutes that will help to adjust technologies to the needs of Indian industry and identify and transfer technologies from abroad.
- Benchmarking: A detailed study and analysis will be carried out to document the existing status of technologies, processes and performances in selected industrial sectors and benchmark them against best technologies and practices in the world.
- Financing: Detailed project plans will be elaborated for individual facilities that can serve as a basis for investment decision making by the enterprise management, and for obtaining loans from financing institutes.
- Information dissemination and knowledge management: Establish a platform for knowledge management and disseminate successful cases from the project for more replication efforts and share the lessons learnt.

The establishment of an effective energy efficiency project in industry covering benchmarking, promotion of energy management system based ISO50001 and systems optimization leads to a more sustainable energy future. Once established, the projects will effectively transform the market to a higher level of energy saving services including energy management and system optimization measures implementations in industrial facilities on continuous basis.

Energy management and systems optimization are cross-sectoral energy savings approaches. They are applicable in all industries. The project will build on and reinforce the government initiatives for energy efficiency promotion in industry. The experience gained through the project interventions will thus play a key role in sustaining the project outputs and ensuring replicability of the investments on a wider scale across industries. The strong government commitment towards energy efficiency will further favour sustainability and replicability efforts.

The GEF Council document GEF/C.31/rev.1 gives UNIDO comparative advantage for the Strategic Program under the Intervention Type Capacity Building/Technical Assistance. The project has a strong industrial focus, which is UNIDO's overall mandate. UNIDO is especially well placed to implement this project because of its experience and expertise in dealing with the industrial sector in India and its long history of cooperation with key industry stakeholders since the late 60's.

UNIDO is the only UN agency mandated to work on industrial development issues including energy. With its mandate to promote sustainable industrial development, UNIDO has positioned itself as one of the most relevant player to assist industries of both developing countries and economies in transition. It is internationally well known as a leading advocate and technical assistance provider for industrial energy efficiency policies, industrial energy system optimization and energy management systems/standards.

Identified remaining gaps within the current pre-PIF document and further suggestions:

- To broaden the baseline study incorporating more details on the barriers to industrial energy efficiency, socio-economic situation and including gender issues.
- To identify industrial sub-sectors including geographic focus and types of enterprises.
- Similar initiatives have been undertaken by other international/national agencies for creating more cohesion and synergy.

- To identify other partners for inclusion in the project.
- To refine the project activities, outputs and components in line with the expected GEF and Co-financing budgets.
- To estimate potential energy savings in line with the revised project activities, as well as to estimate potential GHG savings from the project.
- To refine the co-financing amount after holding detailed discussions with co-financing partners.
- To include information on the potential risks, including climate change risks.
- To describe the incremental cost reasoning.

### **Promoting Efficient and Sustainable Bus Transport System in India**

Rapid urbanization is posing a challenge to achieving sustainable development from ecological, economic and social perspectives. At the same time, these challenges also present unique opportunities to improve performance, increase efficiency and reduce costs.

Keeping in view these challenges, Government of India has recently launched the National Mission for Sustainable Habitat (NMSH) as one of the eight missions of the National Action Plan on Climate Change (NAPCC) to promote sustainability of habitats, and one of the key platforms for this is through modal shift towards public transport and resource conservation. The launch of NMSH provides unique opportunities of developing and promoting low carbon urban systems in India while building upon the GEF 4 interventions in promoting sustainable urban transport program. The mission emphasizes mitigation strategies such as (i) strengthening of public transport system through a combination of promotional, regulatory and fiscal measures, and (ii) reduction of fuel consumption per passenger travel through various measures including fuel efficiency.

Rapid urbanization in Indian cities has led to severe congestion, increasing air pollution and a rapidly increasing contribution to GHG emissions. Coupled with increasing income levels, growing city size and poor quality of public transport, this trend has been aggravated by an increasing reliance on motorized transport and use of personal motor vehicles. It is in this context that the National Urban Transport Policy emphasizes the use of sustainable modes of travel like public transport and non-motorized modes.

Urban transport demand in Indian cities is met by a range of modes. While the high income group has access to cars, the middle-income and lower-income group depends on public transport services and 2-wheelers and non-motorized modes such as walking and cycling. The long term sustainability of cities depends on promoting public transport services, as they occupy less road space and cause less pollution per passenger-km than personal vehicles. City bus services can meet the public transport needs of most cities in a cost effective and efficient manner. Cities in India do not, in general, have a good quality public bus system. Out of over 80 cities with more than 0.5 million people, only about 20 have any kind of structured bus service. In those that do have them the quality is poor. According to a study by the Ministry of Urban Development (Traffic & Transportation Policies and Strategies in Urban Areas) public transport mode shares have generally dwindled over the last couple of decades and fleet sizes in nearly all public bus companies declined rather than keep pace with demand.

Road transport in India is governed by the Motor Vehicle Act 1988, which endows State Governments with the responsibility for bus transport (including city buses) and the power to license routes for plying stage carriages, fix fares, and set technical standards and safety norms. Apart from the states of Maharashtra and Gujarat, where urban transport falls under the city governments purview, in all other states' it continues to be regulated at the state level. The legislation was oriented towards policies that encouraged monopoly operation of road services by the State Transport Undertakings (STU). In spite of modifications in the Act, the STUs continue to dominate the road transport sector. On the city routes, there are monopoly public bus services in few very large cities (Delhi, Bangalore, Chennai, Mumbai, and Hyderabad). In most medium and small-sized Indian cities, STUs either do not provide service or only limited service.

The financial situation of STUs providing monopoly bus services in large cities has been unsatisfactory for many years. With mounting losses, there is an urgent need to undertake reform of the policy framework regarding bus transportation as well as examine options for restructuring STUs. In medium and small size cities, fleet availability by STUs has steadily declined with a sharp decline in patronage. The vacuum created by declining STUs is filled by intermediate modes of public transport (auto rickshaws, jeeps, taxicabs, stage cars and so on), a service that is often fragmented and poorly regulated. With growing income levels, the move in travel choices, therefore, has been from poor quality buses to motor bikes. In cities that do not have any bus service, typically the small and medium sized cities, the move has been from bicycles and cycle rickshaws to motor bikes and auto rickshaws. Unless existing city bus transport services are revamped and upgraded and quality services launched in new cities the shift to personalised modes shall continue.

With a view to providing impetus to bus public transport in Indian cities the Ministry of Urban Development provided assistance with bus fleet replenishment under their ambitious urban development initiative Jawaharlal Nehru National Urban Renewal Mission (JnNURM) to the tune of roughly 15,000 buses costing over US\$1 bn across 61 cities. Many of these cities are first timers. However, beyond fleet replenishment the success and viability of bus systems depends on several other factors such as (i) upgradation of requisite infrastructure such as terminals, depots and bus stops, (ii) improved quality of service through measures such as route rationalization, fare collection systems, ITS etc. (iii) introduction of private participation and performance management systems, (iv) greater autonomy and financial sustainability of STU's through improved regulatory environment, (v) greater fuel efficiency through adoption of measures such as driver training and improved maintenance practices, (vi) overall capacity building and training in operational, environmental and financial sustainability aspects.

The India Sustainable Urban Transport Program (SUTP) under GEF4 was an umbrella program focussed on developing necessary national, state and city level capacity in urban transport planning and kickstarting the process through some high impact demonstration projects on Bus Rapid Transit, Non-motorized Transport, ITS in a few cities (5 cities). It was not designed to systematically address bus services and operations in major cities. This proposal deepens and takes forward the earlier initiative for promoting public transport by focusing more comprehensively on city bus transport and treating the multiple issues - operational , financial, regulatory, fiscal - facing it.

The proposed GEF intervention aims at *efficiency measures encouraging a shift from personal to public mode of transport leading to low carbon cities in India*. The fuel efficiency gains that are possible from better maintenance and driver training have not been recognized and taken advantage of, largely due to out-dated methods of functioning. Initial estimates suggest that these interventions alone could provide fuel savings of the order of 5-15%. The proposed GEF intervention is in alignment with GEF CC focal area strategy objective – 4 on “Promote energy efficient, low carbon transport and urban systems”.

The main components of this project are as follows:

- Review policy, legislative and regulatory constraints to promoting efficient and quality city bus public transport including modernization of STUs, decentralization to city governments, and the taxation burden on public transport vehicles vis-à-vis personal vehicles and develop policy notes to assist nodal government departments at the national and state level to address identified issues;
- Conduct pilots to modernize bus services in 2-3 cities where they already exist and introduce modern bus services in 1-2 cities where such services do not exist. This will involve assistance to improve their quality of service through route rationalization, better buses, terminals and depot infrastructure, ITS enabled passenger information systems and fare collection systems, encourage private participation, greater functional autonomy to state transport undertakings, , improved branding and overall financial sustainability;

- Assistance to 2-3 STUs and private bus companies in same or different cities in adoption of improved techniques through driver training and vehicle maintenance to improve fuel efficiency; Conduct workshops to disseminate experience of these cities and propagate the use of fuel conserving practices among STUs and private bus companies; Creation of curricula/ training program in Centres of Excellence;

The total GEF Grant requirement is estimated at USD 10 million. This project will have co-financing from MoUD and from respective state & city governments based on pilot project specifics. The World Bank may consider IBRD financing upon request from Ministry of Finance, Gol.

The purpose of the exercise is to assist cities develop sustainable city bus transport and evolve solutions and models for further replication to other cities in the country.

The World Bank has significant expertise and knowledge in the area of urban transport from its numerous projects from around the world.

### **Up scaling Access to Clean Energy for Rural Productive and Domestic Uses in India**

The project aims to accelerate the use of renewable energy for productive purposes and to meet domestic energy needs in underserved regions. Specific objectives are (i) to meet energy needs (including electricity) through renewable in un-electrified villages, (ii) to provide reliable and quality electricity supply in tail-grid villages, (iii) to stimulate the use of modern energy for livelihoods promotion, so that incomes of poor households can grow in underserved villages, (iv) encourage efficiency in thermal energy demands, (v) develop and demonstrate market mechanisms including after-sales services and access to finance, and (v) to contribute to policy and institutional capacities on this theme.

About 40% of India's rural population has no access to electricity and 75% of rural India depends on biomass fuel. Electricity supply in grid-connected villages is unreliable, particularly for productive purposes. Limited access to modern energy is a major constraint to labour productivity. It is estimated that 149 million kerosene based lighting devices such as hurricane lanterns and wick lamps are being used in India. National Sample Survey Organization also estimates that 60% of 7326 million liters (2000/01) of kerosene was used in rural areas for lighting. Inefficient cooking devices, operating at 8% thermal efficiency, are used for cooking. Rural areas suffer from poor quality of energy service constrains enterprise development as well.

The Government of India has plans to expand grid supply of electricity in rural areas. However, a large number of villages (about 10,000) and a large number of households will have to wait for long before the grid reaches them. While RGGVY is expected to bring electricity to a large part of rural India, its reach is limited. Grid-based supply to tail end villages needs to be complemented through decentralized power generation through renewables. India can sustain growth rates of over 9% along with significant poverty reduction only when access to modern energy for its poor underserved communities is expanded rapidly. Several pilots have demonstrated the feasibility of renewables for electricity generation and thermal energy needs in India. However, there are significant set of barriers due to which Renewable Energy has not yet become a choice.

The major barriers for promoting renewable energy for rural areas are broadly a) lack of investor interest, especially in the rural and off grid villages; b) lack of knowledge on demand for modern energy, seasonal and spatial distribution of demand for energy, revenue generation models, ground-level management systems and mapping of resources with requirements; c) limited experience in linking renewable energy with productive uses; d) limited supply of technologies, service providers and e) lack of long term policy to nurture & expand renewable energy. Some specific constraints that need to be addressed at early stages include (i) Lack of level playing field for RE when compared to conventional energy –High subsidies for fossil fuels, other investment support and tariff policy for conventional energy makes it difficult for RE providers to recover their capital and operating costs; (ii)

No credible suppliers of RE products – Lack of energy services that caters to both domestic and livelihood needs in a rural area (Quality products are not available, Readymade RE products are not available); (iii) Low priority given by service providers to rural areas and very few entrepreneurs (since they are not attractive to entrepreneurs, lack of visibility of ongoing RE based initiatives and support for energy access scaling up); (iv) Lack of infrastructure in rural areas (extension of grid is not economical for rural areas); (v) Lack of identification of sites/villages (lack of local resource assessment, lack of assessment of energy requirement); and (vi) Lack of capacity and awareness (lack of identification and capacity of stakeholders, people in rural areas do not have enough training to utilize the local resources well to meet their energy needs).

The project aims to provide global and local environmental benefits. The project will promote demonstration, deployment and transfer of innovative low carbon technologies; address barriers and promote market transformation of critical low carbon systems and capacity building. The project is consistent with and will contribute to Government of India's strategy and objectives.

- a) Reduce emissions intensity of India's GDP by 20-25% by year 2020 on a 2005 reference level, through proactive policies. India's 12<sup>th</sup> FYP, to be launched in 2012 will have low-carbon growth strategy as one of the key pillars.
- b) Concrete steps undertaken to diversify energy fuel mix. 20,000 MW of solar power generating capacity will be set up by 2022.
- c) Achieving 100% electrification as outlined in 11<sup>th</sup> Five Year Plan, and achieving 20% of renewable energy share in meeting electricity requirements

The expected outcomes and activities proposed under this project are:

- a) Establish energy supply for domestic needs and productive uses (enterprises/livelihoods) in un-electrified and electrified villages. The activities to achieve this outcome are;
  - Identification of local energy needs and their priorities
  - Assess local income levels and current expenditure on energy
  - Assess productivity and enterprise development at both household and community level
  - Assess availability of modern energy services and sources at a given location in terms of conventional and non-conventional energy sources; and commercial and non-commercial energy sources
- b) Support energy enterprises to install RE based electricity generating and energy efficient thermal systems
  - Prepare and assess business proposals by rural energy technology suppliers and service enterprises
  - Facilitate access to start-up and working capital loans for technology suppliers and service providers; risk guarantee facilities and end-user financing and smart subsidies (generation based incentives);
  - Support establishment of enterprises that provide energy services as per the local energy needs
- c) Develop and demonstrate models to showcase level playing field for RE to compete with conventional energy;
  - Promote institutions providing services to access local energy needs and strengthen energy service delivery through government-led energy programmes, subsidy-supported commercialization models, commercialization models (affordable to pay service), commercialization supported by civil society, public-private partnership in community-based renewable energy systems
- d) Awareness generation, training and capacity building; and,
  - Selection of regions/rural locations/districts/communities
  - Assessment of local energy needs and resources availability

GEF assistance will be used for prospecting for and advisory services to potential energy entrepreneurs; adapting technology solutions to location specific conditions; facilitating technology transfer, including developing capacities; incubation support in remote regions; improving access to finance; revenue models to help the development of generation based incentives for mini-grid and tail-end grid solutions; detailed analysis of existing business models; facilitation of supply chains for materials/ equipment and services and supporting organic

linkages between energy provision and productive use. The capital investment in energy enterprises will be largely met by private equity/bank finance and investment subsidy by MNRE.

Firstly, the design of the project would encompass high level of participation by host government and the users. As can be seen from the project costs, a large share of 50% is borne by private equity either from own sources or through financing options and 33% by government. Secondly, a part of the exit strategy/roadmap aiming to replicate will be implemented during the project duration itself.

UNDP has been partnering with MNRE on projects aimed at promoting renewable energy to meet energy requirements. Some of them are: a) Removal of barriers to Biomass power, an ongoing GEF funded project; b) Rural Energy for Rural Livelihood a UNDP core funded project that was piloted with three different technologies in three different locations. Micro hydro was piloted in the state of Uttarakhand and helped IIT Roorkee to set up a micro-hydro simulator – a training facility, which has now become self sustaining intervention. Solar enterprises were supported through Social Work and Research Centre - Tilonia also supported barefoot women solar entrepreneurs and solar based Reverse Osmosis for water purification. Village enterprises were supported through small gasifier based systems with support from corporate houses – through their social wing; c) An ongoing project on Access to Clean Energy – UNDP-MNRE project aims to support a few projects that can become business models if some gaps are supported. These projects have provided immense lessons and poised to logically link the present proposal.

### **Promoting business models for high temperature industrial applications of renewable energy in India**

**Project Objective:** The proposed project will focus on developing business models for promoting medium and high temperature industrial applications of renewable energy (RE) in selected industrial sectors in line with the priorities outlined in the National Action Plan on Climate Change (NAPCC) and its relevant National Missions, including the National Solar Mission, the National Mission for a Green India, the National Mission for Sustainable Agriculture and the National Mission on Strategic Knowledge for Climate Change. The project will focus on the following activities:

The planned project activities can be broken down into four categories:

- **Policy component:** This component will strengthen the policy and institutional framework (at both the national and state level) to enhance penetration and scaling up of RE technologies for medium and high temperature applications in selected industrial sectors; the activities under this component will build on the existing framework, i.e. the Electricity Act 2003, as well as the recent regulatory initiatives (guidelines from the Central Electricity Regulatory Commission – CERC – and the use of Renewable Energy Certificates – RECs);
- **Technology component:** This component will prepare the most relevant technologies for high temperature application in selected sectors, including development of performance guidelines and initiation of standardization and certification;
- **Demonstration:** This component will build pilot plants for the most promising technologies in selected sectors, demonstrating technical and financial viability of the technology for medium and high temperature applications through favorable business models for technology transfer and enhancing local manufacturing capability for industrial applications;
- **Scale-up:** This component will develop a pipeline for replication and assist similar projects elsewhere in the country, building on the experience gained through the pilot plants; and
- **Awareness raising and capacity building:** These activities will enhance the capacity of key players in the target industries, document best practices on RE based medium and high temperature and promote

research, networking and international cooperation for promoting technology transfer, information sharing and dissemination of best practices.

The project will build on the ongoing efforts of the Ministry of New and Renewable Energy (MNRE) under GEF4, specifically GEF / UNIDO's project "Promoting Energy Efficiency and Renewable Energy in Selected Micro, Small and Medium Enterprises (MSME) clusters in India", and GEF/UNDP's project on "Market Development and Promotion of Solar Concentrators based Process Heat Applications in India".

While ongoing projects have components that include the application of RE thermal technologies in SMEs, the proposed project will take a more comprehensive and integrated approach for promoting business models for a range of RE technologies for medium and high temperature applications, and facilitate scaling up through increased private sector participation. Special care will be taken to bring about synergies with ongoing projects, and avoid any duplication.

Recent UNIDO's analysis on the long-term potential for RE in industrial applications has shown that by 2050, up to 21% of all energy and feedstock use in manufacturing industry can be renewable, primarily from solar and biomass (for feedstock and process energy) energy. The project will build on this analysis and demonstrate innovative technology interventions on the ground. Primary focus will be on the industries with medium and high temperature requirements, such as cement, ceramics, and petrochemical sector.

Despite India's vast RE potential, this potential remains largely untapped primarily due to the high upfront cost of RE technologies compared to conventional sources of power. Yet in order to address the rising demand and cost for energy, continued power shortages and the increasing import of coal, RE has the potential to improve the security of supply and improve energy independence through supply diversification. Although a number of policy initiatives to stimulate the use of RE are already being taken, additional efforts will be required and new business models and financing instruments (including carbon finance) will need to be implemented to deploy RE technologies to their full potential.

Another barrier is the lack of detailed information on the potential and techno-economic feasibility of RE based medium and high temperature applications in different industrial sectors, which currently hampers an increased and accelerated uptake of these technologies. India as a fast growing economy also has the potential to become an important global player in the manufacturing of RE technologies, and will need supporting measures along the value chain to achieve this goal.

The use of RE for industrial applications saves greenhouse gas (GHG) emissions through the avoided use of fossil fuels.

Under the National Action Plan on Climate Change (NAPCC), which provides the framework on how India plans to move forward in combating climate change, 8 National Missions have been formulated as the road map to implementing the Government's strategy and achieving the National Action Plan's objective. This project will seek to reinforce the goals of these missions, including the National Solar Mission, the National Mission for a Green India, the National Mission for Sustainable Agriculture and the National Mission on Strategic Knowledge for Climate Change.

India is planning to achieve ambitious targets of RE technologies and the project will actively assist the creation of an enabling environment for renewable energy technology penetration in the country both at a centralized and decentralized level. To achieve the, policy framework and institutional capacity needs to be strengthened, and new capacity must be built and promoted for promoting investments, scaling up markets and develop business models for RE in India, thus accelerating the achievement of the Government's strategic objectives in the field of climate change.

Following the successful demonstration of RE technologies for medium and high temperature applications in selected sectors, the project will aim to develop a business model which will enable development of a pipeline of similar projects and assist in technical assessments and securing of financing. The experience gained through the interventions will thus play a key role in sustaining the project outputs and ensuring replicability of the investments on a wider scale across industries.

UNIDO's mandate within the United Nations system is to promote and accelerate sustainable industrial development in developing countries and economies in transition. Specifically in the area of energy and environment UNIDO promotes sustainable patterns of industrial consumption and production through cleaner technologies and processes in order to de-link economic development from environmental degradation.

UNIDO can therefore draw on its long term experience in the area of RE for industry, including in the field of energy generation from organic sources through bio-methanation or gasification. South-south cooperation has also been supported through UNIDO's technology centers and partner institutions. On the use of bio-energy applications UNIDO is currently running several projects, examples of which are in Russia and Ukraine, sub-Saharan Africa and South-East Asia. The RE component of the GEF-4 UNIDO project in Ukraine for example is focusing on solar and thermal applications in the agro-food sector.

Identified remaining gaps within the current proposal and further suggestions:

- Heat demand in target sectors, clusters, units
- Target technologies
- Resource availability (i.e. biomass)
- Size of interventions to target (in capacity; in investment).
- Refinement of activities
- Detailed baseline definition
- Selection of key partners
- PIF development
- Estimation of GHG savings potential
- Refinement and commitment on co-financing
- Ensure synergies with ongoing GEF projects

### **Climate Resilience through Community-Based Approaches to Livelihood Adaptation in Semi-Arid States of India**

About 72 percent of India's population live in rural areas and account for about 50 percent of the poor. Most of the poor depend on agriculture or other natural resource based economic activities for their livelihoods. Agriculture employs about 52 percent of the labor force but contributes only 15.7 percent to India's GDP indicating a low productivity in the agricultural sector. With their livelihoods closely linked to climate sensitive sectors such as agriculture, the poor will be disproportionately affected by climate change unless remedial actions are taken. This is all the more urgent as the impact of climate change in the form of higher temperatures, more variable precipitation and more extreme weather events are already being experienced in India, adding to the hardships of the poor and vulnerable people in rural India. An important part of a successful poverty alleviation strategy must therefore include increasing the productivity in the primary sector taking account of the added challenge that climate change entails.

Since the 1980s the Government of India (GoI) has invested substantial resources towards rural poverty alleviation. The World Bank has been a partner in this work since the year 2000 when it initiated support activities in the states of Andhra Pradesh, Madhya Pradesh, Bihar, Chhattisgarh, Tamil Nadu and Rajasthan. The central message learned through these efforts is that significant investments in building institutional platforms of rural

poor households are a critical foundation for sustainable poverty reduction. This has resulted in social and economic empowerment of the rural poor and enabled them to build linkages with state and market institutions. The projects supported by the Bank in three states have, over a decade generated household savings in excess of US\$400 million, leveraged nearly US\$3 billion in credit from commercial banks and reached a turnover in collective marketing of farm and non-farm produce of US\$1 billion.

The Andhra Pradesh Drought Adaptation Initiative (APDAI) was launched in 2006 to find solutions to the frequent droughts in the drought prone districts of the state. The droughts had a severe impact on the livelihoods of the affected people which in turn were reflected in the drought prone states lagging behind the otherwise overall successful economic development in the state. APDAI was focused on natural resource based economic activities and linked to the Bank supported Andhra Pradesh Rural Poverty Reduction Program (APRPRP) in order to benefit from the social mobilization and institutional framework that had been built by that program over several years. The efficient functioning of village, mandal, state and local government organizations proved to be key to success in several ways. Well functioning Self Help Groups (SHGs) were able to undertake and master new initiatives quickly. Through their savings and loans experience they were also able to mobilize capital to pursue, on their own successful initiatives thereby building for themselves a more secure livelihood. Similar initiatives are now being pursued in Bihar and Rajasthan where adaptation measures are linked to rural livelihoods projects.

Lesson learned from these programs demonstrate that there is significant scope for expanding and scaling up adaptation to climate change by incorporating a dedicated climate change adaptation component into a more inclusive rural livelihoods program.

The National Rural Livelihoods Project (NRLP) has been developed on the basis of lesson learned from World Bank supported projects in Andhra Pradesh, Madhya Pradesh, Bihar, Chhattisgarh, Tamil Nadu and Rajasthan. The objective of NRLP is “to establish efficient and effective institutional platforms of the rural poor that enable them to increase their household income through sustainable livelihood enhancements and improved access to financial and selected public services”. To this end NRLP will assist the GoI in setting up a National Rural Livelihoods Mission (NRLM) in the Ministry of Rural Development. NRLM will provide a combination of financial resources and technical assistance to states to enable them to pursue a comprehensive livelihoods approach encompassing four inter-related tasks, i.e. (i) mobilizing all rural, poor households into effective SHGs, SHG federations and producer organizations and create an effective institutional platform of the rural poor, (ii) enhancing access to financial, technical and marketing services, (iii) building capacities and skills for gainful and substantial livelihoods and, (iv) improving the inclusive delivery of social and economic support services for the poor. NRLP will have four components. Component 1 will focus on Institutional and Human Capacity Development, including establishment of professional teams at state level. Component 2 will provide State Livelihood Support, including mobilization of the poor into SHGs and their federations and provide livelihood grants to such institutions. This component will also provide support to Special Programs including climate change related activities. Component 3 will support the spread of ideas from across the country to maximize the benefit to the rural poor and although the Bank’s support will have a focus on 12 states which include 85 percent of the rural poor households in the country, this component will be available for all states. Component 4 will provide Project Implementation Support.

The total budget of NRLP consists of a World Bank contribution of USD1 billion and a GoI allocation of US\$2.2 billion over the next two years and a further amount of USD5.5 billion included in the FY 13-17 Five Year Plan. An amount of USD115 million linked to the NRLP subcomponents on special programs and incorporating adaptation measures into rural livelihoods throughout the country will constitute the immediate co-financing to the SCCF project.

Support the Government of India to become climate resilient by integrating adaptation measures into development policies, plans, programs and regular budget allocations.

The project objectives are as follows:

- Increase adaptive capacity to respond to the impacts of climate variability and change at local, state and national level.
- Reduce vulnerability to the adverse impacts of climate variability and change at local, state and national level.
- Promote transfer and adoption of adaptation measures

The adaptation component to be added to the NRLP will focus on natural resource based economic activities. NRLP itself will address the institutional development aspects that are so fundamental for success and also other income generating activities which must form part of a comprehensive adaptation strategy. The approach to be taken will be based on lesson learned from APDAI and other adaptation projects in India as well as from other countries where the Bank has supported adaptation to climate change in the agricultural sector. It is an approach that recognizes that involvement of farmers and other villagers dependent on the natural resource base must be fully involved in defining the problem and in the search for solutions.

A shared understanding of the problem is the first step towards understanding the type of activities that must be undertaken and thereafter become more specific with regard to potential response options or specific initiatives to be tested. Following these logical steps will make it easier to see that the solutions are not to be found in one or two “silver bullets” but that a package of tested initiatives, each one linked to the others is the way forward. In this process it will become clear that technical solutions without an institutional home that has an understanding on how to bring about the changes will not be sustainable. The focus on institution building that is at the core of NRLP and to be linked with this process is therefore crucial for success.

Finally, the approach is not limited to field-level interventions; instead the focus was also on mainstreaming these into the policy context through: integration of the innovations into mainstream government programs; integration of new routines into government operations through changes in operational procedures and budget allocations and the introduction of economic instruments in favor of adaptation practices and behavior.

#### Outcomes and Activities related to Objective 1

A number of outcomes can be foreseen for this objective such as: (i) increased knowledge and understanding of climate induced risks in targeted vulnerable areas, (ii) strengthened awareness and ownership of adaptation and climate risk reduction processes at local and state level and, (iii) Improved adaptation planning and climate risk reduction processes at local and state levels.

The type of activities that will help reaching these outcomes will be workshops and seminars at local, district and state level involving farmers, other villagers, their representative organizations as well as technical experts and decision making representatives at district and state level. It will be important that all these stakeholders share the same problem analysis and are in agreement about the process to follow in search of solutions. Actual specific technical solutions will have to be worked out in discussion between farmers and other villagers and technical experts using an area-based adaptation planning approach to addressing climate resilience. The experts will have to guide and accompany those involved with specific initiatives to learn, together with them what works and what might need to be changed to find the right solution in technical, managerial and in institutional terms. Such a process of learning by doing in which all stakeholders are involved will be important to reach the objective.

It is estimated that an amount of US\$ 10 million be allocated to activities related to objective 1.

#### Outcomes and Activities related to Objective 2

With regard to objective 2 the following outcomes can be foreseen: (i) diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas, (ii) reduced vulnerability in the natural resource

based economic sectors (iii) increased use of climate risk information and tools; and, (iv) adaptation measures mainstreamed into broader development frameworks at local and state level.<sup>10</sup>

These outcomes will be reached through successful upscaling of adaptation measures which will include incorporating such measures into government programs and regular budgets and might also include adjusting policy frameworks to be supportive of adaptation measures. It will be important to develop market institutions for both inputs and produce to allow for upscaling of innovations and thereby building the foundation for improved economic conditions for vulnerable groups.

It is estimated that an amount of US\$ 10 million be allocated to activities related to objective 2.

### Objective 3

Objective 3 could have the following two outcomes: (i) successful demonstration, deployment and transfer of relevant adaptation measures to similar climatic zones, and (ii) enhanced enabling environment to support adaptation related technology transfer. This objective is specifically related to component 3 of NRLP which will support the spread of ideas from across the country to maximize the benefit to the rural poor. The considerable capacity that will be built both at state and national level through the National and State Rural Livelihoods Missions will be the vehicles for reaching the two outcomes of this objective. This will be done through organizing innovative forums, exchange visits and by utilizing electronic communication tools. It will also include supporting public-private partnerships to facilitate the inclusion of the rural poor in the market economy.

It is estimated that an amount of US\$ 5 million be allocated to activities related to objective 3.

The proposed project is fully in line with the principles of the National Action Plan on Climate Change. The principles in the plan state that action on climate change will be based on (i) protecting the poor, (ii) enhance ecological sustainability, (iii) developing appropriate technologies, (iv) engineering new and innovative forms of market, regulatory and voluntary mechanisms to promote sustainable development, (v) implement programs through linkages with civil society local government institutions and through public-private partnerships, and (vi) welcoming international cooperation for research and development. With regard to agriculture the plan states that agriculture will need to be progressively adapted to projected climate change with a focus on improving productivity of rainfed agriculture.

The Cancun adaptation framework states that enhanced action on adaptation seeks to reduce vulnerability and build resilience in developing countries. The Cancun framework states four principles to which the proposed project adheres, i.e. the project is (i) undertaken in accordance with the convention, it follows (ii) a country driven, gender sensitive, participatory and fully transparent approach, taking into consideration vulnerable groups, communities and ecosystems, it is (iii) based on and guided by the best available science and, as appropriate, traditional and indigenous knowledge, and it will (iv) be undertaken with a view to integrate adaptation into relevant social, economic and environmental policies and actions.

The SCCF eligibility criteria have been defined by the UNFCCC COP 9 as follows: (i) SCCF should serve as a catalyst to leverage additional resources from bilateral and multilateral sources, (ii) activities to be funded should be country-driven, cost-effective and integrated into national sustainability development poverty reduction strategies, (iii) adaptation activities to address the adverse impacts of climate change shall have top priority for funding, and (iv) technology transfer and its associated capacity building activities shall also be essential areas to receive funding from the SCCF. The project is fully consistent with these criteria.

The proposed project is linked to a major rural livelihoods project (NRLP) which in turn is based on a decade long experience of how best to reach the rural poor with sustainable and replicable poverty alleviation measures. The

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<sup>10</sup> A menu of Adaptation Options in Flood and Drought Prone Areas that will be considered in search of best measures

Government of India is investing USD 2.2 billion in the first phase of NRLP as a major effort to address rural poverty which, in spite of rapid national economic growth has not reached the rural poor. This considerable national investment is combined with a loan from the World Bank of USD 1 billion which focuses on the 12 poorest states and on activities that have been found to be specifically significant in overcoming rural poverty. This includes activities that are aimed at replicating successful innovation beyond the 12 core states and the building of institutions that have been found to be essential for sustaining and scaling up results. Of particular importance in this regard is the building of institutions of and for the rural poor such as SHGs and their federations. Given these prerequisites, there probably could not be better conditions for securing both sustainability and replicability.

As pointed out above the project is linked to a very major Government and Bank cooperative investment in overcoming rural poverty. Linked to this is the fact that the adaptation component is based on previous experience of cooperation between rural livelihood projects and adaptation initiatives in the natural resource based economic sectors. The resources and the experience as well as the considerable gains that come from working within one institution and under one common organizational and institutional framework will not only maximize resource use but also facilitate building the important synergy between technical aspects of adaptation and the necessary institutional aspects; both of them crucial for success.

Justification for SCCF Funds: It is still early days in the search for adaptation measures and securing climate resilience. The searching for solutions in the primary sector in developing countries must be done in close cooperation with those who are already suffering from the changing climate. In developing countries these are typically the poorest of the poor who live on very small margins and are not able to take risks in search of better ways to manage the limited resource they have access to. There is thus a need for risk capital when searching for adaptation measures. Farmers and even more marginal groups in villages are willing and able to embark on new initiatives which they have been party to developing and which they believe have the potential to improve their situation. They cannot afford the risk however and this is where a contribution from the SCCF has a fundamental and very important role to play. The approach that will be pursued will be based on the concept that those who engage in a new initiative will have to invest part of the required capital. If the initiative is a success and economically viable, the return on the investment will go back to the group so that they can continue the activity. Should it turn out to be a failure and in need of improvement before an economically viable solution have been found, the project with support of SCCF will bear this risk. In this way the SCCF is as much as risk capital as it is a type of entrepreneurial fund. Return on the SCCF investment is anticipated to result in value created for the rural poor many times the contribution to the project.

The SCCF will allow for the investment by the Government and the Bank in the NRLP to take on a dedicated adaptation initiative with a clear focus and potential to enhance the outcome of NRLP considerably. The SCCF will enable things to be done differently and different things to be done in a way which will considerably enhance the impact of the larger project.

### **Climate Resilient Coastal Protection and Management in India**

This proposed project aims to strengthen the resilience of coastal ecosystems and communities to the adverse impacts of climate change by creating conducive institutional policy and practice frameworks for mainstreaming climate change considerations into coastal protection and shoreline management.

Through the efforts of National and State Governments, a suite of coastal zone management policies has been developed in India. Efforts to integrate the potential climate change impacts into policy are progressing however, there is a need to accelerate these efforts. In particular, planning, design and regulation of coastal protection infrastructure currently does not incorporate resilience building in response to potential climate change, such as

sea-level rise, typhoon activity and related storm surges, ocean acidification, ocean currents and the supply of sediment through rivers and estuaries.

A central element of the project is to examine climate change related risks with local communities and State/local level officials, applying the experiences gained from the climate-proofing of critical coastal infrastructure for vulnerability reduction at all levels. It does this in the context of substantial baseline efforts in mainstreaming climate change adaptation policy, coastal infrastructure development, and capacity building efforts by the ADB and other donors in India. Aligning lessons learned from local level investments with national level programs, related to both coastal zone management (such as the Sustainable Coastal Protection and Management Investment Program (SCPMIP)), and climate change adaptation initiatives (such as the World Bank ICZM project), will catalyze climate resilient development in vulnerable sectors and regions nationally. The proposed SCCF project will be closely linked with the ADB SCPMIP, which is USD 417.5 million investment program supported by ADB and the State Governments of Maharashtra, Goa and Karnataka.

The SCCF grant will enable the mainstreaming of climate change adaptation and resilience measures within the design of SCPMIP sub Project sites.

The main components of this proposed project are:

- Support mainstreaming of climate change resilience building measures into coastal protection and shoreline management. This will be achieved through a range of mechanisms including the development of national-level shoreline planning guidelines, manuals, and methods that will be based on the implementation of on-the-ground best practice that demonstrate the practical implementation of 'climate-proofing' coastal protection infrastructure. Coastal planning and the design of investments will be informed by climate change scenarios for coastal zones linked to work being undertaken through India's Second National Communication (SNC) to the UNFCCC and through the NAPCC process. In addition, site based climate change vulnerability assessments and community consultation will be undertaken for selected sub-project sites with a view to mainstreaming this process for all SCPMIP Sub Project Sites.
- Enhance the awareness and strengthen the technical capacity within key sectoral agencies and professional groups with coastal protection and shoreline planning responsibilities to promote climate-resilient decisions at national and local planning levels.
- Increase the use of coastal ecosystem-based coastal adaptation approaches as cost-effective, environmental sustainable approaches that promote livelihood development. Demonstrating this approach through the SCPMIP will ensure that practical lessons learned can be clearly demonstrated.
- Disseminate relevant adaptation knowledge through national and regional knowledge-sharing networks.

## II.III CHEMICALS

### Introduction

India has a well developed chemicals industry contributing significantly to industrial and economic growth. The industry manufactures more than 70,000 commercial products and contributes to about 3% of India's gross domestic product (GDP). The total investment in the Indian chemical sector is approximately USD 60 billion and total employment generated is about one million. The sector accounts for 13%-14% of total exports and 8%-9% of total imports of the country. In terms of volume, it is the 12<sup>th</sup> largest in the world and third largest in Asia. However, per capita consumption of products of the chemical industry in India is low, at about one-tenth of the world average. The major chemical sectors include alkali chemicals, inorganic chemicals, organic chemicals, pesticides, dyes and dyestuffs, petrochemicals, and fertilizers. In recent years, Government of India has promulgated several regulations under the umbrella Environment Protection Act of 1986 mandating practices to address the management of specified hazardous chemicals and waste, including POPs.

India ratified the Stockholm Convention on Persistent Organic Pollutants in January 2006 (entry into force April 2006), which focuses on reducing and eliminating the production /use and release of 12 chemicals include - Aldrin, Chlordane, DDT, Dieldrin, Endrin, Heptachlor, Hexachlorobenzene, Mirex, Toxaphene, Polychlorinated biphenyls (PCBs), Dioxins and Furans. Continued use of DDT is allowed until cost effective alternatives are available. The COP-4 proposed listing of nine new chemicals to the Annexes of the Convention. India has no inventory of the nine new chemicals proposed for listing under the Convention. As a Party to the Convention, India is developing National Implementation Plan (NIP) to demonstrate how the obligations under the Convention will be implemented. The NIP is expected to be submitted to the Convention Secretariat by mid 2011.

Some of the challenges identified by India's NIP are as follows:

- There is a need to revise and strengthen the existing policies and regulations to assure that the implementation process is cost-effective, efficient and institutional responsibilities are not overlapping. Sound POPs management requires a coherent, multi-sector approach, where information is transparent and easy to access.
- Information on stockpiles of POP chemicals is extremely poor requiring urgent and greater attention. The stocks are also deteriorating, posing immense risk to the environment. Information on the potentially contaminated sites is also limited.
- The PCBs management system is weak due to limited information. The disposal of PCB waste is unsound as all waste oils are sold to local enterprises for different uses. There is no dedicated manpower to monitor implementation of rules and regulations either.
- DDT, a POP pesticide, is still produced and used in vector control in India. The use of DDT in agriculture was banned by the government in 1989. Since then, it is produced and used in vector control program only. There is lack of viable alternatives to DDT on cost / benefit ratio or risk / benefit ratio. The unsound practice of disposing the expired stocks of DDT needs to be controlled. Generally, the control and enforcement mechanism that would assure the complete disposal of the DDT-contaminated materials in an environmentally sound manner is lacking. Since DDT has adverse effects on human health and the environment the GOI is ready to take measures to look for feasible alternatives to DDT.
- The current legislation does not require the adoption of BAT/BEP in the industrial sectors to reduce the releases of UP-POPs. POPs monitoring activities have not yet started in the country. Basically, there aren't any database or research results available on POPs releases in the environment and their levels in human body, animals and foodstuff. The first PCDD/Fs inventory of India developed contain important information on the releases of PCDD/Fs, which needs to be further clarified and authenticated. There are a number of sub sectors which were not considered in the first inventory preparation, due to lack of available information and/or lack of general consensus on the assumption techniques.
- Awareness amongst the concerned stakeholders and public at large on POPs is very limited.

- Updating of the inventory of the chemicals specified under Annex A, B and C of the Convention is a continuous process, therefore, needs regular updating for proper reporting. Proper management information system need to be in place for proper reporting on the implementation measures.

## **India and GEF 5 priorities**

Based on the preliminary survey of India's NIP, the GEF has sanctioned one of the two Post-NIP projects: a) Environmentally sound management and disposal of PCBs; and, b) Environmentally sound management of biomedical waste.

The proposed seven projects for the GEF 5 cycle aims to support and strengthen India's efforts in meeting its national priorities and Convention guidance with regard to the environmentally sound management of chemicals. These projects will generate both global and local environmental benefits. The overall aim of these proposed projects is to protect human health and the environment from persistent organic pollutants – the principal objective of the Convention. The proposed projects will develop strategies to establish inventories on the production, use, trade, stockpiles and wastes of, and sites contaminated by the chemicals, develop action plans, develop infrastructure, capacity building, awareness raising (the nine newly listed chemicals), to develop alternatives to DDT and technologies for environmentally sound management of plastic wastes. The long term impact of these proposed interventions is a reduction in the exposure to POPs and other PTS of humans and wildlife.

Of the three objectives identified under GEF 5 Chemicals strategy, we propose to focus on the two following objectives:

- Phase out POPs and reduce POPs releases; and,
- Pilot sound chemicals management and mercury reduction.

The following matrix presents the priority areas for India:

## Programming matrix

<b>S No</b>	<b>Project title</b>	<b>GEF Grant (In USD M)</b>	<b>Co-financing (In USD M)</b>	<b>GEF agency (ies)</b>	<b>National executing agency</b>
1	Development and promotion of non-POPs alternatives to DDT	15.0	1:4 (TBD)	UNIDO, UNEP and FAO	MoEF, Hindustan Insecticide Limited, National Malaria Eradication Program of Ministry of Health, GoI
2	Implementation of the BAT/ BEP strategies for elimination/ reduction of U POPs emissions of the priority industry sectors identified in the NIP of India	10.0	1:4 (TBD)	UNIDO and UNDP	MoEF, Steel Authority of India, National Environmental Engineering Institute
3	Management of PVC plastic waste to avoid incineration/ dumping the landfill for preventing releases of Dioxins and Furans due to burning	10.0	1:4 (TBD)	UNIDO	MoEF, Central Institute of Plastic Engineering & Technology under Ministry of Chemicals & Fertilizers, GoI
4	Removal of DDT Stockpiles and Pollution Prevention project	15.0	60.0	World Bank	MoEF
5	Supporting the Implementation of the Global Monitoring Plan for POPs in India	2.0	1:4 (TBD)	UNEP & UNIDO	MoEF
6	Development of a National Action Plan for Mercury Management in India	1.0	1:4 (TBD)	UNEP and UNIDO	MoEF
7	POPs Pesticide and Obsolete Pesticide Management	5.0	1:4 (TBD)	FAO	MoEF and other Ministries

## Concept details

### Development and promotion of non-POPs alternatives to DDT

India is the only country that produces, uses and exports DDT. India has not yet prohibited use of DDT for various reasons including socioeconomic, epidemiological and technological. The country is using it under the provisions of acceptable purpose and specific exemption of the Stockholm Convention. Due to rapid development of resistance, synthetic pyrethroids have not met with the expectations. For the proper implementation of the commitments to the Stockholm Convention, an appropriate approach is foreseen.

DDT production started in 1955 in India by M/s Hindustan Insecticide Limited (HIL), a Government of India Enterprise, the sole manufacturer of DDT and its formulation. The use of DDT in agriculture was banned by the government in the year 1989. Since then, it is used in the malaria and kala-azar vector control program only. The production of DDT was 4,495 tonnes of the active ingredient for the period 2006-07, 3,442 tonnes for 2007-08 and 3,315 tonnes for 2008-09. Since 2006, India has been exporting DDT to Mozambique, Eritrea, Botswana and Gambia. With the continued use of DDT in the country and elsewhere in the world viz. countries in Africa, the mosquitoes have developed resistance and the recommended dose of DDT no longer remain effective to combat the mosquitoes menace. Since India is the only country that remained to continue producing and using DDT in a large volume, there is an urgent need to work a phase-out strategy of DDT in the country. The projected DDT phase-out strategy is based on a multi-defensive mechanism using physical, chemical and non-chemical control strategies viz. (1) Using long lasting insecticidal nets (LLIN) in the mosquito endemic areas. The National Vector Borne Disease Control Programme (NVBDCP) of India promotes the use of LLIN in their vector control strategy. Pilot production facility for LLIN will be established. (2) The project also envisages to address the issue of supporting alternative non-POP chemical pesticides. (3) Promote the use of biologically derived pesticides as effective, safe and eco-friendly viable alternatives to DDT.

The GEF resources will finance the incremental cost of developing and promoting a more holistic and country-wide approach to address the issue and support the country in establishing viable alternatives through scaling up LLIN production capacities and promoting the application of bio- and botanical pesticides in an integrated manner. At the global level, the project will provide guidance to the developing countries in Asia and also in Africa in meeting their obligations towards introducing alternatives to DDT under the Stockholm Convention.

Global environmental benefits: The program aims at eliminating all POPs pesticides that are still in use in India and identifying alternatives to those pesticides, which may be added to the list of POPs within the foreseeable future. India is the only country that manufactures and exports DDT, therefore phasing out DDT production and leasing international trade in the country will have significant global benefits. The results and lessons learned will also be disseminated through the Regional Network of Pesticides for the Asia and Pacific (RENAP) covering 17 countries in the region.

Linkages with national priorities: Being Party, India is committed to fulfill its obligations under the Convention and has prepared its National Implementation Plan (NIP), which is under review for approval by the Government. The National Vector Borne Disease Control Programme (NVBDCP) of the Government of India is enhancing its alternative vector control strategy based on Integrated Vector Management (IVM), including the following interventions: biological control; chemical control; and environmental management to reduce the reliance of DDT in public health. The Ministry of Health and Family Welfare (MHF&W) recommended the registration of Long Lasting Insecticidal Nets (LLINs) for commercial marketing in highly malaria endemic areas.

Expected Outcomes: (i) DDT situation analysis in different malaria and Kala Azar endemic areas/states of India; (ii) Sensitization of policy planners and commitment to support alternatives to DDT; (iii) Evaluation of viable alternatives for DDT; (iv) Development and production of bio-and botanical pesticides as well as other alternatives to DDT; (v) Introduction, application and sharing of best available practices, technologies and approaches for implementation of DDT alternatives and (vi) DDT phase out strategy,

Expected Outputs: (i) Alternative technologies operational evaluated; (ii) alternative technology demonstrated; (iii) policy and regulations revised; (iv) sustainable alternatives promoted; (v) Production of bio-pesticides and botanical pesticides at commercial scale demonstrated; (vi) use of bio-pesticides as alternative to DDT promoted; (iv) use of safer eco-friendly bio-degradable pesticides increased; (v) transfer of simple, eco-friendly, low cost technology and adopted by the pesticide industry; (vi) enhanced capacity for machinery to promote agro-industries and medium and large industry in the country; and (vii) reduced health hazard particularly in respect of the resource poor farmers.

**UNIDO** is within the comparative advantage matrix set out in GEF/C.31/5. UNIDO is mandated to assist developing countries and countries on economy in transition to achieve sustainable industrial development. The organization has developed and actively implemented GEF-funded projects on industrial environmental issues where alternative, innovative and cost-effective technological solutions are required to address environmental and health problems. The proposed project will incorporate technology transfer and investment in introducing alternatives to DDT and other POPs, which clearly in the comparative advantage domain of UNIDO. UNIDO has established, developed and maintained RENPAP since 1992 and created an Agro-chemical unit promoting the production of safe and environmentally sound pesticides formulation in the developing countries. UNEP, as GEF Implementing Agency, has since recent years gained wide experience in working together with other Agencies in the field of promoting alternatives to DDT for malaria vector management. **UNEP's** work in the POPs focal area has been built on its leading role in the UN chemicals management where its expertise lies in identifying best practice approaches and tools and methods, where it works with UN organizations and others to introduce phase-out plans and environmentally sound management of chemicals. **FAO's** comparative advantage is its technical capacity and experience in agricultural development, natural resources management and climate change. FAO activities related to Management of POPs are provision of technical advice and support to the multilateral environmental agreements, including the Convention on Biological Diversity (CBD), the UN Framework Convention on Climate Change (UNFCCC), including the Kyoto Protocol, the UN Convention to Combat Desertification (UNCCD), and the Stockholm Convention on Persistent Organic Pollutants (POPs), as well as to other major international agreements and bodies. FAO has extensive knowledge and experience in assisting its member countries in management of POPs pesticide including risk evaluation and management of contaminated sites and elimination of stocks, identification of environmental friendly alternatives and promotion of Integrated Pest Management (IPM) through Farmer's Field Schools (FFS), and management of pesticides throughout their life cycle through adequate regulatory frameworks, register and management systems.

#### **Implementation of the BAT/ BEP strategies for elimination/ reduction of U-POPs emissions of the priority industry sectors identified in the NIP of India**

U-POPs (PCDDs/PCDFs, PCBs and HCB) listed in Annex C, Part I of the Stockholm Convention are unwanted chemicals that are formed in a wide range of combustion and industrial processes and are released into the air, water sediments and soils. It has been demonstrated that they have chronic, irreversible adverse effects on human health and the environment.

The objective of the element/project aims at reducing and, where feasible, eliminating UP-POPs releases by capacity building to implement BAT/BEP measures in the priority industry source categories identified in the NIP including UP-POPs monitoring. The annual PCDD/Fs inventory releases of India as presented in the NIP indicates the major contribution of PCDD/F emission is from waste incineration and ferrous and non-ferrous metal

production categories followed by heat and power generation sector. These three source categories account for 93.61 % of the total PCDD/F releases in India. According to the Action Plan, the implementation of BAT/BEP measures for elimination/reduction of U-POPs releases of priority industry sectors is one of the priorities for the implementation of the NIP in India. BAT/BEP opportunities and measures will be identified, implemented and demonstrated in selected facilities belonging to the hazardous waste incinerator sector, ferrous and non-ferrous metals industry and heat and power generation sector. The criteria for the selection of the demonstration units as well as the selection of the techniques and technologies that will be used and implemented in the demonstration units will be agreed during the preparatory work and will be clearly indicated in the full proposal. These criteria will be mainly based on the following elements: i) high level of support from the stakeholders of the industrial facility; ii) high guarantee of success of the demonstration project on the basis of technical viability and economic sustainability; iii) high guarantee of replicability of the demo results; iv) cost-effectiveness in terms of reduction of U-POPs releases to benefit health and environment protection. Experiences and lessons learnt will be provided to the SC Secretariat for further revision of BAT/BEP guidelines and guidance. The goal of the proposed project is to bring one facility for each sub-category, identified as priority source category in the NIP of India, from the current, baseline technology level to a BAT-based level.

The project is aimed at strengthening the regulatory and institutional framework for a sound implementation of the Action Plan for the reduction of U-POPs releases, to expand the analytical capacity for monitoring Annex C POPs, to establish updated emission inventory, and targeted capacity building in the BAT/BEP field. BAT/BEP measures will be identified, implemented and demonstrated in selected facilities.

Global environmental benefits: India has one of the largest economies in developing countries with a steadily growing industrial output supported by the growing local consumption and international trade.. The introduction and implementation of BAT/BEP measures for the reduction of U-POPs releases from industrial sources has a deep impact on the overall management of an industrial facility. The introduction of BAT/BEP measures, particularly in the small and medium sized enterprises and hence reduce the releases of U-POPs, will also bring significant global benefits It is an important opportunity for investment and modernization of the industry and this goes beyond the challenge posed by the U-POPs issue. The results and lessons learned will also be disseminated through the Regional Network of Pesticides for the Asia and Pacific (RENAP) covering 17 countries in the region as well as BAT/BEP Forms in East and South East Asia sub-region and Eco-town Network.

Linkages with national priorities: By becoming Party to the Convention, the Government of India has demonstrated its strong commitment towards the reduction or elimination of POPs releases as a national priority and that it is committed to take appropriate actions. India has elaborated a National Implementation Plan (NIP) to demonstrate how India's obligations to the Convention will be implemented. The NIP also details the legislative and management context as well as the technical needs for reducing and eliminating POPs. The implementation of BAT/BEP measures for elimination/reduction of U-POPs releases of priority industry sectors is one of the priorities for the implementation of the NIP in India.

Expected Outcomes: (i). Strengthening and enhancement of national regulatory and institutional framework for a sound implementation of the Action Plan for the reduction of U-POPs releases; (ii). Strengthening capacity; (iii). Introducing and promoting BAT/BEP to reduce/eliminate U-POPs releases from source categories listed in Part II and Part III of SC; (iv). Implementing BAT/BEP guidelines and guidance in selected priority source categories and (v). Assessment of the impact of the activities implemented.

Expected Outputs: (i) Review, (ii) analysis, (iii) guidelines and guidance document on BAT/BEP for selected industrial sector developed, (iv) technology transfer and investment made, (iv) building of capacity for identification and adoption of BAT and BEP, (v) technical knowledge shared and (vi) Impact evaluated

UNIDO has a clear comparative advantage on this area where technological solution are required to address environmental and health problems. The organization has successfully completed/undertaken a number of

projects to assist developing countries and countries with economies in transition to reduce POPs emissions in the industry. This project will incorporate technology transfer and investment in introducing BAT/BEP measures in the metallurgical sector, which are clearly in the comparative domain of UNIDO.

### **Management of PVC Plastic Waste to avoid Incineration / Dumping the Landfill for Preventing Releases of Dioxins and Furans Due to burning**

The consumption of plastics is increasing considerably. The annual growth rate of the petrochemical industry is 12- 15 % compare to general growth rate which is about 6- 8%. India's annual per capita consumption of plastic is 5.2 Kg where as the world average is 18 Kg. India produces around 6.0 Million tones of plastics and subsequently generates about 5.7 million tons per year of plastics wastes. As the consumption of plastic is expected to grow, the plastics waste generation will also increase from the present level of about 5.7 million tons. Almost 60% of the plastic waste generated is recycled in India where as 15-20% of plastic waste is recycled in the world. In India PVC is recycled predominantly through mechanical recycling for producing wide range of products such as foot wear, detergent bottles, drainage fittings, cable conduits, windows, sheets, profiles for buildings etc. There is no major mixed waste recycling set up and there is no major chemical/feed stock recycling plant for PVC wastes available in the country. Uncontrolled burning of chlorine containing polymers leads to release of Dioxins – trichloro di benzo dioxine (TCDD) and polychloro di benzo dioxin (PCDD). The objective is to prevent burning of PVC wastes and landfill which ultimately goes into open burning and to bring down release of dioxins and furans emanating from the unconventional burning of PVC plastic waste. The objective is to develop an environmentally sound technology for management of plastic wastes by establishing a demonstration of plant under Public Private Partnership (PPP) mode.

Global environmental benefits: The environmentally sound management of PVC Plastic wastes would reduce the burden of pollution, particularly by POPs releases from burning of PVC wastes to human health and the environment at large. Approximately 16% of the global population lives in India, representing a huge global benefit when the environment quality and human health improve. The results and lessons learned will also be disseminated through the Regional Network of Pesticides for the Asia and Pacific (RENAP) covering 17 countries in the region as well as BAT/BEP Forms in East and South East Asia sub-region and Eco-town Network.

Expected Outcomes: (i) Management through minimum or no waste release in a cluster of industries in the sector encompassing eco-town concept; (ii) energy conservation; (iii) strengthen legislation towards a sound material waste management / recycling system; (iv) material development and integrated waste management; and (v) affordable and environmentally sound recycling technologies

Expected Outputs: (i) Cluster of industries upgraded on minimum or no waste release in an eco-town manner; (ii) appropriate technology transferred and adopted; (iii) proper recycling of PVC plastic wastes for its use in fertilizer industry; and (iv) depolymerization process and into fuel as appropriate through a selection of appropriate technology.

### **Removal of DDT Stockpiles and Pollution Prevention project**

The proposed project aims at identification and clean up of selected sites contaminated by DDT stockpiles and formulation of preventive policies and measures to avoid future accumulation.

In India, DDT has been used for malaria control operations since 1946, primarily for agricultural and public health purposes. It is estimated that since 1985, about 350 thousand tons of DDT have been used in India. In 1989, India banned the use of DDT in agriculture and restricted its use in public health to 10,000 metric tons a year. It is internationally recognized that DDT usage for public health is essential, and it remains one of the key intervention

strategies for the elimination of Visceral Leishmaniasis (Kala-azar) which is prevalent in some states in India. The country is using it under the provisions of acceptable purpose and specific exemption of the Stockholm Convention, to which India is a party. As per WHO expert Committee on Malaria in 2000, DDT usage in indoor residual spraying is permissible but effective safeguards need to be put in place during use and disposal to protect human health adequately and to prevent insecticide release into the environment. In parallel, India also has a strategic phase down plan for DDT usage.

Despite the restricted usage, DDT, which is a Persistent Organic Pollutant, persists in air, water and soil samples and has also been found in aquatic and terrestrial species. Various sample studies of water and soil have identified levels of DDT exceeding 15-35% the permissible levels as prescribed by WHO. Indian dietary consumption of DDT is estimated to be amongst the highest in the world estimated at 231  $\mu$ g/person/day as compared to the allowable daily intake of 35  $\mu$ g/person/day. As is well recognized, increased POPs intake through contaminated water, crops and fish can have serious consequences on environmental and public health.

Studies undertaken by the Ministries of Health and of Environment and Forests have found high levels of DDT in soil and water samples near DDT storage sites. There is evidence of poor management of insecticides, including DDT which is allocated for use under public health programs. The systems for insecticide storage, use and disposal are inadequate and occupational practices are poor. Improper storage of DDT bags, poor disposal methods and significant stockpiles of old and obsolete DDT have been found in and around designated IRS sites. Another possible source of high DDT in tested samples could be run-off from agricultural areas indicating illegal use of DDT in agriculture, although this likelihood is low given that the Ministry of Health has established strict controls on the DDT usage.

The project is expected to meet the primary goal of the GEF in the POPs focal area of protecting human health and the environment by the environmentally sound management of POPs contaminated sites, disposal of POPs waste and prevention of future POPs waste. It will specifically meet the indicator 1.4.2 which requires quantitative measurement of obsolete pesticides which have been disposed in an environmentally sound manner.

The Government of India is increasingly recognizing that sustaining the fast pace of economic and industrial growth requires promotion of cleaner production and minimizing waste generation. The 11<sup>th</sup> Five Year Plan highlighted environmental sustainability as a key objective, with a focus on environmental governance and hazardous waste management. Attention has been paid to amending the existing laws on Hazardous and Biomedical waste and instituting new regulations for e-waste and mercury. There is strong political will to penalize non-complying and polluting industrial units and national budget has been allocated for the establishment of treatment plants for effluents and hazardous waste disposal. Funds have also been allocated for the clean-up of industrially polluted contaminated sites, in addition to the World Bank support and there is political interest in establishing a policy framework for dealing with broader environmental issues such as management of pollution, hazardous wastes and monitoring of pollutant releases pollution prevention and remediation. India ratified the Stockholm Conventions and has prepared the draft National Implementation Plan which defines a comprehensive national POPs management policy and identifies a number of activities, including phase-down of DDT usage.

It is expected that the project will focus on the following activities

- Undertake a comprehensive inventory of DDT stockpiles across the country, in collaboration with the National vector Control Directorate of Ministry of Health
- Develop a plan of action for the destruction of the existing stockpiles, comprising old and obsolete DDT stocks.
- Implement the action plan in collaboration and consultation with Directorate of Vector Borne Disease Control and its state counterparts.

- Undertake an assessment methodology for the contamination levels of these sites and develop a site clean-up plan. (This will be included for implementation in the National Program for Rehabilitation of Polluted Sites, being developed under a separate project detailed in Section VII)
- Formulate a policy for the prevention of future stockpiles and effective enforcement by regulatory authorities. (This policy will be included in the National Program for Rehabilitation of Polluted Sites, being developed under a separate project detailed in Section VII)

The activities planned under this project fit seamlessly with the following two ongoing projects of Government of India and the World Bank:

- *National Vector Borne Disease Control Project*: This project has an Environment Management Plan which prescribes critical steps needed for strengthening insecticide management used for vector control and public health activities, including recommendations for improved occupational practices, supply chain management, and usage and safe disposal of insecticides, including DDT.
- *Capacity Building for Industrial Pollution Management Project*: This project aims at the development of a policy, institutional and methodological framework for the establishment of a National Program for Rehabilitation of Polluted Sites and also supports some pilots for effective clean-up of hazardous waste and municipal dumpsites.

It is expected that this inter-sectoral collaboration through the existing projects will facilitate not only clean-up of the historical stockpile, which are the point sources of POPs pesticide contamination, but will also establish the necessary policy and institutional mechanism for the prevention of future stockpile build-up and improved management of DDT insecticides under the public health program.

The Bank's experience in India with multiple sectors and agencies will help in demonstrating an institutionally sustainable model for wider replication. It is well-placed to bring international knowledge and experience in strengthen GOI's capacity to handle a complex environmental and establish a policy framework to effectively mainstream POPs issues as a whole. Bank support will also strengthen GOI's objective in engaging and coordinating the roles of multiple stakeholders, helping bring together expertise for developing 'best practice' solutions and increasing the capacity of respective agencies.

The project is consistent with the Bank's strategic focus and Country Strategy for the period FY 2009 - 2012 which envisages support for reducing the burden that environmental degradation poses on vulnerable groups and demonstrating business models to address key environmental issues including hazardous waste management.

### **Supporting the Implementation of the Global Monitoring Plan for POPs in India**

Rationale: Article 16 of the Stockholm Convention indicates that the effectiveness of the Convention shall be evaluated four years after the date of entry into force of the Convention and periodically thereafter. The Effectiveness Evaluation consists of monitoring the presence of POPs in the environment and humans as well as their regional and global transport. The Conference of Parties (COP) has completed its first effectiveness evaluation at its fourth meeting in 2009 (COP4), and has agreed upon the essential modalities for the environmental monitoring component of the subsequent evaluations. India has not yet presented a report on POPs monitoring to the Secretariat for its inclusion in the effectiveness evaluation report. So far, in India there has not been a systematic monitoring of POPs, there may be scattered initiatives, but these are not integrated and not known. The Global Monitoring Plan (GMP) focused initially on the core media mother's milk to examine human exposure, and ambient air to examine long-range transport. The COP4 also adopted 9 new chemicals to be included in the POPs list (Decision SC-4/10-18; Annexes A, B, and C). These new chemicals adopted by COP4 will require to analyse new matrices such as human blood and water. Furthermore, the COP 4 invited the Parties to

engage actively in the implementation of the GMP and the effectiveness evaluation program, which include both initial and newly listed POPs (Decision SC-4/31). As Party to the Convention, India is eligible for application of GEF funds to strengthen the monitoring capacity at national level and so to contribute with national data to the GMP.

The global environmental benefit has to be seen in the context of the efforts of the COP to establish an effective global system for monitoring of the effectiveness of the implementation of the Stockholm Convention. The project contributes to these efforts by strengthening the monitoring capacity at national level and with this enabling Parties to contribute national data to the GMP in a regionally and internationally agreed and harmonized approach that meet the minimum requirements established for comparable data in the GMP guidance document. This data will allow to establish trends for POPs presence in the environment and in humans and will allow to identify if current global efforts are conducting to a increase or decrease of POPs emissions to the environment.

The proposed project outcomes are as follows:

1. POPs monitoring data gaps and needs in India analysed and understood enabling the development of a sound plan for POPs monitoring at nation-wide
2. Capacity built at the national level for sampling and analysis of POPs in core matrices and according to mandates and widely accepted standards
3. Capacity and performance of laboratories in analyzing all POPs assessed and enhanced at the global level
4. Government and stakeholders aware and engaged in the implementation of the GMP in India and sharing lessons learned

This project will build upon the experiences in the global UNEP/GEF Pilot Project on “Assessment of Existing Capacity and Capacity Building Needs to Analyse POPs in Developing Countries” and on the ongoing projects on Global Monitoring of POPs in Latin America and Caribbean, South-East Africa, West Africa and Pacific. Lessons learned and good practices from this project reflecting now the aspects of a sub-continent approach will be identified and shared with other partners. Results will be shared through the GMP coordination processes led by the Stockholm Convention Secretariat and UNEP Chemicals. The meetings of the Conference of the Parties to the Stockholm Convention have been identified as places where the results of this project can be shared and presented.

UNEP DTIE Chemicals has the technical expertise and the cooperation with expert laboratories and developing country laboratories and stakeholders in place through the on-going projects. UNEP DTIE Chemicals will work in close cooperation and in consultation with the groups and activities that are already operating under the coordination of the Secretariat of the Stockholm Convention such as Global Coordination Group, Regional Organisation Groups, or GMP Expert Group. In this project UNEP will assist India to identify and apply international standards and policies to conduct monitoring of POPs in India. UNEP is mandated to develop and/or identify international standards and policies for issues of global concern. The UNEP’s biennial programme and support budgets for 2010-2011 includes in Output (c) 3 of the Harmful Substances and Hazardous Waste Subprogramme, the development, testing and transferring of tools and methodologies for monitoring and controlling chemicals and waste covered by multilateral agreements. Furthermore, in its biennial programme of work and budget for 2012-2013, UNEP still supports the development of control systems and policies being implemented to meet international obligations with regard to harmful substances and hazardous wastes, as indicated in output (c) 3 of the Harmful Substances and Hazardous Waste Sub-programme.

### **Development of a National Action Plan for Mercury Management in India**

Rationale: UNEP Governing Council decision 25/5, adopted in February 2009, requests UNEP Executive Director to convene an intergovernmental negotiating committee with the mandate to prepare a global legally binding instrument on mercury. GC Decision 25/5 mandates the intergovernmental negotiating committee to develop a comprehensive and suitable approach to mercury, including provisions to increase knowledge through awareness-

raising and scientific information exchange and to specify arrangements for capacity building and technical and financial assistance. Furthermore, GC Decision 25/5 requests UNEP Executive Director to coordinate, inter-alia, the enhancement of national inventories on mercury and to raising public awareness and support risk communication. The Intergovernmental Negotiating Committee at its first meeting (INC-1) took place in June 2010 in Stockholm, Sweden. During that meeting country representatives indicated that effective implementation of a new global legally binding instrument would require capacity building and technical and financial assistance. This project will be the first inventory project of mercury in India, which will provide demonstration experiences to contribute to explore the overall inventory of mercury in India, add developing country information to the review and updating of the Mercury Toolkit, and to strengthen and improve India's national management capacity of mercury pollution control. India has no national inventory of mercury releases; there is a lack of experience in performing mercury inventories and that there is no data on monitoring of mercury in the environment and in human health.

Mercury is a metal that occurs naturally and cannot be destroyed. It occurs in different forms and exhibits characteristics such as persistence in the environment and humans, certain forms are bioaccumulative and can have a significant impact on human health and the environment. Mercury's inherent property of long-range transport makes mercury a global threat and a pollutant of global concern. The different uses of mercury require a joined effort to manage mercury nationally and internationally. Inadequate management of mercury releases may result in an elevated risk for human health and the environment around the world.

India's efforts to mercury releases may be analysed within the context and magnitude that it represents at the global scale. Significant reduction of mercury releases in India may result in a significant reduction of mercury releases in the world. Through this project India will develop a preliminary assessment of mercury releases and will develop a detailed action plan to decrease mercury releases in main sectors involved in mercury management. This work will also allow India to incorporate mercury into appropriate national management system on this basis, to provide basic data and decision to further control measures, and then carry out control and management over mercury through the four categories of measures, including: Environmental quality standards, source activities and management for the control of mercury emission into the environment, and other standards, actions and projects.

This project will also support the efforts made by the Intergovernmental Negotiating Committee (INC) to develop a legally binding instrument on mercury. During INC-1, the committee was requested to report on the global situation of mercury management and to analyze the available data in relevant sectors (mercury source categories) at the national level.

The proposed project outcomes are as follows:

1. Partnership developed with key sectors involved in mercury management to understand mercury level and to achieve mercury reductions
2. Analytical and monitoring capacity for mercury reinforced and able to carry out sampling and analysis of environmental and human samples
3. Long-term strategy for mercury reduction facilitated through the development of a sound national plan of action for mercury management
4. Good practices and lessons learned identified and available for use

This project will share India's experiences in using the mercury inventory toolkit with other Parties. It will also allow India to identify and share with Parties lessons learned and to summarise experiences in one final report, to be made available to countries and to UNEP and GEF. Project outcomes will be presented in workshops organised by UNEP or GEF Secretariat and the Mercury Negotiating Committee. This project is the pioneer in the mercury inventory in pilot regions and industries in India and will serve as a basis for further studies or works involving mercury releases and mercury pollution control.

India is actively participating in the INC negotiations and is ready to provide information to support the negotiations. India's political willingness to participate in international efforts to address mercury issues demonstrates the level of commitment of the government.

This project is in line with GEF Focal Area Strategy CHEM-3: Pilot sound chemicals management and mercury reduction. In India nearly all 10 categories and 44 sub-categories, indicated in the Toolkit for Identification and Quantification of Mercury Releases of the UNEP Mercury Toolkit are present.

This project is also in line with UNEP's Medium Term Strategy, especially focusing on priority 5 with the objective to minimize of impact of harmful substances and hazardous waste on the environment and human health. India is one of the largest producer and consumer of mercury in the world; therefore dealing with mercury in India is considered as one of the world priorities. This project will also provide the tools and means to prioritize mercury in the environmental agenda in India. It will also provide valuable information to the intergovernmental negotiating committee on mercury to assess the global situation on mercury and to design a sound programme for mercury reduction.

UNEP is leading the international negotiations on mercury. UNEP has developed the first version of the toolkit for the development of mercury inventories and has been mandated to update it through pilots.

UNEP is the UN body mandated: (i) to identify issues of global environmental concern where international action may be warranted; (ii) to aid the negotiation of international agreements; and (iii) to support their implementation. Consequently, UNEP hosts the majority of MEA secretariats. With regard to mercury, UNEP is leading the negotiations on mercury and is working very closely with the key actors involved in drafting the legally binding instrument. UNEP is also working with partners in the field looking to mitigate the effects of mercury use/handling and developing best disposal options.

### **POPs Pesticide and Obsolete Pesticide Management**

Estimates suggest that more than 3000 tonnes of obsolete, banned and unwanted Persistent Organic Pollutants (POPs) and other pesticides plus related wastes (contaminated soils, old pesticide containers and contaminated application equipment) are present with Government agriculture agencies in India plus an unknown amount of similar waste held at farmer and pesticide distributor level. The Government of India is aware of the risks posed by stocks of POPs obsolete, and unwanted pesticides and is looking for the technical assistance on developing strategies for the environmentally sound management (ESM) of these materials.

The project will support the Government of India in the development and implementation of management systems for POPs pesticides and obsolete pesticides based on FAOs comparative advantage in pesticide life-cycle management. The project will provide a template which can be replicated in other chemical sectors and so assist India in the overall drive to improve chemicals management as promoted through international initiatives such as SAICM. The project will link with the series of on-going initiatives on POPs pesticides in India including the UNEP project on promotion of alternatives to DDT and also to other POPs projects proposed in the GEF 5 portfolio.

The proposed project outcomes are:

- An effective Pesticide Stock Management System established
- Updated inventory of PoPs and other obsolete pesticides along with a registry of contaminated sites across the country made
- Progressive and time-bound elimination of stocks with a risk based action plan and responsibilities framed up
- A set of new and revised regulations and guidelines prepared concerning key aspects of the pesticide lifecycle management
- Environmental Management Tool Kit for pesticides adopted

- National capacities on all aspects of pesticide management enhanced
- Communication strategies developed to disseminate policy and technical information derived from the project to farmers and other stakeholders.

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